

Daniel Cardoso Llach

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Education

2007-12 Ph.D. in Architecture: Design and Computation.
Massachusetts Institute of Technology, Cambridge, US.
School of Architecture and Planning. Presidential Fellow.

2005-07 Master of Science in Architectural Studies (SMArchS): Design and Computation.
Massachusetts Institute of Technology, Cambridge, US.
School of Architecture and Planning. Best Thesis Award.

1997-01 Professional Bachelor of Architecture.
Universidad de los Andes, Bogotá, Colombia.

Academic Appointments

Faculty Positions

2019 Associate Professor in Architecture: Computational Design at Carnegie Mellon University School of Architecture, Pittsburgh, US.

2016- Assistant Professor in Architecture: Computational Design at Carnegie Mellon University School of Architecture, Pittsburgh, US.

2015-2016 Special Faculty in Architecture: Computational Design at Carnegie Mellon University School of Architecture, Pittsburgh, US.

2012-2015 Assistant Professor in Architecture: Design Computing at Penn State Department of Architecture, University Park, US.

2002-2005 Instructor in Architecture, Universidad de los Andes, School of Architecture and Design, Bogotá, Colombia.

Fellowships & Scholarly Visits

2016 Visiting Scholar at the Martin Centre for Architectural and Urban Studies, Department of Architecture, University of Cambridge, Cambridge, UK. Jan-Aug.

2016 Research fellow at the Institute for the Advanced Study of Media Cultures of Computer Simulation (MECS), Leuphana Universität, Lüneburg, Germany. Apr-May.

Teaching & Research Assistantships

2006-2012 Massachusetts Institute of Technology, School of Architecture and Planning, Department of Architecture Design and Computation Group, Digital Design and Fabrication Group, Mobile Experience Laboratory. Cambridge MA, US.

2001-2002 Universidad de los Andes, School of Architecture and Design Research Center (Centro de Investigaciones de la Facultad de Arquitectura y Diseño, CIFAD), Bogotá, Colombia.

University Service

Carnegie Mellon	University	University Non-tenure committee 2020-21 University Doctoral Mentoring Working Group 2019 University Senator 2017-2019.
	Department	Track Chair of the MS in Computational Design 2015-, Computational Design Laboratory Codirector 2015-, Chair of the SoA Graduate Programs Committee 2016-19
Penn State	University	Presidential Commission for Racial and Ethnic Diversity 2013-15,
	College	College Faculty Advisory Council 2013, Chair of the Stuckeman Center for Design Computing (SCDC) Executive Committee 2014-2015, Stuckeman School Director Search Committee 2013,
	Department	Graduate Curriculum Committee 2014-15, Graduate Admissions Committee 2014, Technology Committee 2012, Design Computing Research Cluster Curriculum 2013-15, “Beehive” Faculty Advisor 2013-15.
MIT	Department	Design and Computation program Admissions Committee.
Universidad de los Andes	Department	Department of Architecture, Publications and Media Office Digital Publications 2002-05.

Refereed Publications

Books	2015	Daniel Cardoso Llach , <i>Builders of the Vision: Software and the Imagination of Design</i> (New York and London: Routledge, 2015).
Edited Collections	2020	Daniel Cardoso Llach , and Andres Burbano, eds. <i>Other Computations: Digital Technologies for Architecture from the Global South</i> . Special Issue of Dearq, Vol. 27, 2020. https://revistas.uniandes.edu.co/toc/dearq//27 .
	2010	Rafael Villazón, Daniel Cardoso Llach , and Leonardo Parra, eds., <i>SIGraDi 2010: Proceedings of the 14th Congress of the Iberoamerican Society of Digital Graphics</i> (Uniandes, 2010).
Book Chapters	2021	Daniel Cardoso Llach . “Sculpting Probabilistic Spaces: Brief History and Prospects of Machine Learning in Design.” In <i>The Routledge Companion to Artificial Intelligence in Architecture</i> , 1st ed. Routledge, 2021 (in press).

- 2019 **Daniel Cardoso Llach**, “Tracing Design Ecologies” in *DigitalSTS: A Handbook and a Fieldguide*, ed. Janet Vertesi and David Ribes, (Princeton University Press: 2019).
- 2018 **Daniel Cardoso Llach**, “Data as Interface: The Poetics of Machine Learning in Design” in *Machine Learning – Medien, Infrastrukturen und Technologien der Künstlichen Intelligenz*, eds. Christoph Engemann and Andreas Sudmann ([transcript-verlag]).
- 2017 **Daniel Cardoso Llach**, “Architecture and the Structured Image” in *Imagery in the Age of Modelling: Operative Artifacts in the Design Process in Architecture and Engineering*, ed. Sabine Ammon and Inge Hinterwaldner (Springer: 2017).
- 2010 **Daniel Cardoso Llach**, “Scripts in the Architecture Studio,” in *Computational Constructs: Architectural Design, Logic and Theory*, ed. Josh Lobel and Shouheng Cheng (Shanghai: 2010) 180–90.
- 2020 Liu, Jingyang, Yi-Chin Lee, and **Daniel Cardoso Llach**. “Computational Design and Fabrication of Highly Customizable Architectural Space Frames: Making a Flat-Cut Weaire-Phelan Structure.” *International Journal of Architectural Computing*, August 21, 2020, 1478077120949033. <https://doi.org/10.1177/1478077120949033>.
- Cardoso Llach, Daniel**, and Andrés Burbano. “Other Computations: Digital Technologies for Architecture from the Global South.” *Dearq*, no. 27 (July 10, 2020): 6–19. <https://doi.org/10.18389/dearq27.2020.01>.
- Lee, Yi-Chin, and **Daniel Cardoso Llach**. “Hybrid Embroidery: Exploring Interactive Fabrication in Handcrafts.” *Leonardo* 53, no. 4 (July 1, 2020): 429–33. https://doi.org/10.1162/leon_a_01931.
- 2019 **Cardoso Llach, Daniel**, and Mine Ozkar. “Cultivating the Critical Imagination: Post-Disciplinary Pedagogy in a Computational Design Laboratory.” *Digital Creativity* 30, no. 4 (October 2, 2019): 257–76. <https://doi.org/10.1080/14626268.2019.1691604>.
- 2017 **Daniel Cardoso Llach** and Robin Forrest. “Of Algorithms, Buildings and Fighter Jets: A Conversation with Robin Forrest.” *Arq: Architectural Research Quarterly* 21, no. 1 (March 2017): 53–64. <https://doi.org/10.1017/S1359135517000173>.
- Andrew Viny, Avanti Dabholkar, and **Daniel Cardoso Llach**. “Two Design Experiments in Playful Architectural Adaptability.” *Nexus Network Journal* (July 11, 2017): 1–15. <https://doi.org/10.1007/s00004-017-0350-z>.
- Daniel Cardoso Llach**, Ardavan Bidgoli, and Shokofeh Darbari. “Assisted Automation: Three Learning Experiences in Architectural Robotics.” *International Journal of Architectural Computing (IJAC)* 17 (March 1, 2017): 87-102.
- 2015 **Daniel Cardoso Llach**, “Software Comes to Matter: Towards a Material History of Computational Design,” *DesignIssues* 31, no. 3 (Summer 2015): 41–55, doi:10.1162/DESI_a_00337. (Version of *Builders*, Ch. 3.)
- 2013 **Daniel Cardoso Llach**, “Algorithmic Tectonics: How Cold War Era Research Shaped Our Imagination of Design,” *AD Architectural Design: Computation Works* 83, no. 2 (March 12, 2013): 16–21 (not blind).

- 2012 **Daniel Cardoso Llach**, “Esclavos Perfectos: Breve Historia de La Ciber-Arquitectura En MIT (1959-1967),” *Dearq*, no. 10 (August, 2012): 48-59.
- 2011 **Daniel Cardoso Llach**, “Inertia of an Automated Utopia: Design Commodities and Authorial Agency 40 Years after the Architecture Machine,” *Thresholds*, no. 39 (July, 2011): 39–44.
- 2010 **Daniel Cardoso Llach**, “Shift+Design: Scripts and Other Design Artifacts,” *International Journal of Architectural Computing (IJAC)* 8, no. 1 (January 1, 2010): 17–28, doi:10.1260/1478-0771.8.1.17.
- 2009 **Daniel Cardoso Llach** and Remei Capdevila Werning, “Arquitectura, diseño y computación,” *Dearq* 1, no. 4 (2009): 136–40.

Refereed Conferences

Papers

- 2020 Fang, Zhihao, Yuning Wu, Ammar Hassonjee, Ardavan Bidgoli, and **Daniel Cardoso Llach**. “Towards a Distributed, Robotically Assisted Construction Framework.” In *Distributed Proximities* (Association for Computer Aided Design in Architecture, ACADIA, Online, 2020).
- Burgess, Cameron, Maayan Albert, **Daniel Cardoso Llach**, and Dan Lockton. Stamper: An Artboard-Oriented Creative Coding Environment. In *CHI EA '20: Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems*. <https://doi.org/10.1145/3334480.3382994>
- Cardoso Llach, Daniel**, Jingyang (Leo) Liu, and Yi-Chin Lee. “Algotecton.” In ACM SIGGRAPH 2020 Art Gallery, 455–56. SIGGRAPH 2020. New York, NY, USA: Association for Computing Machinery, 2020. <https://doi.org/10.1145/3386567.3388563>
- Ulberg, Erik, Daragh Byrne, and **Daniel Cardoso Llach**. “Hand-Crafting Neural Networks for Art-Making.” In *Proceedings of the 11th International Conference on Computational Creativity (ICCC'20)*, 508–11. Coimbra (Virtual), 2020. <http://computationalcreativity.net/iccc20/papers/168-iccc20.pdf>.
- 2019 Bidgoli, Ardavan, Eunsu Kang, and **Daniel Cardoso Llach**. “Machinic Surrogates: Human-Machine Relationships in Computational Creativity.” In *Proceedings of the 25th International Symposium on Electronic Arts (ISEA)*, 153–59. Seoul, Korea, 2019. <http://arxiv.org/abs/1908.01133>
- Rhee, Jinmo, **Daniel Cardoso Llach**, and Ramesh Krishnamurti. “Context-Rich Urban Analysis Using Machine Learning: A Case Study in Pittsburgh, PA.” In The 37th Conference on Education and Research in Computer Aided Architectural Design in Europe, 343–52. Porto, 2019. https://doi.org/10.5151/proceedings-ecaadesigradi2019_550.
- Cardoso Llach, Daniel**, and Javier Argota Sánchez-Vaquerizo. “Design, Ecologies, Networks: Exploring the Data of Computational Design.” In *Hello, Culture* (CAAD Futures, Daejeon, Korea, 2019).

Cardoso Llach, Daniel, and Scott Donaldson. “An Experimental Archaeology of CAD: Using Software Reconstruction to Explore Early Computer-Aided Design Technologies.” In *Hello, Culture* (CAAD Futures, Daejeon, Korea, 2019).

Argota Sánchez-Vaquerizo, Javier, and **Daniel Cardoso Llach**. “The Social Life of Small Urban Spaces 2.0.” In *Hello, Culture* (CAAD Futures, Daejeon, Korea, 2019).

Ferrando, Cecilia, **Daniel Cardoso Llach**, Niccolo Dalmaso, and Jiawei Mai. “Using Machine Learning to Analyze Architectural Traditions.” In *Hello, Culture* (CAAD Futures, Daejeon, Korea, 2019).

2018 Lu Han and **Daniel Cardoso Llach**, “Ludi: A Concurrent Physical and Digital Modeling Environment,” in *Learning, Adapting, Prototyping* (Association for Computer-Aided Architectural Design Research in Asia Conference - CAADRIA, Beijing, China, March 2018).

2016 **Cardoso Llach, Daniel**, Ardavan Bidgoli, and Shokofeh Darbari, “Of Hands and Robots: Creativity and Learning in Architectural Robotics Pedagogy,” in *Creating a Sustainable Ecosystem for Making in Education* (FabLearn Conference, Stanford University, 2016).

Avanti Dabholkar and **Daniel Cardoso Llach**. “Biometrically-Responsive Architecture: Mapping Biometric Data to Dynamic Spatial Change,” in *Architecture In-Play International Conference Proceedings* (Architecture In-Play, Instituto Universitario de Lisboa, 2016).

Andrew Viny and **Daniel Cardoso Llach**, “[Yours]: Distributing Design Agency through Multi-Modal Interactors,” in *Architecture In-Play International Conference Proceedings* (Architecture In-Play, Instituto Universitario de Lisboa, 2016).

Vina Rahimian, Lisa Iulo, and **Daniel Cardoso Llach**, “Participatory Energy Management in Building Networks” in *The First International Symposium on Sustainable Human-Building Ecosystems Proceedings* (Carnegie Mellon University, 2015).

2015 Ardavan Bidgoli and **Daniel Cardoso Llach**, “Towards a Motion Grammar for Robotic Stereotomy,” in *Emerging Experiences in the Past, Present and Future of Digital Architecture* (Association for Computer-Aided Architectural Design Research in Asia - CAADRIA, Kyungpook National University, Daegu, Republic of Korea. 2015).

2014 **Cardoso Llach, Daniel** “Aedificatoria Binaria: On the Cold War Invocation of Alberti’s Ghost,” in *What’s the Matter: Materiality and Materialism at the Age of Computation* (ENHSA, EAAE, COAC, Barcelona, Spain, 2014).

Daniel Cardoso Llach et al., “Acacia: A Simulation Environment for the Design and Analysis of Highly Responsive Building Facades,” in *Proceedings of the 5th Annual Symposium on Simulation for Architecture and Urban Design - SimAUD* (Tampa, FL, 2014): 193-200.

Seoug Oh, Veronica Patrick, and **Daniel Cardoso Llach**, “Typologies of Interaction in Architectural Space,” in *Proceedings of the 5th Annual Symposium on Simulation for Architecture and Urban Design - SimAUD* (Tampa, FL, 2014): 65-72.

- 2009 **Cardoso Llach, Daniel** Avni Argun, Dimitar Dimitrov, Qi Ai, “Drawing Transparencies: Responsible Responsiveness in Spaces Through Organic Electrochromism,” in *Computation: The New Realm of Architectural Design* (eCAADe Conference, Istanbul, Turkey, 2009): 83–88.
- Cardoso Llach, Daniel** “Generative Craft: A Brief Critical Inquiry into Design Automation and Design Automata” in *From Modern to Digital: The Challenges of a Transition* (SIGraDi Conference, Universidade Presbiteriana Mackenzie, Sao Paulo, 2009): 288-290,
http://cumincades.scix.net/data/works/att/sigradi2009_948.content.pdf.
- 2008 **Daniel Cardoso Llach**, “Design and the Automated Utopia: Certain Assumptions in Digital Design Culture,” in *What Matters? Proceedings of the First International Conference on Critical Digital*, (Critical Digital Conference, Harvard University, 2008).
- Daniel Cardoso Llach** and Lawrence Sass, “Generative Fabrication,” in *Proceedings of the Third International Conference on Design Computing and Cognition* (Design Computing and Cognition '08, GeorgiaTech, Atlanta: Springer, 2008): 713–32,
http://dx.doi.org/10.1007/978-1-4020-8728-8_37.
- 2007 **Daniel Cardoso Llach**, Dennis Michaud, and Lawrence Sass, “Soft Façade: Steps into the Definition of a Responsive Facade for High-Rise Buildings,” in *Predicting the Future* (eCAADe Conference, Frankfurt, 2007): 567–73.
- Lawrence Sass, Dennis Michaud, and **Daniel Cardoso Llach**, “Materializing a Design with Plywood,” in *Predicting the Future* (eCAADe Conference, Frankfurt, 2007): 629-636.
- 2006 **Daniel Cardoso Llach**, “Controlled Unpredictability: Constraining Stochastic Search as a Form-Finding Method for Architectural Design,” in *Proceedings of the 10th Iberoamerican Congress of Digital Graphics* (Sigradi Conference, Santiago de Chile, Chile, 2006): 263-267.
- 2020 **Cardoso Llach, Daniel**, “Reconstruction, Emulation, Speculation: Methodological Provocations into the Sociotechnical History of Computer-Aided Design.” In *Locating and Timing Matters: Significance and Agency of STS in Emerging Worlds* — Society for Social Studies of Science Annual Meeting, Prague, August 18, 2020
- Cardoso Llach, Daniel**, “City as Software: Designing the ‘Civil-Industrial Complex’ at Carnegie-Tech, 1969-1975.” In History of Science Society Conference, Virtual Forum, October 6, 2020.
- Cardoso Llach, Daniel** and Andres Lombana Bermudez, “Paisajes Distantes.” In International Conference of Computational Creativity ICC3’20, Coimbra (Virtual), September 7-11, 2020.
- 2019 **Daniel Cardoso Llach**, “Design and STS: Challenges and Opportunities for Pedagogy in a Post-Disciplinary Laboratory,” (*Innovations, Interruptions, Regenerations* – Society for Social Studies of Science Annual Meeting, New Orleans, LA, September 4, 2019.)

Unpublished
conference
presentations

Daniel Cardoso Llach, “Software as Narrative, City as Syntax,” (*Innovations, Interruptions, Regenerations* – Society for Social Studies of Science Annual Meeting, New Orleans, LA, September 4, 2019.)

- 2018 **Daniel Cardoso Llach**, “Architectural Scientists in the Steel City: Computing Urban Form at Carnegie Mellon’s Institute for Physical Planning, 1968-1974.” (Society for the History of Science Conference, SHOT, Seattle, WA, Nov. 3, 2018).
- 2017 **Daniel Cardoso Llach**, “Plexes and Patches: Ambivalent Artifacts of Computer-Aided Design,” in organized panel “The Valence of Misplaced Concreteness” in *STS (In)Sensibilities* (4S: Society for the Social Studies of Science, Boston, September 2017).
- Daniel Cardoso Llach**, “Software Comes to Matter: An Episode in the Material History of Computational Design,” in *Command Lines: Software, Power and Performance* (Meeting of the Special Interest Group Computers, Information and Society SIGCIS, Computer History Museum, Mountain View, CA, March 18-19 2017).
- 2016 **Daniel Cardoso Llach**, “Between Automated Utopia and Augmented Practice: Steve Coons’s CAD, and the early future of Computational Design.” In *Disciplines in Transition* panel (3 Societies Meeting, Edmonton, Canada, June 2016).
- 2014 **Daniel Cardoso Llach**, “The Architect’s Bargain: Building the Bilbao Effect in the Abu Dhabi Desert,” in *Industries of Architecture: Relations, Process, Production* (Industries of Architecture Conference, University of Newcastle, Newcastle, UK, 2014).
- 2013 **Daniel Cardoso Llach**, “Design Conflicts: Visualizing Collective Agency in BIM” in *4S Annual Meeting* (4S: Society for the Social Studies of Science, San Diego, CA, 2013).
- Daniel Cardoso Llach**, “Seeking a Lingua Franca: Images of Building Information Modeling” in *Operative Artifacts: Imagery in the Age of Modeling Conference* (University of Basel, Switzerland, 2013).
- 2010 **Daniel Cardoso Llach**, “The Poetics of Automation: Conceptions of Human and Non-Human Agency in Design,” in *4S Annual Meeting* (4S: Society for the Social Studies of Science, University of Tokyo, 2010).
- 2009 **Daniel Cardoso Llach**, “New Geography of Design” in *European Conference of Computation and Philosophy* (IACAP, Barcelona, 2009).
- 2008 **Daniel Cardoso Llach** and Takehiko Nagakura, “The Melnikov Grammar” in *3A International Conference of Computer Graphics and Artificial Intelligence* (Athens, 2008). Not presented in person.
- 2004 **Daniel Cardoso Llach**, “Information Surfaces: Architecture as a multimedia practice.” in *COVIRARQ* (Caracas, Venezuela, 2004). Not presented in person.
- 2018 Javier Argota Sánchez-Vaquerizo and **Daniel Cardoso Llach**. “Tracing Design Ecologies: A Networks Perspective.” In *Eight International Conference on Design Computing and Cognition* (DCC ’18, Milan, Italy, Jun 30-Jul 1 2018).

Poster
Sessions

- 2017 **Cardoso Llach, Daniel.** “Tracing Design Ecologies: Trees, Maps, Fields, Networks.” In *4S Annual Meeting* (4S: Society for the Social Studies of Science, Boston, MA, 2017.) http://www.4sonline.org/md17/post/tracing_design_ecologies

Other Major Publications

Essays and Reviews

- 2020 **Cardoso Llach, Daniel.** “Between Accident and Control: Contrasting Traditions of Computational Design.” In *WWW Drawing: Architectural Drawing from Pencil to Pixel*, edited by Mehrdad Hadighi and Janet Abrams. Barcelona: ACTAR Publishers, 2020.
- Cardoso Llach, Daniel.** “Unruly Bits.” URBAN OMNIBUS - Digital Frictions (December 4, 2019). <https://urbanomnibus.net/2019/12/unruly-bits/>
- 2018 **Daniel Cardoso Llach.** 2018. “Reconstructing ‘Sketchpad’ and the ‘Coons Patch’: Toward an Archaeology of CAD.” *Leonardo* 51 (4): 429–30.
- 2017 **Daniel Cardoso Llach** and Nida Rehman, “Functional Utopias: Interrogating Latin America’s New Modernisms,” *Urban Flux: Architecture Magazine: The New Future of Colombian Architecture*, no 16. (2017).
- 2012 Nida Rehman and **Daniel Cardoso Llach**, “The Manhattan Promenades,” in *By the City / For the City: An Atlas of Possibility for the Future of New York*, 1st ed. (New York: Mult, 2012), 296–97.
- 2012 **Daniel Cardoso Llach**, “Lessons on Realarchitektur: The ‘Bosque de La Esperanza’ by Giancarlo Mazzanti and the Social Moment of Colombian Architecture,” *Cuadernos de Vivienda Y Urbanismo* 5, no. 9 (June 2012): 142–56. Reviewed Building: “Bosque de La Esperanza” by Giancarlo Mazzanti.
- 2011 **Daniel Cardoso Llach**, “La vanguardia es así: ansiedades paramétricas en *From Control to Design*,” *Dearq*, no. 8 (July 2011): 153–55. Reviewed Book: Michael Meredith et al., *From Control to Design: Parametric/ Algorithmic Architecture* (Actar, 2008).
- 2002 **Daniel Cardoso Llach**, “Blur: La Construcción de La Nada,” *Piedepágina*, March 2005. Reviewed book: Ricardo Scofidio, *Blur: The Making of Nothing* (Harry N. Abrams, 2002).

Course-books

- 2015 **Daniel Cardoso Llach**, ed. *Fall 2015 Thesis Studio*. (Carnegie Mellon University School of Architecture, 2015).
- Daniel Cardoso Llach** et al, *Exploring Algorithmic Tectonics: A Course on Creative Computing in Architecture and Design* (University Park: SCDC Press, 2015).
- 2010 **Daniel Cardoso Llach**, *Hello (3D) World: An Introduction to Geometry Automation using RhinoScript*, 2010 (Course materials for Computational Design workshops).

Catalogues and event booklets

- 2017 **Daniel Cardoso Llach**, ed. *Computational Design: Practices, Histories, Infrastructures*. Event catalogue for organized symposium at Carnegie Mellon, School of Architecture, hosted by the STUDIO for Creative Inquiry.

- 2017 **Daniel Cardoso Llach**, ed. *Designing the Computational Image, Imagining Computational Design*. Exhibition catalogue for curated exhibition at the Miller Gallery, Carnegie Mellon University.
- 2015 **Daniel Cardoso Llach**, ed. *Design Across Boundaries: An Event and a Conversation about Transdisciplinary Design Practices* (University Park: SCDC Press, 2015). Event catalogue for organized symposium at Penn State, Stuckeman School of Architecture and Landscape Architecture.
- 2014 **Daniel Cardoso Llach**, *Responsive Architectures: A Report of the Design Ecologies Research Group* (University Park: SCDC Press, 2015).

Exhibitions

As lead
curator

- 2021 “Vers un imaginaire numérique” (Towards a Digital Imaginary). Centre de Design, Université de Québec aux Montréal. September-November 2021 (forthcoming).
- 2017 “Designing the Computational Image, Imagining Computational Design.” Miller Gallery, Carnegie Mellon University. September-November 2017.

As exhibitor

- 2020 SIGGRAPH 2020 Art Gallery, Washington DC, 17-28 August, 2020. Curated by Nik Apostolides. On display: “Algotecton” generative fabrication installation created with students Jingyanyg Liu and Yi-Chin Lee.
- “The Architecture Machine” at Architekturmuseum der TUM, Munich, Germany. Curated by Teresa Fankhänel. On display: Interactive software reconstruction of “Sketchpad” created with Scott Donaldson and Emek Erdolu. Feb-Jun 2020.
- 2019 “At the Heart of the Work: The Electronic Computer at Carnegie Mellon.” Curated by Mary Catharine Johannsen. May 1-30. On display: Interactive software reconstruction of Chris Yessios’ “Computer-Implemented Site Planning (CISP)” created with Harshavardan Kedia and Erik Ulberg.
- 2018 “Original Narratives,” SIGGRAPH 2018 Art Gallery, Vancouver, Canada, August 12-16, 2018. Curated by Andres Burbano. On display: “An Archaeology of CAD: Reconstructing ‘Sketchpad’ and the ‘Coons’ Patch.”
- “Composites Challenge Exhibition,” AIA Convention, New York, June 21-23, 2018. On display: Tutored work by two “Fundamentals of Computational Design” student teams.
- 2017 “Designing the Computational Image, Imagining Computational Design.” Miller Gallery, Carnegie Mellon University. September-November 2017. On display: “An Archaeology of CAD: Reconstructing ‘Sketchpad’ and the ‘Coons’ Patch.”
- 2011 Future New York: Archiprix 2011 Workshop Exhibition at the Solomon R. Guggenheim Museum, 1071 5th Avenue (at 89th Street), New York, NY, Jul 7. On Display: student work from tutored Archiprix Workshop. Co-instructor: Nida Rehman.
- Future New York: Archiprix 2011 Workshop Exhibition
Center for Architecture, 536 Laguardia Place, Manhattan, NY, Jul 8.

On Display: student work of tutored Archiprix Workshop.
Co-instructor: Nida Rehman

- 2010 MACHINIC PROCESSES: Architecture Biennial Beijing 2010; 798 Space, 798, Beijing, Oct. 15 - Oct. 20, 2010; curators: Neil Leach, Xu Weiguo; on display: Tutored student work from scripting workshops in Lima, Peru, and Santiago, Chile. Co-instructors: Kenfield Griffith and John Snavely
- 2008 Voronoi Pavilion (Universidad Peruana de Ciencias Aplicadas, Lima, Perú, 2008). Scripted and digitally fabricated studio projects exhibition space. Roles: Workshop instructor, RhinoScript programmer and design consultant with lead designers Natalija Bojlsakov and Brian Miller.

Other contributions

Invited Lectures

Keynotes

- 2020 Universidad de los Andes, Bogota, Colombia. Department of Architecture Inaugural Talks. "Sculpting Expressive Spaces: Overview and New Directions for Computational Design." Aug 14.
- 2017 Universidad del Valle, Cali, Colombia. IV Seminario de la Representación del Proyecto: Sostenibilidad y Medio Ambiente. "Design at the Interface: Notes on Computation and Creativity." Nov 8.
- Humboldt Universitat zu Berlin, Germany. CAx: Dimensions of Computer-Aids in Architecture, Biological Sciences, Design and Medicine. "Slaves, Partners, Aides: Imagining Computers in Design and Architecture." Apr 2.
- 2016 Universidad Piloto, Bogotá, Colombia. Digital Reveal Conference. "Builders of the Vision." Sep 1.

Guest Lectures

- 2020 Architekturmuseum der TUM speaker series linked to the exhibition "The Architecture Machine." Talk: "Experimental archaeology of computer-aided design" followed by an interview with Philip Schneider. Munich, Nov 25.
- Ink & Switch Lunch-time Lecture: "Software reconstructions, emulations, and speculations." Sep 17.
- 2019 University of Michigan, Taubman School of Architecture Lecture Series joint with the STS Department. Talk: "Working things out: Design-STS transitions from technical formalization to critical imagination." Ann Arbor, Nov 4.
- Harvard University, Graduate School of Design. Talk: "Laborious computers: making and unmaking 'perfect slaves' in the architectural imaginary" in the symposium 'Other Histories of the Digital' organized by Matthew Allen, Phillip Denny, and Christina Shivers. Cambridge, MA Apr 2.
- Clemson University, Department of Architecture Lecture Series. Talk: "Design at the Interface." Clemson, Mar 27.
- University of Houston, Department of Architecture, guest lecture: "Infrastructures of the Imagination: Creative and Critical Inquiry into Computation and Design." Houston, Mar 25.

- Carnegie Mellon University, History Department, Lunch-time Lectures. Talk: “Experimental Archaeologies of CAD.” Pittsburgh, Feb 20.
- 2018 Bauhaus Universität, School of Media, lecture “The calculative imagination: computation and the boundaries of design.” As part of the Bauhaus Digital Masterclass organized by Christoph Engemann. Weimar, Oct. 17.
- University of Toronto, Department of Architecture, guest lecture in the course “Architecture and Media” invited by Prof. Pete Minosh, Toronto, Canada. Oct 14.
- Carnegie Mellon University, Department of Philosophy, guest lecture in the “Automation, Artificial Intelligence and Society” seminar invited by Prof. Aiden Kestigian, Pittsburgh, PA. Apr 3.
- 2017 Massachusetts Institute of Technology, Department of Architecture Lecture Series. “Designing the Computational Image, Imagining Computational Design.” Cambridge, Nov 11.
- Carnegie Mellon University, Human Computer Interaction Institute (HCII) Lecture Series, Pittsburgh PA. “Design at the Interface.” Pittsburgh, Oct 13.
- Leuphana Universität, Institute for the Advanced Study of Media Cultures of Computer Simulation (MECS). Perspective Rules Symposium. “To See is to Play: The Poetics of Machine Learning in Design.” Lüneburg, Germany, Jan 17.
- 2016 Oberlin College, Department of the History of Art. Seminar on Contemporary Architecture, Prof. Peter Minosh, Oberlin, OH. “Builders of the Vision.” Oberlin, Nov 17.
- Technical University of Munich, Munich Center for Technology and Society Lecture Series. “Cybercultures of Design and Architecture: Cross-disciplinary Origins and Prospects.” Munich, Germany Jul 4.
- University of Cambridge, Department of Architecture Lecture Series, Cambridge, UK. “Computing the Architectural Imagination: Postwar Architectural Research at MIT and Cambridge.” Jun 1.
- Leuphana Universität, Institute for the Advanced Study of Media Cultures of Computer Simulation (MECS) “Software and the Imagination of Design: Probes and Prospects.” Lüneburg, Germany, May 10.
- Institute of Advanced Architecture of Catalunya (IAAC) Lecture Series, “Computer-Aided Revolutions: Critique of the Future.” Barcelona, Spain, May 5.
- University of Cambridge, Department of History and Philosophy of Science (HPS), “Twentieth Century Visions of Design” in 20th Century Think Tank Lunch Time Lectures. Cambridge, UK, Apr 28.
- The Bartlett School of Architecture, University College London, Mario Carpo’s “Digital Turn” Seminar, London, UK. “Builders of the Vision.” Mar 16.
- 2015 The Bartlett School of Architecture, University College London. Material Matters Lecture Series, London, UK. “Towards a Material History of Computational Design.” London, UK, May 19.

- Carnegie Mellon University School of Architecture Candidate talk, “Infrastructures of the Imagination: Creative and Critical Inquiry in Computational Design.” Pittsburgh, Mar 3.
- 2014 The Bartlett School of Architecture, University College London. Computational Making Workshop at DCC Conference. “The Making of an Abstraction.” London, UK, Jun 21.
- Foster and Partners Friday Lectures. “Bits Come to Matter.” London, UK. Jun 20.
- 2013 Massachusetts Institute of Technology, Mobile Experience Lab Lunch Talk. Cambridge, MA. “The Design Ecologies Research group.” Cambridge, MA, Nov 25.
- The Drawing Center, WWW-Drawing Symposium, “Design and Computation: Between Accident and Control.” New York, NY. May 9.
- Autodesk Lunchtime Lecture, “Building BIM: Seeking a Lingua Franca.” Waldham, MA, Jul 26.
- LA Design Week PechaKucha, “De-centering Design.” Los Angeles, CA, Jun 26.
- Penn State College of Arts and Architecture Faculty Forum, “Creative work and research.” State College, PA, Mar 16.
- 2012 Architectural Association AA Visiting School, “Missiles, Symbiosis and the Invention of an Algorithmic Tectonics.” Bogotá, Colombia, Jun 22.
- University of Massachusetts at Amherst, School of Architecture candidate talk. “Creative Ecologies.” Amhers, MA, Mar 30.
- The Pennsylvania State University, Stuckeman School of Architecture and Landscape Architecture candidate talk “Design and the Technological Imagination.” State College, PA, Mar 19.
- Université Laval, Ecole d’architecture et d’aménagement candidate talk, “Design et Imagination Technologique.” Quebec, Canada, Mar 15.
- The State University of New York at Buffalo, Department of Architecture candidate talk. “Design and the Technological Imagination.” Buffalo NY, Feb 13.
- Lancaster University, Lancaster Institute of Contemporary Arts (LICA) candidate talk. “Design and the Technological Imagination.” Lancaster, UK, Jan 27.
- 2011 American University of Sharjah, “Geometry as Data, Data as Material.” Sharjah, UAE, Apr 22.
- 2010 Universidad Francisco Marroquin, Department of Architecture Lecture Series, “Arquitectura, Tecnología y Computación.” Ciudad de Guatemala, Guatemala, Sep 13.
- 2009 Boston Architectural College class guest. “A Generative Grammar for Fabrication.” Boston, Jan 8.
- 2016 Galería Casa Hoffman, “Builders of the Vision.” In conversation with Andres Burbano. Bogotá, Colombia, Sep 3.

Book Launch
Events

- Chelsea School of Art, University of the Arts, London (UAL). “Builders of the Vision.” In conversation with Betti Marenko. London, UK, May 5.
- 2020 Carnegie Mellon University, School of Architecture. Guest talk “Cultivating the critical imagination” at Architectural Theory course invited by K. Gutschow. Nov 5.
- 2019 Carnegie Mellon University, School of Design. Guest talk at seminar invited by Molly Wright Steenson.
- 2018 Carnegie Mellon University, School of Architecture Lecture Series. Introduction to Kyle Steinfeld’s lecture. Pittsburgh, Apr 9.
- 2014 Penn State, Stuckeman School of Architecture and Landscape Architecture, State College PA, US. Introduction to Achim Menges’ lecture. State College, Feb 6.
- 2013 Massachusetts Institute of Technology, MIT Media Lab. Moderator in panel with Nicholas Negroponte and members of The Architecture Machine Group in the “Futures Past: Design and the Machine” Conference, MIT. Cambridge, MA, Nov 21.
- Penn State, Stuckeman School of Architecture and Landscape Architecture. Introduction to Mark West lecture. State College, PA, Feb 6.
- 2011 Massachusetts Institute of Technology Department of Architecture. “Science Vs. Storytelling” public conversation as part of the Archiprix competition. Cambridge, MA, May 6.

Selected Press/Reviews

- 2018 Allen, Matthew. “The Computational Imagination: Review of the Exhibition ‘Designing the Computational Image, Imagining Computational Design.’” *Leonardo Journal*, 2018.
- 2017 Smith, Greg J. “Designing the Computational Image, Imagining Computational Design – An Excavation of Digital Form.” *Creative Applications Network*, November 21, 2017.
- INTER-PUNCT. “In Conversation with Daniel Cardoso Llach.” *Interpunct Special Issue: Exhibitions - Intermission*. November 17.
- 2015 Pfaff, Marc. “Daniel Cardoso Llach: Builders of the Vision: Software and the Imagination of Design.” *PLANBILDER: Medien Der Architekturgestaltung*, no. 11 (2015): 207–2012.
- 2010 MIT spotlight, “A Better Window: MIT Team Designs a Light-Controlling, Energy-Smart Facade,” *Massachusetts Institute of Technology*, January 5, 2010, <http://web.mit.edu/>.

Editorial, Reviewing, and Board Roles

- Boards
- Editorial Dearq Journal, since 2017

	Projects	Building for Tomorrow Project for the Collaborative Development of Sustainable Infrastructure for Architectural and Design Documentation. Harvard University. Since 2020. https://projects.iq.harvard.edu/buildingtomorrow
Peer review	Journals	Science, Technology and Human Values (ST&HV) 2020; Digital Culture and Society 2019; NTM Journal of the History of Science, Technology and Medicine 2019; Ardeh 2019; IJAC 2014, 2015, 2019; Design Studies 2015; FOOTPRINT #15 2014; Dearq Journal 2011, 2016, 2017, 2020.
	Conferences	CSCW 2020, Minneapolis (Virtual); eCAADe 2020 (Virtual), TU Berlin; ACSA 2017, San Francisco; Re:Trace 2017, Vienna; CAADRIA 2017, Suzhow, China; SIGRADI 2016, Santa Catarina; CAADRIA 2016, Melbourne; SIGGRAPH 2014, Buffalo; ACSA 2013, Fort Lauderdale; Futures Past 2013, Cambridge (MA); ICIE 2013, Athens; SIGRADI 2012, Fortaleza; SIGRADI 2011, Bogotá.
	Books	MIT Press (three book proposals 2017, 2018, 2020, two manuscripts 2017, 2018); Routledge (two book proposals); Springer (two book proposals).
	Expert Panels	New Frontiers in Research Fund (NFRF-FNFR) 2019; Einstein Professorship, Berlin 2018; William J. Mitchell Hackathon July 2015; Universidad de los Andes Faculty Grants 2013.
Other conference roles	2010-18	Track Chair DRS 2018; Session chair DHS 2016; Session chair SIMAUD 2014; Conference Co-chair SIGRADI 2010.
Book Series	DTS	Founder and co-editor of the book series “Routledge Research in Design, Technology and Society” since 2017. Two published books; one in production, three under contract, and three at the proposal stage. URL: https://www.routledge.com/Routledge-Research-in-Design-Technology-and-Society/book-series/RRDTS

Academic Events Organized

Symposia	2021	“Digital.Visual.Material” virtual symposium linked to the “Vers un imaginaire numérique” exhibition. Co-organized with Theodora Vardouli (forthcoming, May 2021).
	2017	“Computational Design: Practices, Histories, Infrastructures.” Organizer and chair of two-day symposium at the School of Architecture, Carnegie Mellon University, Oct 6-8, hosted by the STUDIO for Creative Inquiry. Twelve invited speakers, five workshops, over a hundred registered attendants.
	2015	“Design Across Boundaries.” One-day Symposium and Open House at the Stuckeman Center for Design Computing, The Pennsylvania State University, May 5. Four invited speakers, open house, around one hundred attendees.
Conference sessions	2019	“Computation in the Core: Critical Pedagogies.” Panel at the 2019 ACSA Conference “Black-Box: Articulating Architecture’s Core in the Post-Digital Era,” in collaboration with Matthew Allen. Pittsburgh, PA. 2019.

- 2018 “Architects and Science in the Research University.” Panel at the 2018 History of Science Society conference “Telling the Stories of Science,” co-organized with Theodora Vardouli.
- “Design, Technology and Society” track at the Design Research Society Conference 2018, co-organized with Terry Knight. Limerick, Ireland. Jun 25-28 2018.
- 2015 “Computing Futures: Three Episodes in the Postwar Imagination of Design.” Session at the Design History Society Conference, California Center for the Arts, San Francisco, Sep 11-13.
- Lecture Series 2020 “The Digital Mundane” Computational Design Lecture Series Fall 2020 including Moa Carlsson (University of Edinburgh) *On View Mapping Technology: What Difference Did Computers Make?*, Oct 21; Matthew Allen (University of Waterloo) *Software Loopholes: Reconfiguring Architectural Labor Hierarchies*, Oct 29; Theodora Vardouli (McGill) *From Data to Form: Generativity and its Structures*, Nov 18; Galo Cañizares (Ohio State University) *Softwarization and Design’s Socio-Technics*, Nov 19; and Vernelle Noel (University of Florida), *Situated Computations*, Dec 3. With support from the Steiner Fund at the Frank-Ratchye STUDIO for Creative Inquiry.
- 2019 Computational Design Lecture Series including speakers Mine Ozkar (Istanbul Technical University) *Matters of Shape Representation: A Computational Approach to Architectural Heritage*, April 17, 2019; Paul Pangaro (Carnegie Mellon University), *Computing Conversation: When, Why, How, Who?*, April 9, 2019; TeamLab (Tokyo), *Relationships Among People*, October 30, 2019, co-hosted by the Frank-Ratchye STUDIO for Creative Inquiry; Violet Whitney (Sidewalk Labs), *Working in Spatial Technology*, November 14, 2019; Thanos Economou (Georgia Institute of Technology), *Shape Machine*, December 5, 2019.
- 2017 Computational Design Lecture Series including speakers Lining Yao, *Morphing Matter Across Scale, Discipline, and Context*, Nov 15, 2017;
- 2016 Computational Design Lecture Series including speakers Daniel Leithinger: *Hold that Thought: Designing Interfaces for Embodied Cognition*. March 5, 2017; Ruari Glynn: *Animating Architecture*. December 8, 2016.
- 2013 Stuckeman Center for Design Computing (Penn State) Lectures: Daniel Rosenberg: *Feeling the Doing: Transforming Experience Through Design*. September 27, 2013; Josh Lobel: *Building Information: Examples of a Hybrid Modeling Approach for Design Development and Construction*. October 18, 2013; Avni Argun: *Electrochromism*. Friday, October 25, 2013; Rick Mistrick: *Modeling of Daylighting*. November 1, 2013.
- Workshops 2020 Computational Design workshop “Agent-Based Modeling: The Art & Science of Emergence.” Instructor: Scott Donaldson. Co-organized with Eddy ManKim. Mar 24.
- 2017 “Introduction to Mathematical Form-Making.” Instructor: Joseph Choma, in “Computational Design: Practices, Histories, Infrastructures” symposium, Carnegie Mellon University, School of Architecture. Oct 8.
- “Re-imagining Urban Intersections Through Systems Thinking.” Instructors: Scott Donaldson and Atefeh Mahdavi, in “Computational Design: Practices, Histories,

Infrastructures” symposium. Carnegie Mellon University, School of Architecture. Oct 8.

“Build a Miniature CNC from E-waste.” Instructor: Jonah Ross-Mars; in “Computational Design: Practices, Histories, Infrastructures” symposium. Carnegie Mellon University, School of Architecture. Oct 8.

“Meta-Tool: Seeing Spaces.” Instructor: Dan Taeyoung; in “Computational Design: Practices, Histories, Infrastructures” symposium. Carnegie Mellon University, School of Architecture. Oct 8.

“Cutting-edge Nostalgia: Rhino-Controlled Vintage Pen Plotters.” Instructor: Carl Lostritto; in “Computational Design: Practices, Histories, Infrastructures” symposium. Carnegie Mellon University, School of Architecture. Oct 8.

2013 “Feeling the Doing: Transforming Experience Through Design.” Instructor: Daniel Rosenberg. Penn State Department of Architecture. Sep 27.

Grants and Fellowships

2020 PA Manufacturing Fellows Initiative Technical Proposal: “Innovating Construction Through Manufacturing: A Reinforcement Learning Framework for Robotically-Supported Modular Factories.” As PI with Co-PI Jean Oh and industry collaborators iBUILT. \$75,000.00. Pending.

Isabel Sophia Liceaga Discretionary Fund, Carnegie Mellon University School of Architecture. Funds to support the development of the installation “Molecular Tectonics,” selected for the SIGGRAPH Art Gallery 2020. \$2,000.00.

Frank-Ratchye STUDIO for Creative Inquiry Steiner Guest Lecture Fund in support of “The Digital Mundane” Fall 2020 Computational Design Lecture Series. \$500.

2019 Social Science and Humanities Research Council from Canada, Connection Grant. Funds to support the curated exhibition “Vers un imaginaire numérique” in Montreal, Canada, a related symposium, and a series of interactive installations. As Co-PI with PI Theodora Vardouli. CAN \$49,000.00.

National Science Foundation, Innovations in Graduate Education (IGE Program) Proposal: “Re-thinking Graduate Education for Critical and Creative Technical Practice.” As PI with Co-PIs Daragh Byrne and Mine Ozkar. \$499,000.00 Not awarded.

Public-Interest Technology Challenge proposal “Cultivating Critical Technical Practitioners at the Intersection of Design, Technology, and Society. As PI with Co-PIs Molly Wright Steenson and Rosta Farzan. \$86,148. Not awarded.

EaaS Microgrant sponsored by Yale University for the proposal: “Supporting Software Reconstruction and Analysis of Early Architectural Software.” As PI with Co-PI Eric Kaltman. \$5,000.00

College of Fine Arts Research and Creativity Fund, Carnegie Mellon University. Funds to support the production and transport of the installation “Molecular tectonics [Algotecton]” to be exhibited in SIGGRAPH Washington DC. \$3,500.00.

Manufacturing Futures Initiative Proposal: “Computational Design and Manufacturing of Highly Customizable Interlocking Space Structures.” PI with Co-PIs Jessica Zhang and Keenan Crane. \$179,834.00. Not awarded.

2018 DOE Benefit – High Performance Windows Topic. Proposal: “A Fast, Tunable and Low-Cost Dynamic Window for Improved Building Energy Performance and User Comfort.” As PI with Co-PIs: Omer Karaguzel, Michael Bockstaller, and industry collaborators Giner, Inc., and Vitro Architectural Glass. \$1,393,137.00. Not awarded.

2017 Graham Foundation for the Advanced Study in the Fine Arts. Funds to support the exhibition “Designing the Computational Image, Imagining Computational Design.” \$3,500.00.

Manufacturing Futures Initiative. “A Manufacturing Technology for Highly Responsive Organic Electrochromic Windows for Energy Efficient Buildings.” \$136,392.00 (not awarded)

College of Fine Arts Research and Creativity Fund, Carnegie Mellon University. Funds to support the development of “Soft Reconstructions,” an interactive component of the exhibition “Designing the Computational Image, Imagining Computational Design” at Miller Gallery, CMU. \$4,000.00.

Berkman Faculty Development Fund, Carnegie Mellon University. Funds to support the exhibition “Designing the Computational Image, Imagining Computational Design.” \$3,000.00.

Isabel Sophia Liceaga Discretionary Fund, Carnegie Mellon University School of Architecture. Funds to support the symposium “Computational Design: Practices, Histories, Infrastructures.” \$2,000.00.

2016 Institute for the Advanced Study of Media Cultures of Computer Simulation (MECS), Leuphana Universitat, Lüneburg, Germany. Research Fellowship. Funds to support “Tracing design ecologies.” \$7,000.

Department of Energy (DOE) Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Programs. “Organic Electrochromic Windows for Energy Efficient Buildings.” \$35,000.00. Not awarded.

2014 Collaborative Design Research Grant, Penn State. (As Co-PI with PI Frans Padt and Co-PI Mallika Bose). “Exploring the Role of Science in Green Design Pedagogy.” \$50,000.00. Not awarded.

CTSI's Innovative Approaches to Big Data Pilot Project Funding 2014. (As Co-PI with PI Darla Lindbergh). “Interactive Data Visualization Tools to Support and Transform Client-Centered Dietary Health Decision Making: A Systems Architecture Approach.” \$300,000.00. Not awarded.

- 2013 The H. Campbell and Eleanor R. Stuckeman Fund for Collaborative Design Research, Penn State. Funds in support of the development of a software system for modeling facades of variable transmittance as a step towards low-cost organic electrochromic smart facades. \$34,588.00.
- 2012 DOE SBIR/STTR Programs Phase I Application (As Co-PI with PI Avni Argun). 2012. “Organic electrochromic windows for energy efficient buildings.” \$100,000.00. Not awarded.
- 2009 The MIT Council for the Arts, Massachusetts Institute of Technology. Funds in support of the ‘CROMA’ Project. \$1,000.00.
- 2007 MIT Presidential Fellowship. Awarded full tuition and stipend for doctoral studies. Best SMArchS Thesis Award, Department of Architecture, MIT. \$500.
- 2005 Tuition Support Grant, Department of Architecture, MIT. Special Merit Recognition (stipend support), Department of Architecture, MIT.
- 1996 Andres Bello National Award. Andres Bello Foundation, Colombia. Granted to the Top scores nationwide on the ICFES (equivalent to the SAT in the US) test. The award included financial aid towards college tuition.

Doctoral Theses

Principal
Advisor

- 2021 (expected) Ardavan Bidgoli, “Learning Matters: An Approach to Situated Learning in Human-Machine Design” (working title). Carnegie Mellon University School of Architecture, Ph.D in Computational Design. Pittsburgh, US.

Oscar Kang, “Adaptive Solar Control Strategies” (working title). Carnegie Mellon University School of Architecture, Doctor of Professional Practice. Pittsburgh, US.
- 2023 (expected) Emek Erdolu, “Computational Cultures in Practice: Software and Interdisciplinary Collaboration in Architecture” (working title). Carnegie Mellon University School of Architecture, Ph.D in Computational Design. Pittsburgh, US.

Jingyang Liu, “Spatially Augmented Interfaces” (working title). Carnegie Mellon University School of Architecture, Ph.D in Computational Design. Pittsburgh, US.
- 2024 (expected) Jinmo Rhee, “Extended Formalism: Data-driven Morphological Analysis of Architectural and Urban Form” (working title). Carnegie Mellon University School of Architecture, Ph.D in Computational Design. Pittsburgh, US.

Yuning Wu, “Towards Human-Robot Ecosystems for Building Construction” (working title). Carnegie Mellon University School of Architecture, Ph.D in Computational Design. Pittsburgh, US.

Committee
Member or
Examiner

- 2019 Heather Ligler “The Portman Variations.” Georgia Institute of Technology Department of Architecture. Atlanta, US.

- Victor Okhoya, “Investigating Machine Learning for Parametric Analysis and Design in Architectural Practice” (working title). Carnegie Mellon University, School of Architecture, Doctor of Professional Practice. Pittsburgh, PA, US.
- 2020 Jonathan Weston, “Seeing Beyond the Pretty Picture: Exploring the Aesthetics and Function of Architectural Visualization” (working title). University of Cambridge, Department of Architecture. Cambridge, UK.
- Ricardo Correia, “A Transdisciplinary Vision of Digital Architecture Through Computational Methods of Mapping, Analysis and Visualization” (working title). Instituto Universitario de Lisboa (ISCTE-IUL) Departamento de Arquitetura e Urbanismo, Lisboa, Portugal.
- 2019 Anne Burdick, “Designing Text Technologies for Critical Interpretation” (working title). Carnegie Mellon University, School of Design (DDes). Pittsburgh, US.
- Philippa Mothersill, “Communicating Through the Design of Man-Made Artifacts” (working title). Massachusetts Institute of Technology, MIT Media Lab. Cambridge MA, US.
- Vernelle Noel, “Computational Approaches to Craft: Exploring Wire-Bending in Trinidad” (working title). Department of Architecture and Landscape Architecture, Penn State. State College, US.
- 2016 Guangxuan Zhang, “Designing a Platform to deal with Conflicts in Organizations: A Design Science Project.” Department of Information Sciences and Technology, Penn State. State College, US.
- 2015 Michael Marcinkoswki, “Data, Design, Dialogue: Hermeneutics of Socio-Technical Design.” Department of Information Sciences and Technology. Penn State. State College, US.
- 2014 Camilo Cifuentes, “Narrativas cibernéticas y arquitectura computacional” (Cybernetic Narratives and Computational Architecture). Escuela Técnica Superior de Arquitectura de Barcelona (ETSAB), Barcelona, Spain.

Masters Theses

Principal
Advisor

- 2020 Yufei Cheng, “Data Processing in Using Machine Learning to Analyze Floor Plan Layout Design.” Master of Science in Computational Design, CMU.
- Zhihao Fang, “Towards Multi-drone Autonomous Construction via Deep Reinforcement Learning.” Master of Science in Computational Design, CMU.
- Siyu Guo, “A Generative Design Application Development Workflow for Architecture” Master of Science in Computational Design, CMU.
- Yun Hao, “The Responsive Layer: Steps Towards a Digital Augmentation System to Make Everyday Objects Responsive.” Master of Science in Computational Design, CMU.

Yaxin Hu, “Children’s Exploration with Social Robots in Digital Art-Making.” Master of Science in Computational Design, CMU.

Yi-Chin Lee, “Hybrid Embroidery.” Master of Science in Computational Design, CMU.

Hongtao Ma, “A Mixed-Modeling Environment Exploring Tangible and Digital Interactions for Iterative Design Modeling.” Master of Science in Computational Design, CMU.

Vincent Mai, “Toward Designing with Heterogeneous Values.” Master of Science in Computational Design, CMU.

Weixin Qiu, “An Inquiry Into Crowdsourcing for Early-stage Product Design” Master of Science in Computational Design, CMU.

Erik Ulberg, “Crafting the Weights of a Convolutional Neural Network to Make a Drawing.” Master of Science in Computational Design, CMU.

2019 Ozguc Capunama, “CAM as a Tool for Creative Expression: Informing Digital Fabrication Through Human Interaction.” Master of Science in Computational Design, CMU.

Zheng Luo, “Image-Based Light Modification: A Machine-Learning Approach to ‘Content-Aware’ Image Processing.” Master of Science in Computational Design, CMU.

Jinmo Rhee, “Context-Rich Urban Analysis Using Machine Learning: A Case Study in Pittsburgh, PA.” Master of Science in Computational Design, CMU.

Humphrey Yang, “GeoMatries: Machine Learning-Powered Simulation for 3D Printing and Morphing Materials Design.” Master of Science in Computational Design, CMU.

Zhuoni Yang, “Modeling Computational Design: An Interactive Visual Analysis of the Field Based on Topic Modeling and Bibliometrics.” Master of Science in Computational Design, CMU.

2018 Adie Al Nobani, “Alternative Architectural Narratives”. Carnegie Mellon University School of Architecture, Master of Science in Computational Design. Pittsburgh, US.

Javier Argota Sánchez Vaquerizo, “What you See is What you Get: A Data-Informed Workflow in Design for Architecture and Urbanism”. Carnegie Mellon University School of Architecture, Master of Science in Computational Design. Pittsburgh, US.

Camille Baumann-Jaeger, “Exploring How Design Perpetuates Online Harassment in Virtual Reality”. Carnegie Mellon University School of Architecture, Master of Science in Computational Design. Pittsburgh, US.

Cecilia Ferrando, “Automating Spatial Analysis of Architectural Floorplans”. Carnegie Mellon University School of Architecture, Master of Science in Computational Design. Pittsburgh, US.

Yuqian Li, “An Approach to Search Through Architectural Topology”. Carnegie Mellon University School of Architecture, Master of Science in Computational Design. Pittsburgh, US.

Yingxiu Lu, “A New Shape-Finding Process Based on Conversational Genetic Algorithms”. Carnegie Mellon University School of Architecture, Master of Science in Computational Design. Pittsburgh, US.

Atefeh Mahdavi, “Reimagining Urban Intersections Through Participatory Simulation Platforms”. Carnegie Mellon University School of Architecture, Master of Science in Computational Design. Pittsburgh, US.

Rachael Tang, “A Collaborative Online Platform for Geo-Located Data Visualization”. Carnegie Mellon University School of Architecture, Master of Science in Computational Design. Pittsburgh, US.

George Zhu, “Make Models Great Again: Interactively Generating Simplified Human-Editable Models from 3-D Scanned Meshes”. Carnegie Mellon University School of Architecture, Master of Science in Computational Design. Pittsburgh, US.

2017 Scott Donaldson, “Generating, Simulating, Interrogating: A Computational Design Thinking Framework.” Carnegie Mellon University School of Architecture, Master of Science in Computational Design. Pittsburgh, US.

Hetian Cao, “Designing for Interaction and Insight: Experimental Techniques for Visualizing Building Energy Consumption Data.” Carnegie Mellon University School of Architecture, Master of Science in Computational Design. Pittsburgh, US.

Lu Han, “A Concurrent Physical and Digital Modeling Environment.” Carnegie Mellon University School of Architecture, Master of Science in Computational Design. Pittsburgh, US.

Qiaozhi Wang, “HADEN: Using Virtual Reality as an Expressive Medium for Spatial Design.” Carnegie Mellon University School of Architecture, Master of Science in Computational Design. Pittsburgh, US.

At Penn State

2015 Ardavan Bidgoli. “Towards an Integrated Design-Making Approach in Architectural Robotics.” Penn State, Department of Architecture. Master of Science in Architecture: Design Computing. State College PA, US.

Vina Rahimian, “Energy Distribution Management in a Network of Intelligent Buildings as a Learning Machine.” Penn State Department of Architecture. Master of Science in Architecture. State College PA, US.

2014 Seoug Oh, “Typologies of Interaction in Architectural Space.” Penn State Department of Architecture. Master of Science in Architecture: Design Computing. State College PA, US.

Committee Member

2020 Ian Friedman, “Rethinking PropTech: Drawing Insights About the Real Estate Technology Industry Through Technical Experimentation.” Carnegie Mellon University School of Architecture, Master of Science in Computational Design. Pittsburgh, US.

- Yixiao Fu, “Evoking the Post-industrial Landscape Memories through Mixed Reality Soundscape.” Carnegie Mellon University School of Architecture, Master of Science in Computational Design. Pittsburgh, US.
- 2019 Wei Wei Chi, “3D Microscopic Texture Interface in CAD: Cultivating Material Knowledge for the Practiced Digital Hand.” Carnegie Mellon University School of Architecture, Master of Science in Computational Design. Pittsburgh, US.
- Runchang Kang, “Designing the Interactive Architecture Space:A System for Designing and Interacting with Appliances in Interactive Architecture Indoor Sensing Environment.” Carnegie Mellon University School of Architecture, Master of Science in Computational Design. Pittsburgh, US.
- 2018 Manuel Rodríguez Ladrón de Guevara, “Multiresolution.” Carnegie Mellon University School of Architecture, Master of Advanced Architectural Design. Pittsburgh, US.
- 2017 Dyani Robarge, “Critical Mass,” Carnegie Mellon University School of Architecture, Master of Advanced Architectural Design. Pittsburgh, US.
- Mike Jeffers, “Design Games and Machine Learning: A Method for the Application of Machine Learning in Design Environments.” Carnegie Mellon University School of Architecture, Master of Science in Computational Design. Pittsburgh, US.
- 2016 Martin West, “Can Architecture Ascribe the Human Condition?” Cambridge University Department of Architecture. MPhil. Cambridge, UK.
- 2014 Savia Palate. “Visualizing Famagusta's Coastline: Co-existence in a contested ghost-city.” Penn State Department of Architecture. Master of Architecture: Culture, Space, and Society. State College PA, US.
- 2012 Prince C. Kwabi “Does the Management of BIM Implementation of a Project’s Design Phase Require a Specialist?.” Salford Institute of Technology, Manchester, UK.

Undergraduate Theses

Principal
Advisor

- 2021 Ammar Hasonjee, “Rethinking Automation in Construction” (working title). Carnegie Mellon University School of Architecture. Bachelor of Architecture. (expected)
- 2016 Andrew Viny, “[YOURS]: Distributing Agency in Design Through Computation.” Carnegie Mellon University School of Architecture. Bachelor of Architecture.
- Avanti Dabholkar, “Towards Emotive Architecture.” Carnegie Mellon University School of Architecture. Bachelor of Architecture.
- 2015 Dustin Julius, “Complexity.” Penn State School of Architecture and Landscape Architecture.

Courses Taught

Associate Professor CMU	F 2020	Pre-Thesis II (48-716), Inquiry into Computational Design (48-727).
	S 2020	Master Thesis (48-769B)
	F 2019	Pre-Thesis II (48-716), Inquiry into Computational Design (48-727), Special Topics in Computational Design: Experimental Archaeology of CAD (48-749).
	S 2019	Fundamentals of Computational Design (62-275), Special Topics in Computational Design: Critical Technologies (48-749), Master Thesis (48-769B), MSCD Pre-Thesis I (48-715).
	F 2018	Pre-Thesis II (48-716), Inquiry into Computational Design (48-727).
Assistant Professor CMU	S 2018	MSCD Pre-Thesis I (48-715), Special Topics in Computational Design: Critical Technologies (48-749), Fundamentals of Computational Design (62-275).
	F 2017	Pre-Thesis II (48-716), Inquiry into Computational Design (48-727).
	S 2017	MSCD Pre-Thesis I (48-715), Fundamentals of Computational Design (62-275).
	F 2016	Pre-Thesis II (48-716), Inquiry into Computational Design (48-727).
	F 2015	Fundamentals of Computational Design (62-275), Undergraduate Thesis Studio (48-519).
Assistant Professor PSU	2013-15	<i>Graduate</i> : ARCH 497C “Algorithmic Tectonics” (Spr 14, 15); ARCH 497B “Inquiry into Design Computing” (Fall 13, 14); ARCH 537A “Technology and the Imagination of Design” (Spr 14). <i>Undergraduate</i> : ARCH 231 Architectural Design I (2 nd Year Studio: Spr 13, 14, 15); ARCH 232 Architectural Design II (2 nd Year Studio: Fall 12, 13, 14).
Teaching Assistant MIT	2009-11	<i>Graduate</i> : “Design Without Boundaries” (Fall 09, Spr 10 with Profs. William J. Mitchell and Federico Casalegno); “Design Scripting” (Spr 10 with Prof. Takehiko Nagakura); “Ph.D. Forum” (Spr 10, 12) and “Inquiry into Computation and Design” (Fall 08-10) with Prof. Terry W. Knight).
Instructor Universidad de los Andes	2002-05	<i>Undergraduate</i> : “Fundamentals of Digital Media” (Spr 04, 05); “Third Year Design Studio” (Spr 05); “First Year Design Studio” (Spr, Fall 02-04).

Workshops Taught

As Tutor

- 2018 Bauhaus Universität, Weimar, Germany. “Computational Design: History and Future Perspectives” lecture and one-day teaching session.
- 2017 Universidad del Valle, Cali, Colombia. “Algorithmic Objects” three-day computational designing and making workshop. Nov 8-10.
- 2016 University of Brighton, Brighton, UK. “Visualising Design Ecologies” at the Design Research Society (DRS) Conference, 2016. Jun 17. Co-instructor: Yanni Loukissas.
- 2014 University College London, London UK. “Computational Making” at the 14 Design Computing and Cognition Conference (DCC ’14), Jun 21. Co-organizers: Terry Knight, George Stiny, Theodora Vardouli, Dina El-Zafaly.
- 2013 The Pennsylvania State University, University Park, PA, US. May 4. “Gestural Modeling and Interactive Architecture.”
- 2011 Massachusetts Institute of Technology, Cambridge, MA, US. “International Architectural Design Workshop” at the ARCHIPRIX 2011 Competition. Co-instructor: Nida Rehman.
- American University of Sharjah, Sharjah, UAE. “Geometry as Data, Data as Material.” Co-instructors: Santino Medina and Maher El-Khaldi.
- 2010 Universidad Francisco Marroquín, Ciudad de Guatemala, Guatemala. Scripting for design exploration workshop.
- ORG Architects, Cambridge, MA, US. Scripting for design exploration workshop.
- Cornell University School of Architecture, Ithaca, NY, US. Scripting for design exploration workshop. Co-instructors: Kenfield Griffith and Yanni Loukissas.
- 2009 Harvard University Graduate School of Design, Cambridge, MA, US. Scripting for design exploration workshop. Co-instructors: Kenfield Griffith and Taro Narahara.
- Lynden High-School, Lynden, WA, US. “All Hands on Deck” workshop on basic computational geometry. With support from McNeel and Associates. Co-instructor: Kenfield Griffith.
- Universidad de los Andes, Bogotá, Colombia. Scripting for design exploration workshop. With support from McNeel and Associates. Co-instructor: Skylar Tibbits.
- 2008 Universidad Peruana de Ciencias Aplicadas, Lima, Perú. “Computational Design Solutions” scripting workshop. Co-instructors: Kenfield Griffith and John Snavely.
- 2006 Universidad de Chile, Santiago de Chile, Chile. “Computational Design Solutions” scripting workshop in SIGRADI conference. Co-instructors Kenfield Griffith and John Snavely.

Invited Reviews

- 2020 University of Buffalo, NY. Final Review for the “Situated Technologies” studio, invited by Omar Khan. May 5.
- Georgia Institute of Technology School of Architecture. Final Review of Second Year Studio, invited by Vernelle Noel. April 15.
- University of California at Berkeley, CA. Final Review for the “Drawn Together” studio, invited by Kyle Steinfeld. Mar 18.
- 2018 University of Charlotte at North Carolina, Charlotte, Georgia, US. Final Review for Thesis Studio, invited by Dimitris Papanikolaou, Apr 30.
- McGill University School of Architecture, Montreal, Canada. Final Review for the “Counterfactual History Studio” invited by Theodora Vardouli, Apr 23.
- Rice University, School of Architecture, Houston TX, US. Final Review for 1st and 2nd Year Design Studio invited by Sarah Whiting, Andrew Colopy, and Gail Chen, Apr 17-18.
- 2016 Institute for Advanced Architecture of Catalunya (IAAC), Barcelona, Spain. “Urban Workshop” Studio Midterm review invited by Tomas Diez. Mar 4.
- 2015 The Pennsylvania State University, Department of Architecture, State College PA, US. 2nd Year Architecture Studio invited by Felecia Davis. Dec 10.
- 2014 The Pennsylvania State University, Department of Architecture, State College PA, US. LARCH 312 and graduate LARCH 540 capstone design studio invited by Maria and Chris Counts, May 2.
- 2013 Harvard University Graduate School of Design, Cambridge MA, US. Final review for “The Mixed Reality City” course invited by Yanni Loukissas, Nov 22.
- The Pennsylvania State University, Department of Architecture, State College PA, US. Midterm review of 3rd Year Architecture Studio invited by Lisa Iulo.
- The Pennsylvania State University, Department of Architecture, State College PA, US. Midterm Review of 1st Year Architecture Studio invited by Nida Rehman.
- 2012 Wentworth Institute of Technology Department of Architecture, Boston MA, US. Final Review of Architecture Thesis Studio invited by Zenovia Touloudi. Dec.
- 2011 American University of Sharjah Department of Architecture, Sharjah, UAE. Midterm Design Studio Reviews invited by Ginger and Michael Dossier. Oct.
- 2010 Massachusetts Institute of Technology, Cambridge MA, US. Midterm Review of 1st Year M.Arch Projects invited by Meijin Yoon.
- Wentworth Institute of Technology, Boston MA, US. 1st Year Architecture Representation Final Review invited by Carlos Cardenas.
- Pratt Institute, New York, NY. Invited by Kyle Steinfeld as a guest critic for the final review of the Summer Architecture Studio. Summer.

- 2009 Wentworth Institute of Technology, Boston MA, US. Final review of drawing and visualization course, invited by Carlos Cardenas. Spring.
Cornell University, Ithaca, NY. Final review of Second Year Studio, invited by Yanni Loukissas. Fall.
- 2008 Wentworth Institute of Technology, Boston MA, US. Final review of Fourth Year Architecture Studio, invited by Peter Minosh. Fall.
Massachusetts Institute of Technology, Boston MA, US. Final review of First Year Architecture Studio, invited by Andres Sevtsuk. Spring.
- 2007 Boston Architectural College, Boston MA, US. Final review of Thesis Projects, invited by Marcel Botha. Spring.
- At CMU
- 2020 School of Design, MDes Thesis Reviews, invited by Dina El-Zafaly. Dec 18.
School of Architecture, “Architectural Interfaces” course final review, invited by Kiriaki Goti, Dec 11.
School of Architecture, “Critical Cyborg” studio final review, invited by Mary-Lou Arscott, Dec 9.
- 2018 School of Design, “Senior Studio: Service Design,” invited by Molly Wright-Steenson, May 7.
School of Architecture, “Back2Front,” invited by Mary-Lou Arscott, Apr 4.
- 2017 School of Design, invited by Terry Irwin as guest critic to the Doctor of Design (DDes) first year review. Mar 9-11.
School of Architecture, “Grow Collective” 2nd Year Design Studio, invited by Josh Bard. Dec 6.
School of Architecture, “THESIS IP” studio final review, invited by Mary-Lou Arscott. Dec 6.
School of Architecture, “THESIS IP” studio mid review, invited by Mary-Lou Arscott. Oct 27.
School of Architecture, B.Arch thesis studio, invited by Mary-Lou Arscott. Feb 24.
- 2016 School of Design, “Interaction Design Studio” final review, invited by Austin Lee. Dec 14.
School of Art, Physical Computing class review, invited by Ali Momeni. Nov 10.
- 2015 School of Art, Physical Computing class review. Invited by Ali Momeni, Dec 16.
School of Architecture, Emergent Media Proseminar final review, invited by Daragh Byrne. Dec 12.
School of Architecture, 3rd Year Architecture Design Studio midterm review, invited by Dana Cupkova. Oct 16.
School of Architecture, invited by Mary-Lou Arscott as guest critic for thesis final reviews. April 2015.

Other Praxes

Architecture and design work	2001- Architectural consultant and embedded researcher Gehry Technologies, Abu Dhabi 2010-2011; UI/UX designer THE MEME, Cambridge MA 2009-2010; Computational Design Specialist Kohn Pedersen Fox, New York 2007; Project Consultant ORG Somerville, MA 2010; Independent practice Bogotá, Colombia 2001-05.
Selected Multimedia/web work	2005- The Observatory of Bogotá 2005; Campus 2004 (with María Mendez); Webarq 2004 (with Carlos Cárdenas, Hernán Velásquez, and María Mendez).
Art/Editorial contributions	2005- Art (geometric models and 3-D illustrations) of an example of Guastavino (Catalan) vaulting for the book: John Ochsendorf et al., <i>Guastavino Vaulting: The Art of Structural Tile</i> , 1st edition (Princeton Architectural Press, 2010). Art direction and illustration for the book: William J. Mitchell and Federico Casalegno, <i>Connected Sustainable Cities, Connected Urban Development</i> (MIT Mobile Experience Lab Publishing, 2008). Maps for the book: Marcelo Bucheli, <i>Bananas and Business: The United Fruit Company in Colombia, 1899-2000</i> (NYU Press, 2005).
Memberships	2002- Wilton E. Scott Institute for Energy Innovation at CMU, since 2016; SCS (Society for Modeling & Simulation International), since 2013; 4S: Society for the Social Studies of Science, since 2010; SCA (Colombian Society of Architects) since 2002.
Licensure	2002- Registered architect in Colombia since 2002.
Op-eds (in Spanish)	Daniel Cardoso Llach, Alejandro Morales, and Carlos Mendivil, “Apostarle a la esperanza,” <i>El Planeta</i> , June 18, 2010, sec. Opinión. Daniel Cardoso Llach, “Mockus, El Déspota,” <i>Días de Verde</i> , 2010. Daniel Cardoso Llach, Alejandro Morales, and Carlos Mendivil, “La Esperanza Es Verde,” <i>Siglo21</i> , June 2010, sec. Opinión.
Languages	English (proficient), Spanish (native), French (basic).
Other interests	An occasional musician, I have recorded and performed live with different music projects including Altiplano, C. Kubli, and Juan Lanas.