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W-120301, 2012. Aluminum, glass, and existing architecture, dimensions variable. Photo: James Ewing

Cause and Effect: A Conversation with Sarah Oppenheimer

May 3, 2022 by Robert Preece

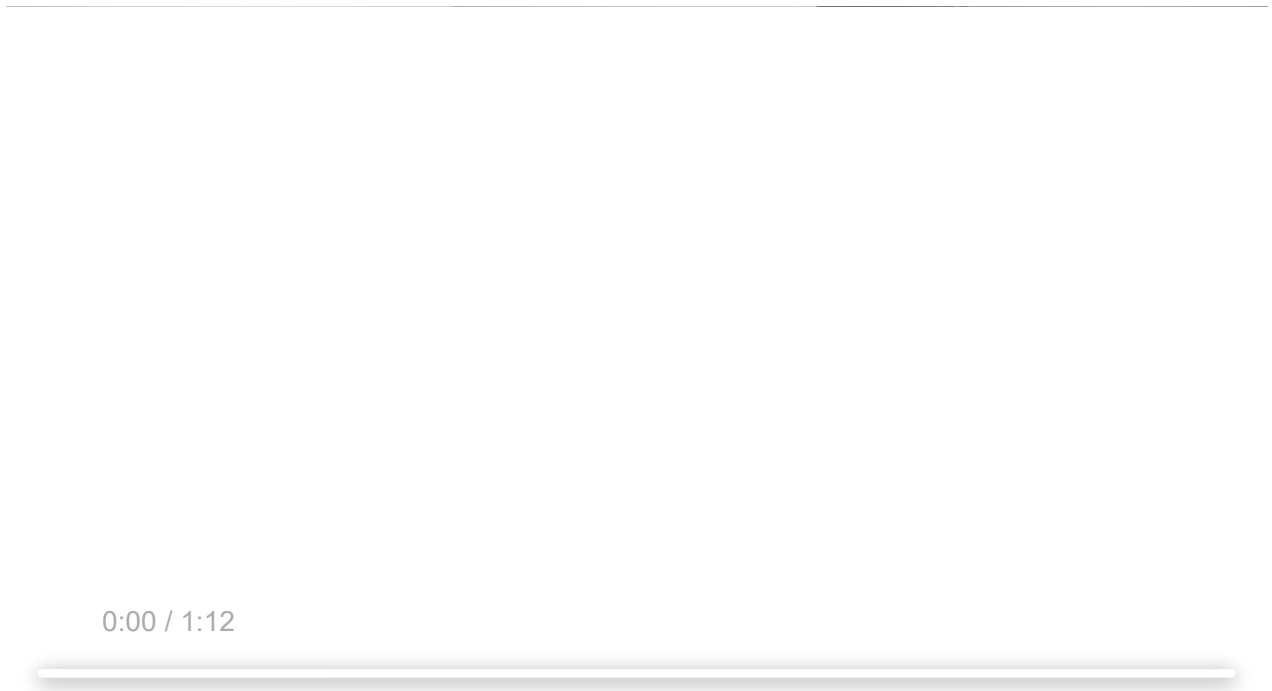
Sarah Oppenheimer challenges the limits of sculpture and architecture in order to investigate how spaces shape behavior and how behavior can, in turn, impact inhabited space. Her intriguing kinetic constructions, their movements frequently set in motion by human touch and action, function as precision-engineered "instruments," designed to manipulate the built environment and remake our relationship to it by playing with light, psychology, and perception, as well as depth and passage. Oppenheimer's aesthetic study of spatiosocial dynamics results in a genuinely interactive and experimental approach to sculpture and installation: viewers connect with each other, the work, and its context, their responses providing additional input for the artist's ever-evolving, sensory-confounding explorations. Her projects contain a certain mystery since their internal mechanisms are not necessarily visible, yet they also present a certain kind of order. It's the kind of work that needs to be experienced over, and over, and over again.

N-01, 2020. Aluminum, steel, glass, and existing architecture, dimensions variable. Photo: Serge Hasenböhler

Robert Preece: What keeps you fascinated with and returning to these kinds of interior architectural interventions?
Sarah Oppenheimer: The built environment contains us, and its machines maintain us, creating an intertwined ecosystem of context and habitation. How does this cacophony of interconnected things materialize? How might our presence within these systems remake and reorder their hierarchies and interdependencies? For the past two decades, I have explored what it means to be inside architecture. Our material envelope is a dynamic organism—it performs as the bodily boundary of our social whole.

RP: Could you discuss "Sensitive Machine," your exhibition at the Wellin Museum of Art last year? You created four specially made works that harnessed the energy of a moving body to change the shape of space.
SO: "Sensitive Machine" was a hybrid: part human, part digital, part analog. It contained within it the intimacy of a hand gesture and the expansiveness of cybernetic feedback. Touch set in motion a dynamic exhibition system. Four instruments—technical ensembles buried within the exhibition architecture— overlapped and interconnected. Each instrument contained within its mechanism an input in the form of a hollow black aluminum beam. As visitors touched and turned each input, a choreography of spatial change was set in motion. Lighting tracks slipped between the vertical surfaces of sliding walls. Luminosity levels fluctuated, while sightlines were interrupted and revealed.

Observing from a distance, the exhibition space was in flux, a temporal score of position. Gestures adapted and changed in a dynamic web of self-modulation so that the piece was made and remade in a continual cycle of haptic feedback. This modulation of making is the subject and object of the work.



N-01, 2020. Aluminum, steel, glass, and existing architecture, dimensions variable. Video: Serge Hasenböhler

RP: How would you describe *N-01* (2020), created for the Kunstmuseum Thun in Switzerland? Were you "subverting," "raising awareness of," and/or "redefining" the space? "Enabling" a kind of performance?
SO: It's about exploring cause and effect. You touch something here; you affect something there. *N-01* created a temporal network. Inserted within the walls of the Kunstmuseum Thun's many rooms, instruments set up relays of cause and effect. Manual manipulation of an instrument's input created changes in remote outputs, modifying light levels, sightlines, and processional paths through adjacent galleries.

In one gallery, a glass and aluminum volume, seemingly supported above and below by two opaque white walls, divided the entryway. Pivoting this volume around an off-center axis shifted its alignment. As the glass volume turned 180 degrees around its axis, surrounding walls slid in and out of configuration. This rotary and linear periodicity expanded and constricted passage on either side of the dividing wall.

In an adjacent room, turning an aluminum bar rotated large louvers obscuring the façade windows overlooking the river Aare. The space was intermittently suffused with daylight, modulating the brightness of surrounding galleries. Glass volumes nearby, previously transparent, became reflective. As walls retracted and windows opened, visitors and sightlines overlapped in multiple interconnected orbits.

RP: What artistic and technical challenges did you face with the larger scale *S-334473* (2019), currently installed at MASS MoCA, and *S-337473* (2017), shown at the Wexner Center for the Arts?
SO: *S-337473* at the Wexner was one of my first tactile pieces. Positioned at a 45-degree angle to existing building grids, two rotating steel-and-glass structures were activated by the lightest touch. Visitors rotated the beams around an eccentric axis, transforming columns into lintels, thresholds into screens, and back again. The dyads functioned as a conduit: the energy of a human operator set the work in motion, while the momentum of each element modulated the motion of the operator.

The orientation, mobility, and weight of these new elements introduced unexpected technical challenges. Their shifting center of gravity was unstable. New methods were needed to simulate the gestural pathways between material environment and bodies in motion. This proprioceptive feedback could not be predicted by architectural models or technical drawings alone. In collaboration with Ohio State University's Department of Mechanical and Aerospace Engineering, we developed a counter-weight system for tactile calibration. By positioning discrete counterweights along the exterior edges of each rotating volume, we were able to shift its center of mass and achieve dynamic equilibrium. So, touch also became a technical tool through which to regulate and modulate movement.

S-334473, 2019. Aluminum, steel, glass, and existing architecture, dimensions variable. Photo: Richard Barnes

RP: How did *33-D* (2014) address the interior architecture of the Kunsthaus Baselland?

SO: In each of my works, I perform a two-fold manipulation of the existing environment. The first maneuver involves the insertion of a discrete and bounded apparatus—a door, a window, a column, a beam. This element distinguishes itself from the surrounding architecture. The second maneuver involves the alteration of pre-existing architecture housing the apparatus. This maneuver is of equal importance, but it is designed to remain unnoticed by the viewer. Examples include the thickening of a wall in *W-120301* (2012) at the Baltimore Museum of Art and the resizing of cladding on overhead beams in *S-011110* (2017) at Annely Juda Fine Art. Alterations are camouflaged: new build-outs seamlessly blend into existing cladding.

In *33-D*, understanding the pre-existing alignment of the exhibition space was essential to creating perceptual dissonance with an inserted apparatus. Constructed and reconstructed over many decades,
the museum's processional axis twists and turns through overlapping galleries. *33-D* interrupted this path. It was sited in an elongated space bounded by a wall of windows. Two thresholds of aluminum and glass trisected the room, creating an enfilade. Thresholds were divided by large glass planes, oriented at 45 degrees to both the wall of windows and the processional pathway.

Under certain lighting conditions, glass optically dissolves. Under others, it appears reflective and opaque. Its visual effect is dependent on environmental conditions and viewing position. The toggling between transparency and opacity was a defining element

in *33-D*. When viewed from one side, the glass appeared transparent; viewed from the other side, the threshold reflected the world beyond the windows, bringing the space of the city into the gallery.

33-D, 2014. Aluminum, glass, and existing architecture, dimensions variable. Photo: Serge Hasenböhler

RP: *P-021110* (2014), which was installed at the von Bartha gallery in Basel, also featured passageways. Was it related to *33-D*?
SO: Boundaries create the illusion of openness, transforming the chaos of undifferentiated space into a discrete, empty whole. The von Bartha exhibition space was interrupted by a pre-existing line of columns, creating an eccentric wedge along one side of the gallery. *P-021110* camouflaged this architectural eccentricity. A floor-to-ceiling partition wall was erected around these structural columns, and two adjacent glass-and-aluminum thresholds were placed within this new wall, isolating light conditions on either side of the wedge. Paradoxically, the new spatial division created a greater sense of seamless openness.

RP: How do you go about titling your installations?
SO: The title of each work is a key to its orientation within the built environment. Titles are generated from numerical typologies. Early typologies use the notion of spatial adjacency as a defining principle.
This taxonomic structure assumes that the work is situated in a boundary plane dividing two or more spatial zones—designated A, B, C. Each digit in the title describes the flow—or lack of flow—between zones. Titles imply that architectural space can be simplified within a taxonomic system—what "matters" about the space is its relative position within a larger array.

In my recent work, boundaries have dissolved into thin air. The four instruments in "Sensitive Machine" expanded and contracted boundaries that had no footprint. The spaces *in between*—between bodies, rooms, between hand and handle—were interconnected through relays of cause and effect. This re-examination of adjacency required a new taxonomic structure, in which linkage and temporal-spatial change are defining features.

The phasing of interconnected elements molds the perception of temporal and spatial adjacencies. The instruments were titled *I-142-03-70, I-142-03-70, I-132-03-50*, and *I-142-03-70*. Each digit in an instrument's title indicates a temporal relationship between the input (the element activated by
human gesture) and output (elements that move in response to human action).

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S-011110, 2017. Aluminum, steel, glass, and existing architecture, dimensions variable. Video: Dan Fontanelli and Heinrich Schmidt

RP: How does *W-120301* describe the orientation of what you created at the Baltimore Museum of Art?
SO: *W-120301* was a single, hollow volume buried within the museum's plenum. This cavity opened onto three discrete spaces—the first and second floor contemporary exhibition galleries and a larger atrium space. The title describes the flow between these adjacent rooms.

The first digit of the title classifies a perceptual relationship. "W" indicates "wormhole," a term related to theories of cognitive mapping, particularly in non-Euclidean, virtual space. Memories of spatial navigation accrue over time as we build a mental map. Perceptual dissonance within this mnemonic map, created by unexpected openings and apertures, heighten the experience of spatial discontinuity. *W-120301* disrupts our mental picture of congruous space by visually collapsing distant locations within the same vertical plane. The second digit of the title indicates the position of the work within a material array—the number of adjacencies bridged by the piece. In the case of *W-120301*, the number 1 signifies three spaces (A/B/C). The remaining digits in the title each describe the flow and direction of light, air, and passage between each of the adjacent zones.

610-3365, 2008. Plywood and existing architecture, dimensions variable. Photo: Tom Little

610-3365, 2008. Plywood and existing architecture, dimensions variable. Photo: Tom Little

RP: Do you consider *Hallway* (2002) at the Drawing Center in New York and *610-3365* (2008) at the Mattress Factory in Pittsburgh as key works in the development of your practice?
SO: Both works are critical landmarks in how they manipulate temporal and spatial hierarchies. *Hallway* was constructed as a mutable space that functioned as both exhibition and prototype. Modular wall panels were repeatedly reconfigured in response to the observed movement of test subjects. *Hallway* was an early exploration of human-environment feedback.

610-3365 shuffled spatial and social hierarchies differently. A wood-lined hole, buried in the floor on the fourth floor of the museum, passed through the third-floor ceiling and façade wall, opening to the street below. This perforation of the building's opaque boundaries re-ordered visitor experience of adjacency and proximity.

RP: You have a fascinating R&D section on your website featuring in-process photos, plans and schematics, and a video showing a test demonstration. What are you presenting here?
SO: These documents archive the studio's iterative process of prototyping. We begin with manual manipulation of small-scale objects, assessing how the gesture of an activator is entwined with a prototype's movement. As we gain fluency with the technical limitations and possibilities of each device, the prototypes expand in scale. Inputs and outputs incorporate architectural elements such as glass planes, steel tubes, and wood panels. With each step, we evaluate and modulate the human movement required to set the work

in motion. The process is open-ended, involving repeated experimentation and constant revision. Predicting an outcome is impossible, absent the feedback loop between prototyping and redesign.

C-010106, 2022. Aluminum, steel, glass, and architecture, two apparatuses: 191 x 124 x 34 in. and 56 x 124 x 34 in. Photo: Richard Barnes, commissioned by Landmarks, The University of Texas at Austin, 2022

RP: To what extent do you make your own work?
SO: Making requires collaboration between people and things. It is a coordinated action across tools and technologies. In 1923, Moholy-Nagy picked up a telephone and called a sign painter. His voice communicated color location by calling out a set of coordinates on a grid. The telephone, a sound-transmitting apparatus, functioned as an art-making tool, facilitating and authoring his paintings. Making was severed from the feedback between hand and eye, thrust into the mediated labor of a dynamic, automated technology.

Since that time, our tools have evolved. Analog airwaves coexist with digital signals. What is the relationship between the click of a mouse and the position of a router as it mills a block of steel? The operation of a crane as it hoists a curtain wall? Where does making reside? In the hand or in the machine? In one body or in many? Human touch is enmeshed in networks of mechanized motion.

Sarah Oppenheimer's S-334473 *(2019), featuring two instruments that work in tandem to reorient sight and movement, is currently on view at MASS MoCA. Her new permanent commission for "Landmarks" at the University of Texas, Austin, opened on April 30, 2022;* C-010106 *features dynamic glass elements transecting a pedestrian bridge to "reconfigure social patterns emerging within the flux of public space."*

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