



# Reality Drivers: Olafur Eliasson and Sebastian Behmann

*On the occasion of this conversation, artist Olafur Eliasson and architect Sebastian Behmann are sitting around a table covered in geometrical models in Studio Olafur Eliasson in Berlin. Olafur's body of work not only encompasses classical mediums of art – sculpture, painting, and installations exemplified by such works as The weather project at Tate Modern – but also engages the public realm through architectural projects and interventions. Sebastian is head of design in the studio and cofounder of Studio Other Spaces, an architectural counterpart to Studio Olafur Eliasson. His role as an architect has been integral to projects such as the Facades of Harpa Concert Hall in Iceland. The models collected on the table are a sort of archive of potential. They contain the unfinished thoughts that have generated and continue to drive the work of the studio. The selected models range from handmade paper studies built nearly 20 years ago to 3-D sketches printed just some days before. Together, they serve as a point of departure for discussing the role of geometry in Olafur Eliasson's work. – Taylor Dover*

SEBASTIAN BEHMANN: Olafur, you had a deep interest in working with geometry very early in your career – you were already collaborating with the mathematician and geometrician Einar Thorsteinn in the early '90s. What led you to this interest in geometry and these collaborations with Einar?

OLAFUR ELIASSON: My interest in geometry and in collaborating with Einar began with a more conventional critique of modern architecture. In the late '80s, when I started studying art at the Royal Danish Academy, there was a sort of postmodern reevaluation of the rules, or, you could say, a collapse of the rules. This provided me with an opportunity to discover people who had worked with a more utopian – and often engineering-driven – agenda, such as Frei Otto and Buckminster Fuller. Through their work I started to understand the relationship between mathematical and spatial models, and I began to question where these alternative geometrical and other mathematical systems came from. At that

time in my studies, there was a big focus on these systems – like Penrose tiles and fractals – and on how new spatial models could be derived from them. I wouldn't say my initial interest in geometry was a polarized critique of the modern. It was a kind of reconsideration of opportunities.

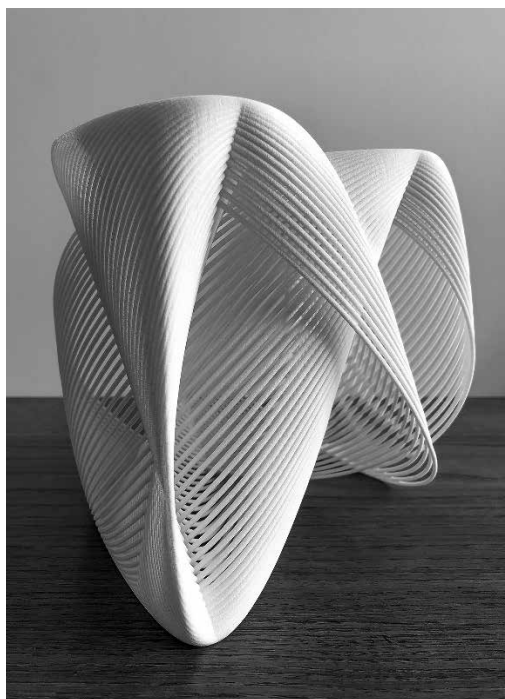
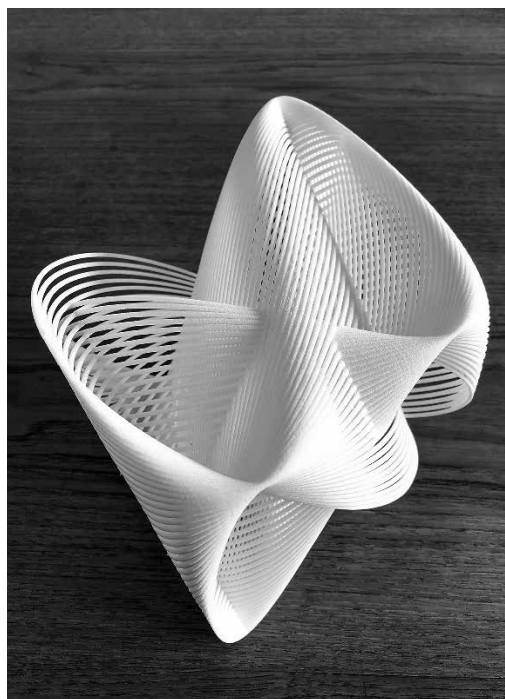
A year or two later I met Einar when I set out to appropriate a Fuller dome. Through a Danish engineer at the school, I found that there was, in fact, a person in Iceland who had been friendly with Fuller and worked intensely with Otto – this was Einar. That was the start of a collaboration that would last more than 20 years. When I met Einar, I realized that, interestingly, he was convinced that the geometric mysteries he was investigating had value in and of themselves. I was drawn to that, even though I never really stopped seeing geometry as a kind of critical lens through which to evaluate the world. Through Einar's work, I became familiar with the principles of tensegrity systems, minimal surfaces, and the structural experiments that Otto was doing with soap bubbles. This experimental playfulness – done with serious rigor – inspired a lot of new ideas for me.

SB: Around the time of your first collaborations with Einar, while I was finishing my studies, I began working with 3-D modeling software to develop geometrical principles into design tools. The speed of the new software allowed me to study and use geometry in a way that had been out of reach. It wasn't about looking into what geometry is at its core, or as a representation of nature, but about how we can use geometry to find and construct different forms, how we can use mathematical principles to generate new shapes and forms.

Your years of experimentation with Einar and developing geometrical tools led to the formation of a team in our studio that is dedicated to conducting fundamental

geometric research. The geometry department's work often begins with a paper model or sketch from your collaborations with Einar, and their geometrical principles are developed or reinvented. Having this type of thinking and activity embedded in the studio serves as inspiration for making our works and inspires the entire studio team to push boundaries in design and construction. It is often a lack of knowledge in geometrical systems that keeps one from trying to work with more complex forms and assemblies. Our geometry department is discovering ways to handle complex geometries in design and construction. Often, modern architecture leads to a simplification of more complex forms in the name of being more efficient. Without the lessons from Einar or our geometry department, we could not make use of the forms that give shape to our artistic and architectural works.

OE: The use of shapes and forms developed through geometric research came to comprise two of the main narratives in my work. One, as you mentioned, is the geometric and spatial principles in nature. I observed that while these forms were generally very beautiful, interesting, and exciting, there was also a fair amount of economic efficiency in them – not that they would necessarily be cheap to construct but that these natural forms were very inspiring in their use of material and engineering efficiency. The other narrative, maybe even more important, was that I was interested in the dematerialization of the conventional object and its fetishistic dominance in art. I got very interested in sensory perceptions and the general map of how we experience the world. Through that, I began to explore how geometry in nature often presents an opportunity to see things that would otherwise be invisible. The condition of seeing these things anew points to the fact that our brain has, or our senses have, to



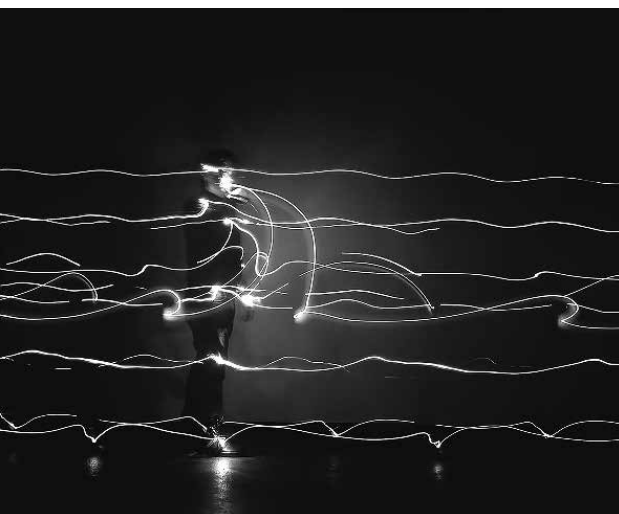
Studio Olafur Eliasson, two views of a 3-D printed harmonograph model. Photos © 2018 Studio Olafur Eliasson.

a large extent been cultivated by the modern world. We mistakenly think that how we see is a natural way of seeing, when, in fact, there are a lot of things to which we are blind. My interest in experimental research and utopian thinkers was largely about bringing shapes or geometries or languages that were otherwise hidden out into the open. For instance, at the time of my early works, I was interested in the stroboscopic photography of Harold E. Edgerton, who shot falling drops of water in midair. My work with geometry and space blended into psychology and experience. My work became an opportunity to examine the fact that we had, without knowing it, become numb to space, and I hoped that these previously hidden geometric systems would somehow kick-start a new relationship to and understanding of space.

SB: I would like to talk about a model that we have here on the table. It's actually a harmonograph, a representation of a chord

– let's say it's C major. It's a spatial overlay of three sine curves that trace the three notes of the chord. Together, the three curves form a representation of the chord. We experimented with many different chords, sounds, notes, and overlays of sine curves to study the point at which the forms produced either beauty or chaos. It's very interesting to observe an overlay between what you see and what you hear and to use these principles to actually experience and explore new shapes and forms. I think this is an old interest in design and architecture – the idea of music and geometry as fundamental to form-finding and design.

For me, it's important in the design process here in the studio that, with the use of digital tools, we can use the conditions that constitute space, like movement and time, and translate them into actual shapes that can be experienced visually and, at a larger scale, architecturally. This process has always been a source of inspiration, and we've



Studio Olafur Eliasson, *Pedestrian vibes study*, 2004. Polymer gravure. Image courtesy the artist; neugerriem-schneider, Berlin; Niels Borch Jensen Galerie und Verlag, Berlin; Tanya Bonakdar Gallery, New York.

translated it into designs like the Serpentine Pavilion, where you walk up a spiral and what you experience both visually and spatially changes continuously as you move – the inclination of the roof, the views out from and into the building. The experience of space is precisely related to your movement in the building. This is not simply a static representation of movement, but a dynamism that plays out over time. In this sense, for our studio, geometry is experimental and related to the body. Olafur, I remember your experiments with spots of light attached to your clothes, on your hands, knees, and feet. You were photographed in long exposures to record the curves of light that you generated when you were moving. My feeling is that these experiments with movement and space have become a source of inspiration for our formal approach to the design of space.

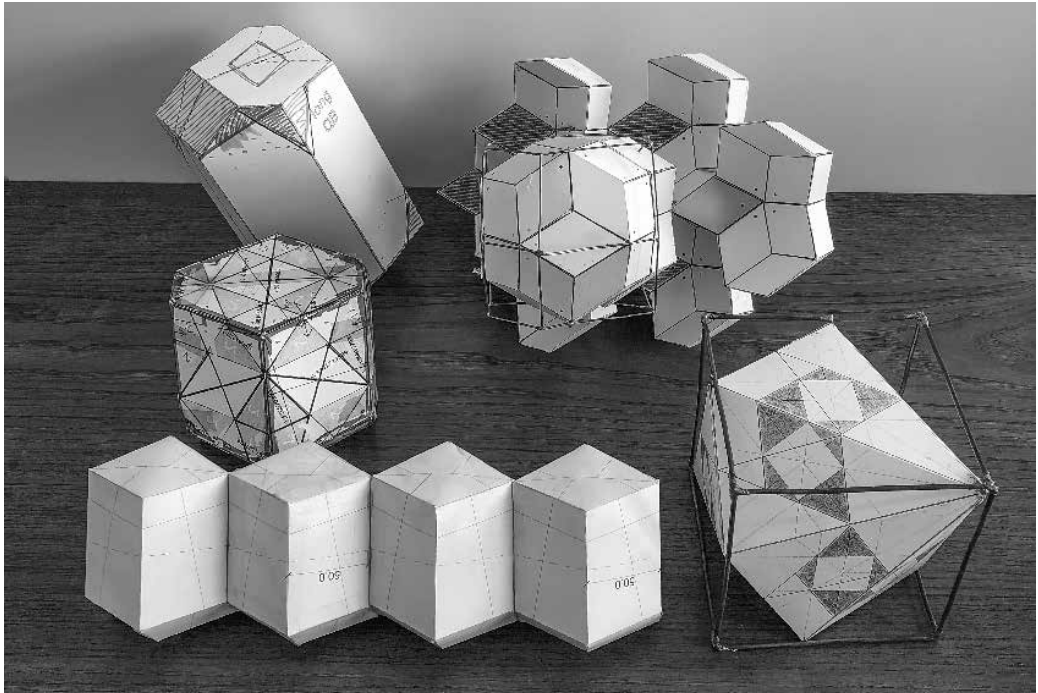
OE: The role of experimentation is incredibly important here. It's essential that the work was never really just a formal exercise – which would suggest a sort of escapist search for essential truth in a beautiful shape, the

“right” shape. It was more a study of what the body is capable of. What kind of critical inquiry does a space nurture and support? Is it a frictional or a normative relationship with the values of the time? The studio has always had this spatial and geometric agenda, but it's never disconnected from a humanistic interest in the relationship between space and society. This is important to say, because there is a tendency in a more esoteric focus on geometry to propose a kind of naive essentialism, which introduces a strong element of exclusion – that is, reading the work instead of feeling the work, and the subsequent exclusion that can bring. What I see as a core strength throughout the work, as shown by the harmonograph experiment, for example, is the conviction that inclusivity matters.

I think it's important to note that if a sound is in harmony, it makes incredibly economical use of the space needed to create its vibration. Looking at all the models here on the table reminds me of how surprised I was to see that the spaces they define made such efficient use of material. They were simply so precise. This efficiency – not as an abstract principle, but in the context of society – is what I was inspired by and what drove our ambition.

SB: It seems to me that it is never enough for you to only look into the mathematical origins of geometry or what it means. You are always interested in the performance of the geometry, in how you see it and where it takes you as a viewer once an artwork is actually produced using it. Whenever we've discussed forms that come from geometry, it has always been about how form is shaped as you move around it and what it does to you, to your body and senses.

OE: For the first half of our working history, I addressed this from a more phenomenological angle, where my engagement – or our engagement, society's engagement – would



Models and geometric studies at Studio Olafur Eliasson. Photo © 2018 Olafur Eliasson.

constitute the agency of a space. This subscribes to the idea that the subject is the author of the situation, that the user is the only producer. In the last few years I have become more interested in the reflexive quality – I don't mean *reflective*, but *reflexive* in a more embodied and mindful way. The reflexive quality gives the geometrical system a subjective agenda – meaning that it takes on agency in the world, takes on the role of being the producer. For better or worse, this might even turn the conventional subject – the user of the space – into an object. Obviously, this can be controversial. It is a shift of authority and power. But, if handled well, it does introduce the principle of objects having an impact on the world – which, in the context of our anthropocentric times, has become an important matter.

Let's dive, just for a second, into this idea of reflexivity. Some spaces allow us to examine our presence in the space from the perspective of the space itself. This means that we can use geometry or a system – or a

work of art, for that matter – to actually see ourselves from the outside. It's not a didactic experience, but simply an interactive quality wherein the space is so hospitable that it makes us increasingly conscious not just of our presence but also of the consequences of our presence – which brings us into a much more intimate and, potentially, more critical mode of being-in-the-world. Spaces are coproducers of the world; we can't just give responsibility for producing the world to people alone. These thoughts are based on the ideas of the philosopher Timothy Morton – and, of course, the later work of Bruno Latour – in terms of the agency of objects and actor-network theory. A lot of our more recent projects have been influenced and inspired by the idea that space is also the subject matter and not just what surrounds the conventional subject.

SB: We started working from your geometric experiments, which then became little



Studio Olafur Eliasson, Model for the Berliner Philharmonie extension, 2011. Image © 2013 Olafur Eliasson.

machines that performed certain actions when you moved around them or interacted with your movement and the movement of the sun – the changing conditions of the environment. They became like mini architectural projects. They were very complex in the way they interacted with a human viewer, but also with the surroundings. This brings us to our idea for the extension of Scharoun's Berliner Philharmonie, a project we did with Studio Other Spaces. The design is based on placing two large objects in front of the Philharmonie, objects inspired by the oloid, a geometric body that is made of one continuous ruled surface joined on two round edges, discovered by Paul Schatz in 1929. The interesting thing about the oloid is that it has some history in your studio, as well as in engineering, in types of propellers and packaging. What is your fascination with this object? Why do you use it so often as an inspiration in your designs?

OE: The oloid is a good example. My initial interest in the oloid was the fact that it's a monosurface, a three-dimensional object that you can cut out from a two-dimensional

surface. Its shape makes incredibly efficient use of material, there is basically no waste. It also struck me as a shape with a strong reflexive quality, because it does not allow you, from a conventional, perspectival point of view, to find a position where you feel perfectly located to look at it. I thought the oloid was a particularly dynamic shape, because once you start walking around it, you realize that, in fact, the walking around it was what made it interesting and not viewing it from a specific vantage point. In this way, your physical activity shapes the architecture rather than your view of it. This was fundamental to our thinking when we started working on the Philharmonie, because it emphasized that it takes time to move around and understand a space. In that sense, the space is very much like music. A musical piece doesn't really make sense if you only hear one moment of it – the peak of Beethoven's fifth symphony only works if you hear what comes before it and what comes after.

SB: The interesting thing for me is, as you say, that the oloid form of the Philharmonie extension is so highly performative in its shape that it is almost a deconstruction of the

shape. You cannot understand it unless you have experienced it from 360 degrees. This nicely complements the thinking behind the shape of Scharoun's original Philharmonie, which was one of the main issues we faced when we began working on the design. Being located near Potsdamer Platz in Berlin, the space is very open. It's in an area of the city where the urban landscape that Scharoun proposed is still visible today. The objects we proposed were meant to behave almost like the elements of a landscape, like a mountain that continuously changes in form and appearance as you circle it on a hike. These objects would behave the same way in the city's space, unlike cubes or a predictable urban volume. They are almost like dancers in front of the building. When you drive toward them on the street, one seems to be a triangle and the other a half-circle; as you pass by, they appear to change and do a kind of performance. Approaching them from the other direction, it's the other way around – one turns into a half-circle, the other into a triangle. So your movement contributes much more to the experience than their placement does.

OE: You could say that these forms trust you to be the coauthor of your relationship with the buildings. This element of trust empowers you; it requires your engagement, your observation that, *Wow, now it actually looks one way, and once I've passed, it looks a different way*. The passing itself becomes the narrative rather than the building and its agenda. To have this kind of trust in people is a very respectful way to handle urban space. We also undertook a number of analytical processes in collaboration with the people from the Philharmonie to evaluate how the shape of the building and the agenda as such could be in sync with the minds of people like the orchestra's conductor, Sir Simon Rattle. Geometry, sound, and urban space were among the layers of analysis that shaped the work we did.

SB: I want to bring up another project, Fjordenhus, the Kirk Kapital headquarters we recently completed in Vejle, Denmark. The idea for this building was to embody the city's relation to the fjord, specifically its growth into the fjord. The most immediate way to accomplish this was to place the building directly in the water. Fjordenhus picks you up in the harbor and connects you directly to the city, which itself has so much to do with the harbor, the water, the fjord. The building's position in the water also influenced the form of its facade – the water's movement and mirroring effects informed the way that the facade and windows were given shape.

OE: In both small-scale artworks and large projects like Fjordenhus, we have investigated what types of surface geometries and spaces stimulate and activate our senses, and what types have a more pacifying and, so to speak, numbing effect. We looked not only at the outer form of the building but also into the psychology of how you perceive and acknowledge your own presence in a space and how, when you move through a space, you have the opportunity to shape or understand the space and yourself in it.

As with the oloid, the surface geometries of Fjordenhus are very economical – most surfaces in the building are circular or elliptical. Even though the curvature of the building is complex, it is actually a very precise and, mathematically speaking, minimal form. I like that the aesthetic curvature of the office walls is not the product of some unrelated, formal exercise that we happen to think is beautiful, but of geometrically consistent systems.

SB: For Fjordenhus, we introduced a type of window that navigates between the inside and outside, that forms a space of its own between them.



OE: The building's outer circular form resembles the silos in the harbor and the industrial buildings that often, for reasons of economy, use the most efficient shape – the circle – to store gas or oil. In the case of our building, the wall is so thick that it creates an inner circle and an outer circle, which are intersected by the precise geometrical shapes of cutouts for the windows. The window, which is normally seen as a membrane between inside and outside, is, as you say, a *space* in Fjordenus. So this makes three types of spaces: the outside, the spaces of the windows, which often accommodate a space like a small meeting room, an office, or a balcony, and the inner rooms. What is normally the membrane, a line which you can be on one side of or the other, is actually negotiable – you are offered the opportunity to be both inside and outside.

SB: Working with positive and negative volumes in architecture is not new – we know this concept very well from the baroque. And, this building is, in a way, a reinterpretation of the baroque. Using the knowledge that we have from the oloid and our spatial research, we can digitally make all that information accessible, something we can use in the design. Our communication with the different parties involved during the design process proved that it is now possible to think in terms of more complex spatial concepts. We have always been fascinated to be in and to work with such complex spaces, but due to the increasing emphasis on functionalism in architecture, that possibility gets lost. By using contemporary technologies, I feel we can reintroduce more complex spatial concepts to architecture.

OE: Our geometric research has an element of trying to understand the world and the universe and of reconsidering the rules that we might have mistakenly seen as

nonnegotiable. This has led us to realize that, well, the world is not as static and solid as we thought. By introducing new rules and modifications, we found that we can, in fact, cause things to change and show that reality is relative. When we work with geometry, we are primarily interested in the consequences that mathematical and geometrical spatial principles can have for our senses. Essentially, all of this points to the relationship between how we perceive the world and how the world perceives us, humankind.

The studio's understanding of spatial relationships has continuously evolved, very much under your guidance, Sebastian, especially in how we turn thinking into doing. We are very interested in understanding the relationship between a theoretical concept and turning that concept into action. I think the world has a robust amount of theories – or at least thinking – but there has been less development in turning that thinking into doing. This could be debated, of course, but I feel the spatial experiments really only drive realities once they are out of the studio and being experimented with on the street – or in the harbor, as in Vejle. Spatial experiments have less of an impact in, for example, my *Model room* in the Moderna Museet in Stockholm – a *Wunderkammer* of idea-stage spatial experiments, many of which have since had substantial impacts once they got out into the world.

SB: It's also important to see geometry as a tool for design. Geometric principles are, in a way, like the pens you use to sketch out a project – you sit with a pen and try to find the right forms. Geometric research does the same. It offers you a variety of shapes, forms, and possibilities that you can select from, or at least get some inspiration from. Research into geometry is a more scientific way of sketching. Like sketching, it becomes a direct design tool.



Olafur Eliasson and Studio Olafur Eliasson, Fjordenshus, Vejle, Denmark, 2009–2018. Photo: David de Larrea Remiro, 2018. © 2018 Olafur Eliasson.

OE: It's important to have a skillful relationship with spatial systems like geometry – one should not just teach it as a nonsocial, formal tool. If you only learn about the tool, that doesn't necessarily make you an architect or a social entrepreneur. The education of spatial practitioners is not just about architecture, but also about the interface-driven relationship to space created by our digital, screen-based spatial activities – drawing, for instance.

To draw and understand geometry is one thing, but to draw in the context of nurturing critical thinking about the relationship between shape and context is a model of theoretical education that is lacking today. Looking ahead, we are going to have increasingly sophisticated capacities for drawing and for understanding new mathematical systems, but how to understand the relationship between geometry and atmospheric conditions – whether environmental, social, or political – is something we need to include in

the educational agenda. I think it's important to see that geometry does not represent a value or a resource in and of itself. When making a critical inquiry into the world, geometry can be a tool with which to achieve greater precision and better execution in terms of how a building or a space coexists with the future worlds that we are going to produce together.