EDITORS: Bruce Campbell, bcampbel01@risd.edu
Francesca Samsel, fsamsel@tacc.utexas.edu

DEPARTMENT: ART ON GRAPHICS

JNZNBRK: Physical Experiments in Light, Modulation, and Substrate

Kyle Janzen, *JNZNBRK, Winnipeg, MB, Canada*
Chris Burke, *JNZNBRK, Calgary, AB, Canada*
Bruce D. Campbell, *Rhode Island School of Design, Providence, RI, 02903, USA*
Francesca Samsel, *University of Texas at Austin, Austin, TX, 78712, USA*

We requested an interview with the Winnipeg-based JNZNBRK art collaborative upon being curious about their work process. The artwork they present on jnznbrk.com suggested a thoughtful aesthetic involving compelling physical exhibits. As we're always interested in the physicalization of data, we were keen to hear about possible considerations that might contribute as relevant to our, and our readers', practices.

Francesca: What intrigues us about your work is its magical quality, and its ability to convey information about shape and form and space using minimal inputs and producing a beauty and complexity. Can you start with an introduction to your work and motivation?

Kyle: Yes, I can start with that and how the digital craft connects to our work. I would say that the architectural work that we do has a lot of influence on this artistic practice of ours. Much comes from exploring things from a scientific, physics, point of view. We experiment with geometry, materials, and their limitations, while knowing architecture is all about materials our approach is very immediate and simple that way. Our work is rooted in that. When setting up situations, we consider sources of light, the modulating materials, and the environment impacted. We have used that structure for all of the pieces of art. We work with environments that can be fixed or can be changed. We can project graphics on a surface that is fixed or changes, and the graphics we project can also change. Usually, one of those two elements can change.

Chris: With our art, when we first started doing the digital projection stuff, it was a constant pursuit of acquiring the highest resolution projector we could get our hands on to get rid of the pixels that only got bigger as we filled a bigger space, or bounced them off a surface. Back then we could always see the pixels, but when we got rid of the projector the crispness and the resolution was so much richer and more tangible. It felt more real. There was this anti-pixel moment.

K: The first thing we ever did was projection mapping on very minimal 3-D surfaces made of folded paper (see figure 1). The project was heavily focused on the digital content being projected. We realized our interest was less about the content we were projecting onto the surfaces, and more on what the surfaces were or could be. That's what led us to start structuring our projects differently similar to the setup of an optical bench.

C: As Kyle says, we set up a lot of our work similar to an optics bench, with a light source, a modulator in the middle, and some sort of register (surface) to display the result of whatever we were exploring. To explore, for example, a caustic light phenomenon, or color, or movement, we have worked with those three categories: source, modulator, and register. Sometimes they overlap where the modulator can be part register for the optical phenomenon or the

source is somehow influenced by the modulator or register. Most of the situations we work in are not in a lab environment where we make something in a vacuum and then take it out to the real world. Most of our work is in a real-world space or situation and goes beyond site-specific and into site-generated or even site-dependent. Often, it's about working with the environment we've been given. There is always something in the environment pushing back on the work or feeding into it. The projects rarely start as blank canvas projects.

Bruce: This sounds like the thinking of a performance artist who has to check out the space and adapt their performance to spatial dimensions and sight lines.

C: Exactly! We went to architecture school together and found we were both interested in the margin's limitations provided by physical space. And we were both enthused by the opportunities we found in existing spaces, like unique lighting conditions, unique materials, or something else radically unexpected. We would walk into a space for a potential artwork and come up against physical limitations or rules for the installation. So, we discussed what we wanted to do. Perhaps we were told that there's no damaging the walls or no hanging stuff. We did one piece that was completely based on the natural light that came into the space. Then you are working with interventions that consider the time of day. Of all our work, we love working with existing spaces and conditions the most.

F: Can you talk about your approach as an evolution to more complex spaces?

C: I think we evolved from that first exhibit we entitled *RAW: Caustic* (see figure 6), when we wanted light and we wanted sound and it had to be heavily digital. As we kept on working physically from there, we kept on stripping out the digital aspects. We didn't lose our interest in digital graphics and projection graphics per se, but we found that once you were in the computer you could do whatever you want with fewer limitations. That's very different from working with an LED lightbulb, a lens, and a surface. We found that the more we stripped out the richer it got. The idea would be simpler and there would be more physical pushback. We kept our appreciation of what we learned with projecting digital graphics but we stepped outside of it more and more. Seemingly enough, the simpler our pieces became, the more complex and captivating the results were.

F: There is a current discussion in our community about materiality and how the data we absorb via our screens lacks a connection to the physical world. Your work bridges that gap.

K: Sometimes I don't step back to see the larger picture of the analog and physical world versus the digital AR and VR coding. I think, like with Chris, we work in an office space, working on buildings digitally and I am still surprised how I feel when I'm within a physical building that comes from a drawing I've worked on and how different it is, scale-wise, after being so attuned to it in the digital space. The physical building tends to seem better, more spacious. Since we do that so often with our careers, outside of the art work, having that opportunity to get out of the workspace and work environment to work with our hands and tangible physical things is really refreshing. And the change is rewarding.

C: Once our attention is immersed in the computer working on buildings, we find that the design is 99% figured out before it leaves the computer. Once something is under construction, there is less of an opportunity to say, "well what if we did this differently?"

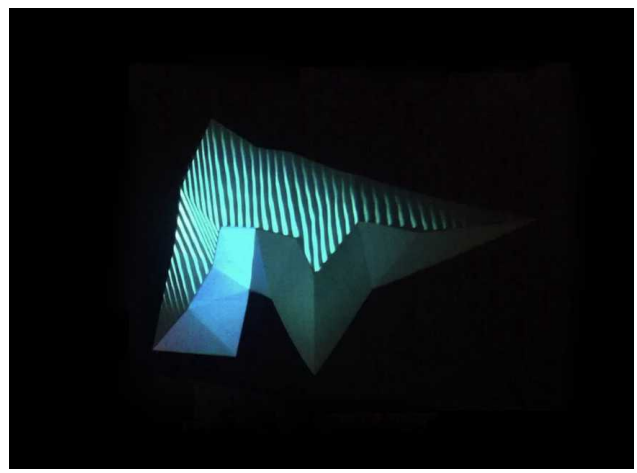

Figure 1 – The artist's earliest projection mapping work used folded paper as a substrate.

Figure 2 – Work on their *Augment* installation introduced the artists to a responsive artistic practice where unexpected behaviors of materials could be integrated to their advantage.

F: You've spoken about the physical space being one component of the work. Can you speak about the other components of the material and the light? I am interested in the range of things you have explored with your approach, and if you might have examples including any little examples you have from your time on the optics bench. What is the range of things you have tried with your experiments?

K: I'll start with one of my most favorite works, *Augment* (see figure 2), where we worked with a plastic packaging material that is used to vacuum seal items. We heat and stretch that plastic material over forms and then project light through it. The realization was that the image that would come out would create a shadow whereby you could see all the stretch marks and imperfections of the material. Our set up exposed the limitations of that material. We didn't expect the material to distort when we hung it in that exhibit. We weren't prepared for that. We thought it would appear more geometric, like a disco ball, but we could bend the material to create a more organic result.

F: How did you feel about the warping plexiglass? The geometric and organic at the same time is part of what makes it so fascinating.

C: The warping came from the weight of the piece itself. It was three-millimeter-thick acrylic, suspended from a ceiling from a single point in the middle of a panel. Once we had a few pieces up there we noticed they were starting to bend and distort to create these caustics and we were not expecting that.

We weren't expecting the end shape or composition. We used turnbuckles and wire to compose as we hung them. We could alter the typography of the piece to direct light in certain ways. In our approach, we were smack in the middle of the modulator in between the projector and the walls of our gallery.

K: And that ties to our enjoyment of what our work is. We might have something predetermined in our head, and what that could be, and that might come from some project, or a thesis that Chris did in school where the material was more rigid and thicker for the scale of what it was so it didn't distort and had more of a uniform disco ball effect. We brought our previous experiences to put ideas in our heads, but then we were open to finding effects that we might not have expected. That might be a risky move, or a less accepted move, but what I have found from working in the artistic world is that if you are just experimenting with a bunch of materials and light, and not searching for the narrative and a story or a meme, you might get some criticism for that. Fair enough, but we don't start our work expecting to make a statement.

C: Our work is not political.

B: But your approach demands presence, because your art is so environmentally integrated. As you were talking, I started thinking about a writer who is writing a scene with an idea they are writing to, but whose characters start talking to them. As they listen to them and consider them, the scene never gets written exactly as they expected, because they are present with their mind as they consider where they want to go. They get new threads and then have to follow up on where that leads. Then they go back to figure out what threads need changes such that the scenes that came before can flush the thread out fully.

F: How about sharing another piece that you think sheds more light on your process?

C: Since Kyle took my favorite project, I'll choose *Hearing Eyes* (see Figure 3) and consider it my runner up. Winnipeg has an event every year called the New Music Festival. It's a great event where they bring musicians in from all over the world, doing avantgarde stuff. They brought in Phillip Glass one year. It's a fantastic music festival and we were working with one of the guys who is on the board for the event and he asked if we would like to come up with some kind of sound-light installation. I don't remember when we thought we'd use water but we definitely wanted to explore sound as vibration and we really wanted to show that off as clearly as possible.

B: And *Hearing Eyes* was the result of your exploration?

C: Yes. The two black dots you see (in figure 3) are just vibrating motors and each of those is being run off of an Arduino board. The frequencies between the two motors sometimes matched up and sometimes were random. We built a case so we could project light through the bottom of it. The water was sitting in a transparent plastic tray and as the frequencies were vibrating the water, we were projecting it upwards and onto a ceiling. As luck would have it, as we built it like a big speaker box, you could hear the humming and see the vibrating. If you got nice and close you could see the ripples in the water. As you stood very close to the water you could see fascinating patterns emerge on it, including where the vibration was holding a pattern still, after peaks rose up and stood there. The peaks could battle each other as the frequencies changed. You could get completely different images coming out of it.

B: I am trying to determine the scale from the imagery. At times I think I can hold it in the palm of my hand and at other times it seems like a whole room.

F: Yes, can you talk about the scale of the source and the ceiling projection? If I understand correctly, the piece itself is small but the projection fills the space.

C: The source apparatus was maybe 11 inches by 14 inches on the top and bottom. And for the projection, I think the ceiling was ten or twelve feet away from it such that the image on the ceiling was five by ten feet, I'm guessing.

F: Let's move on to *Behaviours of Light* (see figure 4). What were the parameters for that piece and what process did you use?

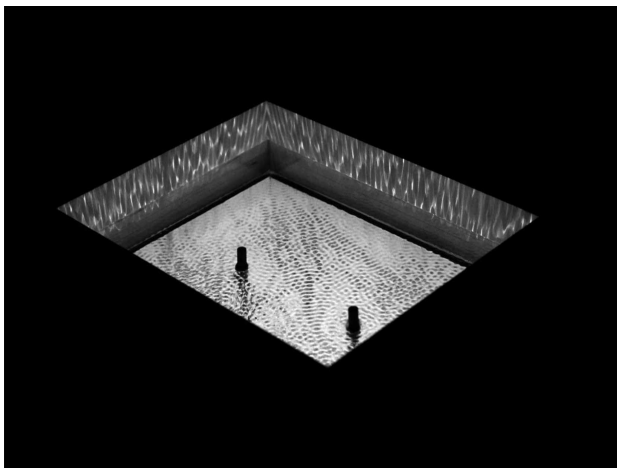

Figure 3 – *Hearing Eyes* provides a surprising large-scale visual result from a small picture frame sized apparatus.

F: Let's move on to *Behaviours of Light* (see figure 4). What were the parameters for that piece and what process did you use?

K: We were invited by a curator at the Winnipeg Art Gallery to create a piece to show at a one-night gala event. We had the challenge of installing something within a mezzanine space and doing it in the most efficient way as the space was provided for people to gather before the event. We used a thin material to divide the space in half horizontally, to create different tiers of environment.

F: Can you elaborate on how the work evolved during construction, and talk about the process that you started to talk about with *Augment*? I am interested in the nitty-gritty.

C: Like what Kyle was saying, we had a short timeline and a very small budget and we were told we had to fill the space with something. Obviously, we didn't have the time or budget to build something physical to fill that massive space. We immediately thought we'd throw light at something to get an effect, starting with the thought of a disco ball where you have a tiny thing in the room but it throws light all over the place. We wanted to create a modular system like what I created in school, where we could use the same geometries but have the flexibility to adapt the result. We weren't expecting any warping, but we thought we could create an interesting effect by adjusting faceted triangles to bend the light in ways we wanted. We didn't expect the caustic effects, but as we got up there and started tightening some cables and loosening others, we experienced it as if it had a mind of its own. If you tightened one side of the assembly too much, the other side might pop up. It was like tuning an optical instrument and trying to hit as many places within the space with light. It was fun, and when I think about it, tuning an instrument comes to mind as trying to find the right balance of the right amount of light in the right spots, while also allowing the piece to push back on us and resist. Some of the projected light patterns were solid white, but some had interweaving black and white stripes across them that gave the light a mind of its own. I might describe it as jellyfish-like light creatures on the walls.

F: Tell me again the elements you had to play with. I heard you say the angle between the plastic triangles, the positioning of the light, but what other dimensions were you able to tune?

C: Yes, each triangle was separately adjustable. Each triangle was eighteen inches on its longest side.

K: We used translucent acrylic sheets that were of a certain size and cut two pieces of triangle from each. Then we had a film that we applied on each triangle that could be skewed.

F: The laminate was a mirror?

K: It was two-way privacy film. The topside was laminated with a two-way mirror which created the bolder reflections on the walls. It was an efficiency task where we tried to get as many triangles as we could from as many acrylic sheets that we had. And then we placed the mirrored film to align. Then we put all the triangular pieces together using hinges to test for the result that we were after.

Figure 4 – The first photograph the interviewers saw of the *Behaviours of Light* exhibit. More images are available for viewing at architizer.com/projects/behaviours-of-light/

B: That sounds more like creating an instrument and then tuning it, or so I would suggest. You envision the result you want it to provide and then you create something that can realize your vision before tuning it to find a pleasing result.

K: That's a nice way of putting it. It is totally like trying to create an instrument of a genre for sensing in a space. Such a process is done with strings, but could be done with buildings instead. I like that terminology to describe this because someone could tune it or change it, which was a reason for the design of surface's modularity. It gave us flexibility if we had to move something around, if a cable needed to be relocated to support it. If the throw of the projectors above couldn't cover it as we had drawn it (see figure 5), we could adapt it. Fortunately, it came pretty close. What we designed digitally in CAD was very close to what we installed within the space.

B: You don't use any simulation tools like Blender where you could put lights in a 3-D scene and model the materials with properties to see the behavior?

C: That time we were limited as to what software we had access to, compared to what is available nowadays.

F: You are experimenting with light and the role light plays activating spaces and the range of impacts light can have on an environment. Can you talk more about your initial experiments with light? Are there any other interesting insights from

that time that you are looking forward to exploring further?

K: We did a piece like this for another smaller gallery in town. It's fabric-based with sheets that can be pulled and fanned out (see figure 6). That exhibit was a lot like what my architecture thesis was, but the Winnipeg Art Gallery installation includes Chris' work as we had the requisite space to do a large-scale space that many could occupy. We really benefited by the extra space. The constraining issue was we didn't have a lot of time to get something up.

C: A lot of the tinkering and testing, and the ah-ha moments, took place when we were in school trying things on our own studio projects or working alongside a professor. We were in the same studios so we were often tinkering and riffing off each other. You would be working away and see light shooting off into a corner and you'd ask, "OK, what is that thing?" As for the fabrics and the fanning out, we had a wonderful studio where we got into sensing: taking real world sounds and sights and motion and putting them into the computer and then spitting them out as something else. There was a lot of digital playing around in these things. We'd test out something at a small scale, for instance a light sensor controlling a sound, and want the opportunity to blow the scale up so there could be human interaction involved. What if someone could get in the way of this and change the behavior of it? We tested a lot in school and when we got the opportunity to make it into an exhibit, we would go for it. We didn't want there to be too many things going on. We wanted to keep it simple and clear, so we weren't mixing too many variables at once.

F: Can you talk about the interaction between the computer involved and the physical results?

C: Yes, I think that fabric one was the heaviest on interaction. On those fabric screens we had photo cells to pick up changes in light and shadow. Those photo cells were going back into the computer and generating sound. There were hums and chimes and some of it got quite loud. That's what you can expect when you unleash a digital beast as it then has its own behaviors. The light was feeding into the sound and then the sound was influencing the light patterns. We made an interactive looped system where the sound would change if someone walked in front of it, and the projection would change which meant the light was going to hit the photo cells differently. The thing could go from quiet to very loud as the lights took on their own behavior and the sound got out of control. It would then calm itself down. So, this loop system would get thrown off-kilter when someone interacted with it.

K: It was generative with some form of autonomy, I guess. The sensors would sense levels of light and the levels would affect sounds and volumes and that would influence the speed of the light going by. It could get off on its own, with the light and sound playing off each other. I think with that one we used Max/MSP and Arduino and video projections.

F: Bruce, that's your domain. Do you have any follow-up on that?

B: I am very interested to hear where this is headed. What is the next thing you do while you wait for the next space to be made available to you?

K: We will be working on something this fall, so we already have a new space to consider, but we cannot make that project or location public yet. It involves an important public institution and working with someone who has a commission to do a projection-based installation within the space.

F: Looking forward, do you have a sense of the impact the software you use for design impacts the art itself? I am interested in any thoughts you have on what the digital tools enable, what they take away, and how they influence your workflow.

K: I have thankfully learned that when using a computer with AutoCAD or other modeling software, they are tools primarily there to help make an outcome, even as today with the latest tools on computers they do a lot of the thinking for you. The tools can lead you into making decisions you get committed to that are then hard to go back on. So, the challenge for me is to use the tools in a traditional way, as a means to execute thoughts as you originally had them.

B: That's a highly relevant point for many with regards to the consideration of artificial intelligence injection into creative tools. There is then the op-

portunity for the AI to adapt software behavior to anticipate use based on how you have been using it, or others have used it in the past. The AI might make an assumption that you want to continue to use software facilities the way you have been using them, with some induced persona you want to continue to follow. I see that as another way of constraining use, which I am concerned about.

F: You both are saying that the software you use can drive or automate some of the choices you make, which in some ways can affect the design outcome. Is that accurate?

C: Yes, mostly that. If we use software, without maintaining a conscious intent and vision, the software does more and more of the work for you.

F: What Bruce is suggesting exists in illustration tools, and I imagine that in architecture tools as well. Do you think the software leads to more homogenous results across the field, impacting one's individual voice.

K: The computer software we use is becoming more and more a palette of things to choose from than coming up with the thing yourself. You have access to libraries of products and structural components and I think creative freedom in that is diminishing. Before, with modeling tools, you could sketch it with software but then figure out the final details onsite. Now because you can do so, you have to precisely model it with extreme instructions on how it is to be made, or people are going to be less inclined to want to build it. I find that alarming.

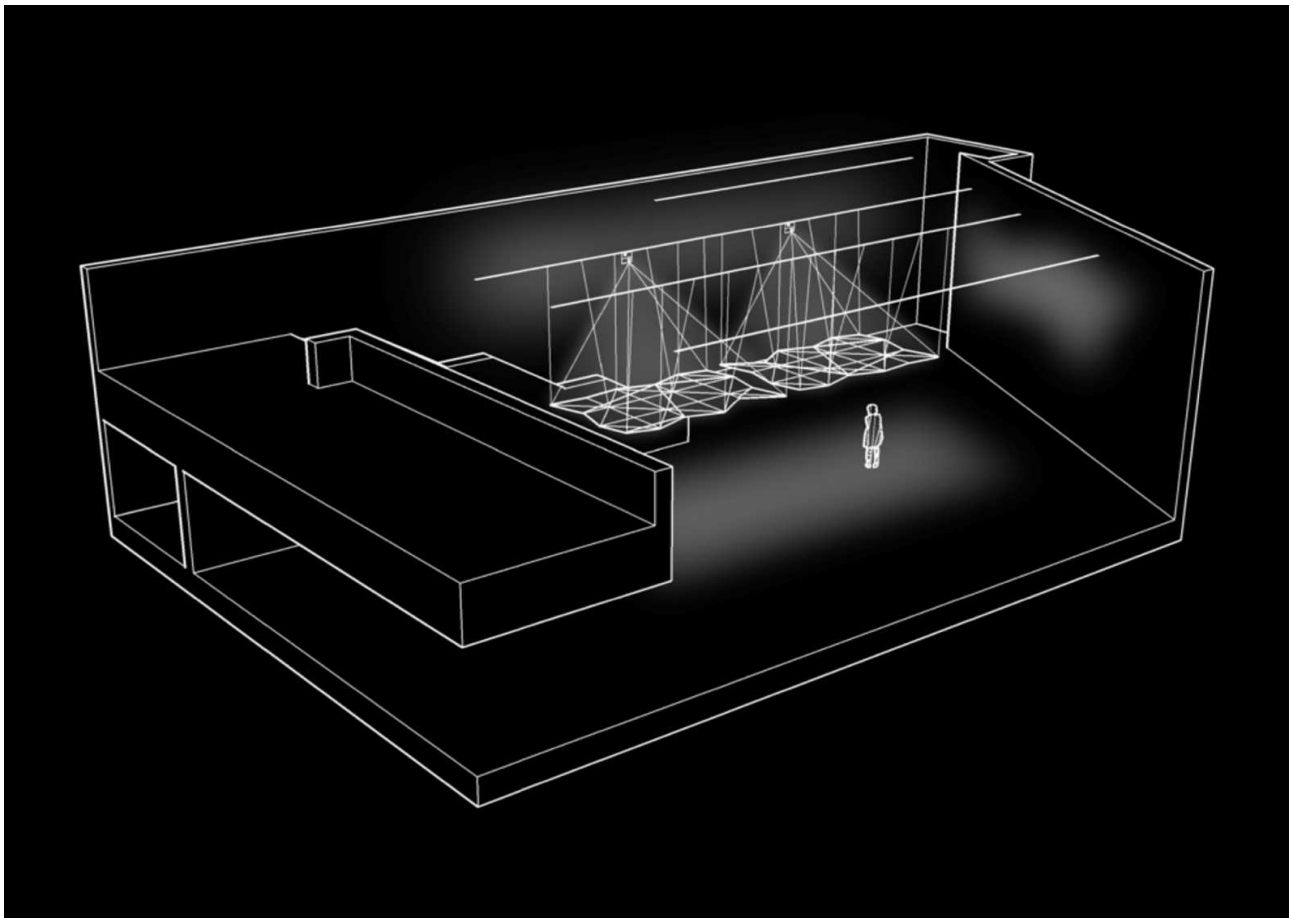

Figure 5 – The conceptual CAD drawing for *Behaviours of Light* helped the artists anticipate the use of space before physically building an exhibit there.

F: I see that relate back to your experience with warping and bending plastic, where the process of building became a critical part of the innovation of the design.

K: And if AI takes that in yet another direction, it will be interesting to see what comes of it. A teacher friend of mine asked if you are going allow ChatGPT to assist in doing an assignment, does that mean you can make the assignment more precise, and find that the outcome of using AI is that they all seem overly similar? Would AI tend to level them all out unless you add your own individual voice to distinguish your submission?

B: I heard a discussion about pursuing intent-based contributions to AI training sets, whereby those pursuing AI modeling processes try to ascertain what is missing in the collective inputs and then set an intent to find other inputs that better represent a wider diversity. That's where good artistic processes can be pursued to create what isn't in there and get it in there.

C: Yes, it's all about intent, just like when sitting down to use software with or without AI support. AI seems like it might be really useful for certain intents, but not for cheating or short-circuiting to an end.

F: And I think I have heard you describe a clear intent you both have to create stunning magical spaces by building with a conscious intent you've developed from experience. You aren't using computers for their latest explosion of computational prowess which is often being used when generating computer graphics.

K: When work feels too constrained, and processes get locked in too early, art can be an outlet that gets the overall contributions of one's effort to feel whole. We set an intent to feel that satisfaction in our practice.

F: That's a good place to end. We thank you for sharing your work and inspirations with us and our readers.

B: Yes. Thank you.

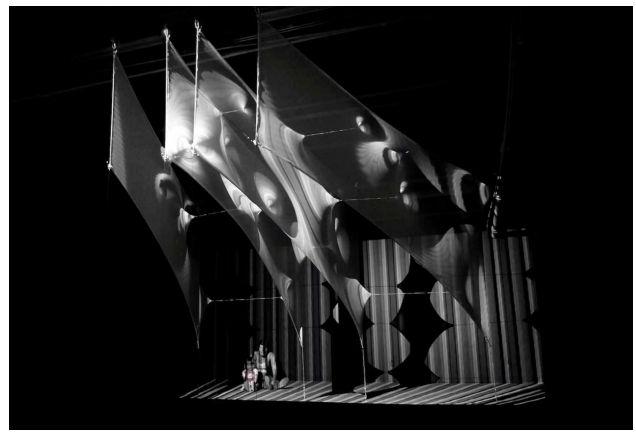

Figure 6 – The artists' work on *RAW: Caustic* provided useful experience to draw upon when conceptualizing and building the *Behaviours of Light* installation.

About the Authors

JNZNBRK is the Winnipeg-based collaborative effort of **Kyle Janzen** (b. 1984, Winnipeg, MB) and **Chris Burke** (b. 1989, Calgary, AB). whose research-based art practice investigates light, sound, and space through installation and sculptural works. In 2011, the pair met in Winnipeg while attending the University of Manitoba where both artists hold undergraduate degrees in environmental design and masters degrees in architecture.

Bruce Campbell is a faculty member of Web Design + Interactivity at the Rhode Island School of Design. He received his PhD in Systems Engineering from the University of Washington. His research interests include ocean data visualization and procedural design. Contact him at bcampbel01@risd.edu.

Francesca Samsel is a research scientist at the Texas Advanced Computing Center at the University of Texas at Austin. Her work focuses on humanizing the communication of scientific climate data by integrating the languages of the arts and humanities. Contact her at fsamsel@tacc.utexas.edu.