AMIR SOLTANI

as2135@cantab.ac.uk
www.metrowave.com
www.archigesture.org
www.vacant.tv

ORCID: 0009-0000-7374-3348
U.S. Citizen, authorized to work in the United States

PROFILE

Architectural designer, researcher, and educator working on human-centered architectural computation. My Cambridge PhD, Gesture as Generator (2025), develops an operative account of gesture as a mechanism of spatial transformation. I am developing AGOS (Architectural Gesture Operating System) and Cinematic Operators to connect architectural thinking with computational workflows, human behavior, and spatial transformation. My current research also investigates how film-based observations of human movement can inform agent-based urban simulation.

I hold an MA in Design from UC Berkeley's College of Environmental Design and a PhD in Architecture from the University of Cambridge. Through Metrowave Studio, my independent design-research practice since 2000, I have developed interactive media and experimental spatial work alongside my academic research. At Cambridge, I designed and taught large-scale lectures in 3D CAD and Modeling courses over 2 years and supervised undergraduate and graduate work in architectural theory, studio, and computational design.

RESEARCH INTERESTS

+ Architectural Gesture
+ Gesture as Generator
+ Cinematic-Aided Design
+ Architectural Atmospheres
+ Cinematic Operators
+ Computational Design
+ Environmental Design
+ Spatial Computation
+ Architectural Pedagogy
+ Practice-Based Design Research

SELECTED RESEARCH PROJECTS

+ ***Cinema, AI, and the Future of Human-Centered Urban Simulation*** *(2026–present) UDHL, Nanjing University and University of Cambridge. Computational contribution to research exploring film-based analysis of human movement informing agent-based urban simulation.*
+ ***CineMuseSpace*** *(2020–2021) University of Cambridge. Interactive digital interface for A Cinematic Musée Imaginaire of Spatial Cultural Differences.*
+ ***Akershus Fortress Digital Construction*** *(2020–2021) Oslo, Norway.*
+ ***PolyChora Alpha & Beta*** *(2019–2021) Applied Urban Studies, University of Cambridge. Computational modeling & interactive spatial work using Rhino/Grasshopper & Unity.*

EDUCATION

PhD in Architecture | University of Cambridge, Department of Architecture. Theory, Spatial Analysis, Computational Design

Thesis: *Gesture as Generator: Architectural Gesture as Mechanism of Meaning-making* (2025)

MA in Design, College of Environmental Design (CED) | University of California, Berkeley (1999). Interdisciplinary Design, GPA 4.0

Thesis: *Sound and Vision: A Cross-Synthesis of Sensual Perceptions*

Center for New Music and Audio Technologies (CNMAT) (1996-99), UCB, sound synthesis, electroacoustic research

BA Fine Arts | San Francisco State University (1994)

Visual Studies, Painting, Photography, Film, Spatial Design

ACADEMIC RESEARCH & PROFESSIONAL EXPERIENCE

Doctoral Researcher | EPSRC-Funded PhD Scholar (part-time)

University of Cambridge, Department of Architecture | 2018 – 2025. Completed practice-based research in architectural theory with computational and cinematic-aided design.

Research Assistant, DIGIS, University of Cambridge, Department of Architecture | 2011 – 2024. Managed the group's website and digital archive of research outputs; supported Prof. François Penz's presentation and symposium work; helped organize DIGIS seminars and symposia. *(Concurrent with doctoral research)*

Research Assistant, Applied Urban Studies University of Cambridge | 2019 – 2021. Computational modeling and interactive work (Rhino/Grasshopper, Unity) for PolyChora Alpha & Beta; interactive filmic-path modeling and conference organization for CineMuseSpace (2021). *(Concurrent with PhD)*

Founder, Design & Research Lead, Metrowave Studio | 2000 – Present. Direct an independent design-research practice exploring interactive media and cinematic methods. The studio provides a continuous setting for experimental work alongside academic research and teaching.

Archivist, Environmental Design Archives | 1998–2000 College of Environmental Design, UC Berkeley (Curator Waverly Lowell).

TEACHING, WORKSHOPS & ACADEMIC SUPERVISION

University of Cambridge, Department of Architecture
Workshop Leader, Lecturer & Design Supervisor | Various terms, 2011–2016

Lecture Course | 3D CAD & Modeling (Course Designer and Lecturer). Designed and taught an undergraduate 3D CAD and Modeling course over three terms across two years.

Design Supervision | Architecture Tripos (Parts IA, IB, II)
Small-group supervision in Computational Design and Architectural Theory & Visualization, with emphasis on conceptual development, portfolio development, computational experimentation, and prototyping. Teaching integrated digital design and fabrication, visual and sensory methodologies, and spatial computing.

Cambridge Sutton Trust Summer School, University of Cambridge (2012 and 2013)
Designed and delivered *Cinematic-Aided Design: Projected Architectural Drawings*, an intensive studio exploring time-based spatial representation and cinematic methods.

International Workshops

Curriculum Designer & Lead Instructor | Various dates, 2010–2017

+ **Node17, Node Forum for Digital Art (Frankfurt, 2017)** | Paper Pop-Up Projection Mapping, bridging analog material design with digital media. nodeforum.org/program-items/paper-pop-up-projection-mapping
+ **Nanjing University, China (2011)** | Cinematic-Aided Design: Index of Urban Spatial Practices, an advanced workshop investigating cinematic methods for reading and representing urban spatial practices.
+ **Nanning Urban Planning Bureau, China (2010)** | Sensation of Space, an urban fieldwork and sensory site-mapping workshop.

CURRENT RESEARCH PROGRAMS

Gesture as Generator | Cambridge doctoral research (2025) A practice-based framework positioning gesture as an operative mechanism linking architectural thinking, sensing, making, and becoming, developing spatial transformation rather than simply representation.

AGOS | Architectural Gesture Operating System | A computational framework that brings gesture into architectural syntax, shifting it from a representational concept to an operational one by translating gesture, cinematic operation, and environmental conditions into generative design operations through explicit rules and computational procedures.

AGOS Manta | Developing a C# plug-in for Rhino/Grasshopper that implements AGOS as a modular computational framework. Current components address BVH motion capture, Gesture, State, Threshold, Trace, Frame, and Sequence. A further component, ΔS (Archigesture), is being developed to formalize the resulting change in spatial conditions.

Cinematic Operators | A design methodology within AGOS that translates cinematic techniques into rules, computational operations, spatial transformations, and architectural outcomes.

Environmental Gesture | A research methodology examining gesture as an environmental condition, modulating light, airflow, material behavior, sound, and atmospheric conditions across architecture.

Cinema, AI, and the Future of Human-Centered Urban Simulation | Computational contribution to collaborative research with Prof. François Penz through the Urban Digital Humanities Lab and Nanjing University. The work explores how AI and computer vision can extract patterns of human movement from film to translate into behavioral parameters for agent-based urban simulation in Unreal Engine.

PUBLICATIONS

Manuscripts under Review

Sun, Y., Soltani, A., Zhu, L., & Penz, F. (2026). *From Screen to Space: Materializing Cinematic Traces of Everyday Urban Experiences.* Manuscript submitted for publication in Visual Communication.

Soltani, A. (2026). *Gesture as Environmental Operator: Atmospheric Fields and Temporal Modulation.* Manuscript submitted for publication in Ambiances: International Journal of Sensory Environment, Architecture and Urban Space.

Peer-Reviewed & Published (Selected)

Soltani, A. (2026). Estranged Ambiance: Alienation and Negative Atmosphere in Architectural Space. In R. Kazig, D. Paiva, A. Pavoni, & R. Shaw (Eds.), *Negative atmospheres: Less is more*, Routledge.

Soltani, A. (2025). *Gesture as Generator: Architectural Gesture as Mechanism of Meaning-Making* (Doctoral thesis, University of Cambridge). Apollo – University of Cambridge Repository. https://doi.org/10.17863/CAM.130403

Soltani, A. (2020). *Atmospheric Gestures of Architecture in Cinematic Aided Design Framework.* In Proceedings of the 4th International Congress on Ambiances (pp. 232–237). https://doi.org/10.48537/HAL-03220300

Soltani, A. (2013). *Practice-Based Design by Research.* Scroope 22 Cambridge Architecture Journal.

Soltani, A. (2013). *Cinematic-Aided Design and Architecture: Sources, Methods, and Potentials.* In *306090, Vol. 15: (Non-)Essential Knowledge for (New) Architecture*. Princeton Architectural Press. https://doi.org/10.5281/zenodo.20837503

Soltani, A. (2011). *Embodied Airborne Imagery: Low-Altitude Urban Filmic Topography.* In S. A. Dunn, J. P. Bowen, & K. C. Ng (Eds.), Electronic Visualization and the Arts (EVA 2011). BCS Learning & Development Ltd. https://doi.org/10.14236/EWIC/EVA2011.22

Conference Papers & Presentations (Selected)

Soltani, A. (2026). *Cinema as Urban Knowledge: Bridging Film Analysis and Urban Simulation.* Cinema, AI and the Future of Human-Centred Urban Simulation: From Cinema to Behavioural Digital Twins. Department of Architecture, University of Cambridge, 23 September 2026. A UDHL–NJU Symposium.

Soltani, A. (2017). *The Endless Gesture of Frederick Kiesler's Design Research.* Digital Studio Symposium, Martin Centre 50th Anniversary Conference, Department of Architecture, University of Cambridge, 14 December 2017.

Soltani, A. (2013). *Mapping Cinematic Dialogue,* at the Cinematic Geography Conference, CRASSH, University of Cambridge.

Soltani, A. (2011). *Mapping Architectural Appearances, Affects, and Amodality.* In Proceedings of the 17th International Conference on Distributed Multimedia Systems (DMS 2011) (pp. 74–77). Florence, Italy: Knowledge Systems Institute.

Soltani, A. (2011). *Archigestural Time Space: Archaeology of Embodied Lived Space*. Paper presented at the Theoretical Archaeology Group (TAG) 2011 USA Conference, University of California, Berkeley.

Soltani, A. (2009). *Haptic Cinema: As Sensory Interface to the City*. In F. Penz & A. Lu (Eds.), *Proceedings of the Urban Cinematics: Film, City and Narrative Symposium* (pp. 181–189). Department of Architecture, University of Cambridge. https://doi.org/10.5281/zenodo.21125610

Soltani, A. (2009). *Panohaptic Interface for Architectural Filmic Improvisation.* Electronic Visualization and the Arts (EVA 2009). https://doi.org/10.14236/EWIC/EVA2009.27

Soltani, A. (2009). *AR Webcams: The Tangible Space of Visible and Invisible in Video.* Video Vortex 4, Split, Croatia. https://networkcultures.org/videovortex/past-events/video-vortex-split/program/

Soltani, A. (2008). *Cinesensory: A Filmic Design for Mapping Urban Sensorial.* In Proceedings of the Design Cinema Conference 2008: Design-en-scène. Istanbul, Turkey.

Soltani, A., & Ng, K. (2000). *Trans-domain Mapping, Music via Motion*. 33rd Royal Musical Association (RMA) Research Students' Conference, University of Huddersfield, Huddersfield, UK.

BOOKS PROJECTS IN PREPARATION *(Target: Q2 2027)*

Gesture as Generator: Thinking, Sensing, Making, and Becoming in Architecture
A theoretical study of architectural gesture as a generative mechanism connecting embodied perception, spatial thinking, material practice, and environmental experience. The book develops *Archigesture* as a framework for understanding gesture not as visual expression or formal representation, but as an operative relation through which bodies, materials, atmospheres, and temporal conditions produce spatial transformation.

Cinematic Operators: Gestures, Relations, and Spatial Transformation
A design methodology translating cinematic operations, including framing, sequencing, movement, and temporal modulation, into computational workflows for architectural design. The book investigates how these operations can be encoded as explicit design procedures, enabling the generation, evaluation, and transformation of spatial conditions. It develops applications for computational design practice and architectural education, connecting theoretical inquiry with parametric modeling, iterative experimentation, and spatial prototyping.

RESEARCH METHODS & TECHNICAL EXPERTISE

+ Computational methods | modeling, parametric design & plug-in development, AGOS Manta, Spatial analysis, simulation, procedural geometry.
+ Rhino 3D / Grasshopper |Parametric modelling, computational design, and algorithmic workflows.
+ C# | Familiarity with programming for Rhino 8 and Grasshopper, including the development of custom computational design components, and Microsoft Visual Studio.
+ Python | Foundational knowledge, with a focus on architectural computation, geometry processing, and AI-assisted workflows.
+ Atmosphere Lab |Cambridge (2025-26), Research / workshop proposal https://archigesture.org/workshops/atmosphere/
+ Spatial & Environmental Analysis | SpaceChase (Space Syntax - integration, choice, connectivity, control), VisualTracer, CFD wind Analysis
+ Time-based media & spatial simulation | Unity / Unreal Engine / VR / AR
+ Interactive & projection-based environments | vvvv (visual programming), projection mapping installations, Processing, MadMapper
+ Sound synthesis & DSP | MAX/MSP, modular synthesis
+ Prototyping, fabrication | 3D printing, CNC (incl. Maslow), Polargraph, EEG (Emotiv), motion capture, Bare Conductive Interactive wall, physical computing and sensing systems

EXHIBITIONS & COMPETITIONS

+ **A Bench in Venice / Chronotope Bench**, International Design Competition (2021) | Shortlisted.
+ **Bocconi Campus**, International Design Competition, Milan (2012) |Shortlisted; $5,000 honorarium.
+ **Still Architecture,** University of Cambridge, Department of Architecture (2012) | Exhibition | presented work; assisted with installation.
+ **Urban Cinematics: Haptic Mapping of the City**, ArchFilm Matinee, Film Casino, Vienna (2010) | Exhibition / Screening
+ **Codecity: incrementing = true**, 5th International Festival for Architecture in Video, Florence (2000) Exhibition / Screening http://architettura.it/image/festival/2000/en/works/2000165.htm
+ **Random Ranting**, College of Environmental Design, UC Berkeley (1998–99) | Exhibition

AWARDS & AFFILIATIONS

+ EPSRC Doctoral Scholarship (UKRI)
+ UC Berkeley Design Fellowship
+ Margaret Whitmarsh Scholarship
+ UC Berkeley Block Fellowship
+ Member of ICSRiM (*Interdisciplinary Centre for Scientific Research in Music)*, University of Leeds

INVITED LECTURES, REVIEWS & ACADEMIC SERVICE *(Selected)*

+ **Cinema, AI and the Future of Human-Centred Urban Simulation:** *From Cinema to Behavioural Digital Twins*, UDHL–NJU Symposium, University of Cambridge (September 2026), Invited presenter
+ **CineMuseSpace**, Contributed to conference organization alongside computational modeling and interactive filmic-path work (2021).
+ **DIGIS, Department of Architecture, University of Cambridge**, Supported the department's research culture by maintaining the group's website and digital archive, assisting Professor François Penz with presentation and symposium work, and helping organize seminars and symposia (2011–2024).
+ **The Endless Gesture of Frederick Kiesler's Design Research**, Digital Studios Symposium (DIGIS), Martin Centre 50th Anniversary Conference, University of Cambridge (2017), Invited talk
+ **Cinematic Geography,** *Mapping Cinematic Dialogue*, CRASSH, University of Cambridge (2013), Invited Presenter
+ **Cambridge Science Festival**, University of Cambridge (2013), helped prepare the Department of Architecture's exhibition for public engagement
+ **Still Architecture,** University of Cambridge (2012), contributed to conference organization, helped assemble the exhibition installation over several days, and presented work as part of the event.
+ **100 Years:** Research and Practice Symposium, Clare College, University of Cambridge (2012), contributed to event organization.
+ **Department of Architecture PhD Colloquium,** University of Cambridge (2012), Co-organizer
+ **As Found,** Department of Architecture, University of Cambridge (2010), First-year architecture student critic

RESEARCH TRAJECTORY

Phase I (1998 – 2012) | Cinematic Geographies & Embodied Perception

+ **Methodological Foundation:** Initiated a long-term inquiry crossing architectural representation, time-based media, and electroacoustic sound synthesis, grounded in early hands-on experience in exhibition installation, art handling, and gallery operations at Vorpal Gallery, San Francisco, during undergraduate study in Visual Studies and Film (SFSU, 1994). Continued through graduate research at CNMAT and Berkeley's College of Environmental Design (1996–2000), including an MA thesis, Sound and Vision: A Cross-Synthesis of Sensual Perceptions, and archival work processing Northern California architectural and landscape records at the UCB Environmental Design Archives (EDA).

Phase II (2013 – 2020) | Spatial Computation & Digital Heritage Networks

+ **Technology Crossover:** Expanded cinematic methods into computational design, projection mapping, responsive environments, and digital fabrication through Metrowave Studio, alongside projects including PolyChora Alpha & Beta and CineMuseSpace, and a role within DIGIS, University of Cambridge (2011–2024), managing the group's website and digital archive of research outputs and supporting Prof. François Penz's presentation and symposium work.

Phase III (2020 – Present) | Gesture as Generator & Environmental Atmospheres

+ **Core Synthesis:** Began EPSRC-funded, part-time doctoral research at the University of Cambridge (2018), consolidating prior media and computational research into a single doctoral framework while continuing DIGIS digital-archive work. From 2019, research within Applied Urban Studies, including computational modeling and interactive work (Rhino/Grasshopper, Unity).
+ **Current Development:** Developed *Gesture as Generator* as a practice-based framework positioning gesture as an operative mechanism connecting thinking, sensing, making, and becoming through spatial, material, and environmental transformation. This research is being extended through **AGOS Manta**, a custom Rhino/Grasshopper framework for encoding, tracing, and testing architectural gestures as computational operations and **Cinematic Operators**. These projects investigate how human-centered computation can transform gesture into an architectural syntax of rules, relationships, and spatial change.