S-399390, 2016, glass, metal, wood, and architecture, dimensions variable. Courtesy of the artist and Mudam Luxembourg. Photo by Serge Hasenböhler.

We live in the age of the museum. Thousands have opened in the US and around the world since 2000, and visitors have answered their call, flocking to them for everything from exhibitions to lectures to children's sleepover parties. Often architectural wonders in their own right, museums today are no longer musty storehouses of the past, but public venues where private dreams intersect with public life. It shouldn't surprise us, therefore, that they have come under increasing artistic and critical scrutiny. The old opposition between the "white cube" and the "black box" feels obsolete, even as the exhibition space's importance as a subject of artistic and critical investigation continues to grow. One such investigation, by Sarah Oppenheimer, an artist who has long worked with built environments, and, in particular, the spatial organization of the museum, takes place this fall at the Pérez Art Museum Miami. This interview began as a conversation between Oppenheimer and media theorist Alexander Galloway held at the Center for Curatorial Studies at Bard College in April 2016.

—Saul Anton

P-021110, 2014, glass, aluminum, and architecture, dimensions variable. Courtesy of the artist. Photo by Andreas Zimmermann.

ALEXANDER GALLOWAY I'd love to begin with the fundamental question of space in architecture. I was struck, listening to a lecture you gave recently, by your discussion of the acts of dividing and splitting space. You establish boundaries within and between spaces that do not take the form of a grid or a rigid, regular structure. Tell us how you have gone about this in recent projects.

SARAH OPPENHEIMER You're pointing to a very common trend in contemporary architecture: a lack of fixed subdivision. Spatial zones are defined but not divided, and flow is encouraged between zones. More traditional ways of design tended to produce discrete, divided spaces. Nineteenth-century museums such as the Metropolitan Museum of Art in New York or the National Gallery in London direct visitors through discrete galleries along a fixed path. They have fixed walls that do not get torn down and reconfigured for every new exhibition. Visitors move through isolated, specific and, sometimes, dead-end rooms, and there's a processional quality to the experience. By contrast, Frank Gehry's Bilbao, or Marcel Breuer's former Whitney Museum of American Art [now the Met Breuer], or Renzo Piano's new downtown Whitney building, have open, cavernous, and infinitely flexible zones. SANAA's 21st Century Museum in Kanazawa, Japan emphasizes undirected navigation through an open plan. But in order to make this open-plan function, a tremendous amount of dividing happens. Partitions are concealed, so you don't notice lighting systems or the air conditioning. You don't see the maintenance or storage areas, or how artworks travel between storage and exhibition spaces. What appears to be open space is often the result of an architectural sleight of hand. Boundaries create the illusion of openness, transforming the chaos of undifferentiated space into a discrete, empty whole.

AG How does this play out in your work?

SO In *P-021110*, a project I showed in 2014 at Galerie von Bartha in Basel, the open space of the gallery was interrupted by an irregular column grid. Exposed columns and trusses created an excentric wedge along one side of the exhibition space. I buried these structural members within a floor-to-ceiling partition wall. A pair of glass-and-aluminum thresholds were located within this wall, isolating light conditions on either side of the boundary. At the same time, this increased division created a sense of seamless openness.

AG So you think that a return to division is a way to push back against today's dominant trend toward flow, indistinction, and integration?

SO I do, particularly when I'm working in the context of a museum space. Museum plans often correspond with the historical evolution of spatial division. While developing my project for the Pérez Art Museum Miami, for example, I learned that Herzog & de Meuron presented the museum administration with a gallery typology that traced the historical development of the museum floor plan from the enfilade at the Louvre and the Hermitage to "suites" at the Tate Modern and the Beyeler Foundation, to the "matrix" at the 21st Century Museum.

AG Dividing a space can take the form of a wall obviously, but it can also happen as an informal boundary that can be transgressed. You must spend a lot of time thinking about floor plans. As someone who works in a specifically architectural vocabulary and context, perhaps even more so than artists who consider their work to be about site-specificity, how do you connect ideas of the array and of cellular division to the architectural plan?

SO I have used the term *array* to align the spatial organization of a place—a museum, a public building, a home—to a broader set of historical, social, and spatial patterns. It encompasses the protocols of spatial organization determined by construction codes, the availability of material, and spatial development. Museums are a wonderful example of the relationship between the array and the architectural plan.

AG Historians of domesticity have written about the invention of the hallway and the disappearance of the enfilade or the railroad apartment. I love that one of the casualties of all that is the room divider. It used to be that people had screens in rooms in order to change their clothes. I think it really does come back to a fundamental act of division.

SO It's interesting to consider how discrete units are organized. Division is common in museums. Walls and ceilings house extensive mechanical systems for airflow and lighting. But, as I mentioned, they're buried, so you don't think about where the lighting system or the air conditioning are located. You think about the visible exhibition space. The Pérez presents a flexible space interspersed with discrete rooms, but there's a three-foot-deep cavity beneath the floors of the galleries that doesn't correspond easily with the rhetoric of flexibility.

AG You have a particular way of titling your pieces, for example, *S-281913*. It's as if you're encoding something, or arranging a set of possibilities. Can you describe your approach to titles?

SO The titles are generated from a typology of transactions between spatial zones. Each discrete space is assigned a generic nomenclature: space A, space B, space C, and so on. Each digit in the title tracks

different types of flow between the spaces. For example: a viewer may be able to look from space A to space B, but be unable to walk between them. My title describes this relationship: the integer in the third position describes sight, the integer in the fourth position describes circulation. In theory, the title of an artwork is a key to the orientation of the work within the array.

AG Your typology and naming conventions are great. They remind me of bit masking and bitwise operators.

SO What are those?

AG They're used to manipulate strings of numbers by performing an operation on each number in its position in the word. They're commonly used in binary arithmetic. Your naming convention has a similar approach. The integers each have their own meaning. How do you connect real space and representational space?

SO I'm fascinated by the potential of this connection. The floor plan is often the mode of representation that best corresponds with our path of procession, the sequential passage from one space to another. In contrast, the section rarely corresponds to how we experience a building. A section is often surprising because it contradicts the lateral axis of procession. One extraordinary example of the relationship between experiential and representational space is the classic arcade video game *Pac-Man*. Players navigate the space of the game through endless hallways. But you can go out the left side and come back in on the right via a connecting hallway. A fascinating thing happens in that instance: there's an obvious yet acceptable contradiction between our experience of the representational space *as* space and our reading of it as a diagrammatic plan.

AG You've made work that utilizes wormholes, similar to the *Pac-Man* effect where space wraps from one side to the other. And I know that you've been thinking a lot about Euclidean space, coordinate systems, and what non-Euclidean geometries might look like, and how they might operate. Can we have an architectural model and an architectural experience that doesn't conform to the dominant Euclidean mode?

SO I like to imagine that we tend toward experiential continuity, creating a seamless sequence as we proceed through our environment. I want to make evident the perceptual edits that allow us to maintain this sense of seamlessness. My work aims to heighten the dissonance between the Euclidean coordinates of built space and our experience of it. In *W-120301*, at the Baltimore Museum of Art, I used the existing division of the building to interrupt our sense of its seamlessness. The piece was inserted within the thickness of the walls and floors, creating a composite view into the adjacent atrium and the exhibition space directly below. It takes time to walk from one location to another, and my piece used the spatial division to generate a visual shortcut.

AG How does this relate to the history of the open floor plan you were talking about earlier?

SO It invokes the history of the curtain wall, which was used, for instance, to build the *Bauhaus* in Dessau in 1926 and the *Lever House* in Midtown Manhattan in 1952. These projects liberated the wall from the task of holding up a building, thus making possible the flexible spaces and open floor plans that we're so familiar with today. The development of the open plan also coincided with innovations in glass and its use as a facade material. Transparent facades were unable to conceal mechanical infrastructure, so these systems began to be buried in temporary walls and overhead cavities created with drop ceilings. Today, the ever-increasing volume of digital infrastructure is generally located in the thickness of the floor.

AG So a shift from walls to floors.

SO Yes, my piece *S-281913* at the Pérez takes advantage of the plenum space beneath the floor plane. The piece's structural elements will be buried under the gallery floor: a large beam will be wedged between the architectural concrete and the metal decking supporting the floor plane. This structural move allows the space to remain undivided. The work will then be free to operate as a switch, bouncing light between the building exterior and the overhead florescent lighting grid.

AG You've talked about ray tracing in the past, which allows one to render a space by pretending that a ray of light is moving through it, then mathematically calculating how it hits an object. People often shift into romantic and sublime phenomenology in discussions of light, where it's all about how light reveals the world in its primordial being, and a kind of spirituality kicks in. That's not what you do. You use the term *isovist*, which is taken from urban planning and refers to a space visible from any vantage point. It implies that a space visible to an observer can, almost by definition, create its own floor plan. So you're interested in the linearity of light, and you're asking: What can light see? You've made the point—which I love—that light systems are scalable. You can scale them up and you can scale them down. This is also true of 3D coordinate systems, which can be massive or small with no loss of resolution.

SO Light is intensely regular and predictable. You can understand how sunlight will change over the course

S-399390, 2016, glass, metal, wood, and architecture, dimensions variable. Courtesy of the artist. Photo by Serge Hasenböhler.

of a day or a year. And you can predict precisely how sunlight will illuminate, reflect, or absorb light from neighboring surfaces. You can digitally model it without friction or noise. That means that it's a variable in a space. You can flatten things, you can shift color and proximity, you can create spaces that seem very small but in fact are very large. Analog light models are unusual. Unlike materials such as wood or glass, which behave very differently at different scales, light behaves the same at every scale.

AG Do you introduce light sources ever, or do you only use existing or available light?

SO I change light bulbs, but I've never introduced additional light sources. The eye always assumes that it exists in a neutral color space. Therefore, you need to establish a correspondence between the neutral reference of the eye and a specific light temperature. One way to do this in an analog situation is to use identical fixtures and bulbs with an equivalent Kelvin value. You can then use this value as a standard against which to kick light in a specific direction—either warmer or cooler.

AG Right.

SO You need a standard. I like to establish a standard with lighting and then work against it.

AG I know you're sensitive to micrograduations of color that a lot people might never see. Is it really just about finding a standard?

SO Well, I don't have a position, but I do have a preference.

AG (*laughter*)

SO Piet Mondrian insisted on fluorescent lighting. Fluorescence is really useful because it diminishes volume, and I like that.

AG Oh?

SO It does something very specific. Light is fascinating because even though you can model it digitally, a rendering or a picture of light is always different when you inhabit that space physically. And that, I think, has to do with a kind of adaptive wetware we have—our bodies are always taking the light condition we're in as normal and projecting the anomalous away from ourselves. When you look at a rendering or a computer screen or a printed document, you're looking at a set of fixed light relationships. I avoid models using rendered light—by which I mean digital real-time or scripted radiosity tools—which show how light will bounce off of or be absorbed by surfaces.

AG Why? Because it's misleading? Or because you don't like rendering?

SO Because I don't like rendering, and diagramming that light condition requires a real break with our experience of it.

AG I like that about you.

SO Well, I'm curious why you like that.

AG I like it because it means that, for you, the computer screen is not the dominant technology. The only reason why things are rendered is to be able to have something exist in a two-dimensional image that represents a given shape. It seems like you're primarily interested in the fully volumetric form, and a rendered screen is just not what you're doing. Is that accurate?

SO I'm still grappling with that. (*laughter*) I'm interested in the possibilities and limitations of the tools we have. When we are looking at a monitor using 3D drafting software, we imagine we're designing in and working with tools of spatial manipulation. By and large, we are manipulating points defined by coordinate systems. But we don't perceive these systems. Instead, we perceive whole, rendered, smooth volumes. We perceive light-dappled interiors and don't recognize that they're made of discrete entities. Rendering obfuscates discreteness, I think—which leads me to wonder whether you think there's some weird correlation between our perceptual tendency toward continuity and the highly articulated differentiation of the digital.

AG That's a huge question. The human sensorium and the physiognomy of our senses are such that they are able to fuse what is, in reality, fragmented information. Film is the classic example. You have this insanely cut-up media substrate, and because it's presented to you at a certain speed, you perceive it as having continuity. A former student of mine has written an amazing text on the tactile pixel. Nineteenth-century scientists performed experiments on how closely you can touch two needles on your skin before you can no longer tell that they're two instead of one needle. It turns out there's a haptic fusion situated directly on the skin.

But maybe we can shift gears a bit. I know you're working on a set of dynamic mechanical objects and architectural installations. Can you say something about switches? An electrical switch governs the flow of electrons through copper wire. In your case, a switch might govern the flow of light, sound, or air, along with people viewing and interacting with the work.

SO I became interested in switches by looking at a series of threshold and transition spaces that we would generally call doors. This happened at a moment when I needed to contend with some massive wide-open

W-120301, 2012, glass, aluminum, and architecture, dimensions variable. Courtesy of the artist and the Baltimore Museum of Art. Photos by James Ewing.

33-D, 2014, glass, aluminum, and architecture, dimensions variable. Courtesy of the artist. Photos by Serge Hasenböhler.

What appears to be open space is often the result of an architectural sleight of hand. Boundaries create the illusion of openness, transforming the chaos of undifferentiated space into a discrete, empty whole.

spaces for museum and gallery shows. I was intrigued by how doors actually work. They don't simply mark a transition; rather, they create the possibility of a transition by existing in a state of openness or closure. The duality of the state or phase of the door led me to the idea of the switch.

AG What kinds of flow have you identified, and how do your switches modulate it?

SO Last year, I was invited to create a work for Mudam Luxembourg's Grand Hall. The hall appears at first to be an empty volume, but in fact operates as an elaborate threshold into the exhibition spaces inside the museum, much like a public piazza. Visitors enter through the hall's four corners and follow a central axis. The paths of entry and exit determine what happens in the center. I started to think about how the distance between the entry and the exit could be collapsed or expanded. Could processions and sightlines be reversed or rerouted without increasing subdivision? So I started to consider the hall not as a volume but as an exchange network. My project, *S-399390*, operated as a switch within this network. Two inhabitable glass elements would change position according to a precise scheme in order to redirect the flow of light and bodies between zones.

AG Is that project related to the work at the Pérez?

SO Yes, my work at the Pérez grew out of that investigation, and will comprise a pair of pivoting glass switches that operate in tandem. These will generate a visual relay between the overhead flourescent-lighting grid and a window-framed view of Biscayne Bay. It is precisely the apparent emptiness between switches that will allow the light, air, and bodies to travel unobstructed.

AG Have you done mechanical stuff before?

SO No, this is a new problem. It has evolved over the past two years while I have been in residency at the Wexner Center for the Arts.

AG The Wexner is designed by Peter Eisenman. It's a special building for anyone interested in architecture. How have you responded to the various planes—and plans—in the building?

SO The Wexner Center is constructed around two grid systems: the coordinates of the city plan and the Ohio State University campus. Eisenman's emphasis on these coexistent coordinate systems invokes the Euclidean space of 3D software. In a digital model, each object and each view has its own coordinate world. The independence of these coordinate systems enables a user to reorient the coordinate world of a single object or view without altering the spatial orientation of the whole. During my residency at the Wexner, I worked closely with the mechanical and aerospace engineering department at Ohio State to develop a pivot. What I like about mechanical pivots is how they allow architectural elements like doors and windows to occupy different positions over time: open or closed, visible or obscured, and so on. Most of the time, architectural thresholds pivot along an axis of rotation that runs parallel to a building's structural grid. For example, interior doors pivot round a vertical axis allowing the plane of the door to remain parallel to the walls of the room. However, the bias pivot I've developed over the course of my residency—and for which there's a pending patent!—is oriented diagonally through planes of interior architecture. My upcoming show at the Wexner will have two glass thresholds that link multiple exhibition spaces and shape procession through the existing building envelope.

AG Why glass?

SO Glass responds differently to different light conditions.

AG It's like there's already a switch built into glass.

SO That's right, yes, it's already a switch. It responds optically to its environmental conditions. So depending on whether it's bright only on one side, or whether it's day or night, a piece of glass is either transparent or reflective. This was the case in *33-D* at the Kunsthaus Baselland in Switzerland.

AG It can reflect on the front or back face, or both.

SO In that sense, switches abound—and although they don't move, there's still motion in them. A switch exists in relation to movement.

AG That's cool. It makes me want to ask you about dynamism and change. Part of what's motivating your vision of the switch is dynamic change. I feel like there's a lot of lip service paid in architecture to the idea of buildings as machines. It seems like many architects have long dreamed about the building that can get up and walk down the street. But let me play devil's advocate: Is architecture fundamentally static?

SO Our inhabited spaces are constantly being climatized, or, as Reyner Banham would say, they're made to produce a "well-tempered environment" by an endless number of machines that we plug into them. So what appears to be static depends on machines buried in our floors and walls that condition our environment. I'm not sure the aim is to imagine that the building is a machine. Perhaps it's to recognize that the habitation of buildings is shaped by a mechanization of the environment.

AG So there's a system overlay or something.

SO Yes, there's a system overlay, and it could be as simple as a door. The more I learn about doors, the more I think that what appear to be simple systems are actually very complicated. You asked me if joints are static, and I would respond by saying that joints remain in place, but they allow for movement. They're actually in motion all the time.

AG Right, that's superinteresting. The virtue of a joint is connection—a static connection where you can transfer force loads down to the ground effectively, but, in fact, good carpenters know how to build in tolerances in wood joints because wood shrinks and expands according to moisture and other environmental conditions. So maybe stasis is the myth, and not the other way around.

SO I think it's not just that stasis is a myth; it's that synchrony is a myth, and that's because, in fact, everything is moving depending on your increment of time. A building is always being built and destroyed if your time frame is longer. In a similar way, the door is moving or the door is still, depending on how long you're observing it.

AG Motion is a function of looking at things through a temporal window.

SO Right. I was recently looking at online documentation of airports that had been highly optimized in terms of their program, and what really struck me was that there were no still images. The documentation existed exclusively in the form of video derived, it seemed, from an animated rendering. Not only was the building a result of the rendering, so were the positions from which it was documented. Our access to the architecture was mediated through an animated rendering.

AG You're suggesting that architecture is time-based. Is that accurate?

SO I'm saying that inhabiting architecture necessarily takes place in time, and that's a dimension that isn't traditionally taken into consideration.

AG Do you consider people to be switches, too?

SO Maybe. Actually, that is a very interesting thing to consider, because people could be considered radiant points or changing nodes in a system. That would be a great project.

AG You can have a switch that has just two positions. With the ones you're working on, it seems that there's either a broad spectrum of possible conditions or a smooth sweep through a series of points of intensity.

SO That's an interesting problem in terms of time, and it raises the question of whether or not people are switches. One thing that's striking when you study a building is that all these temporal frames tend to intersect: there's the time of the sun moving across the sky, the time of people navigating a space, the time of a building going through whatever warming and cooling is happening in its shell, the time of a door swinging open or closed. Each of these times is both extended and discrete. It's a kind of a choreography of times, almost like watching dance notation, but all of these things happen—

AG —kind of out of phase.

SO Yes. The shorter intervals overlap with longer periods of architectural history. Different durations reveal shifts in habitation. In the case of museums, emerging strategies of spatial division disrupt the quiet contemplation of discrete art objects. The museum is increasingly a social destination, a semi-public space that enables and encourages interaction while still maintaining one's privacy and anonymity.

AG The Museum is out of phase, you're saying.

SO Yes, that's right.

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