Proof of Performances

Kelly Jazvac
June 24 – July 29, 2017

Christina Battle in conversation with Dr. Lorena Rios

At the invitation of Gallery TPW and inspired by Kelly Jazvac's practice, particularly her work on and contributions to scientific plastics research, Lorena Rios and I spoke via email for nearly a month.

Christina Battle: I'm looking at this line from your last email: "Honestly I am thinking about how to join science and art!" How about we start there? I think the arts and sciences can overlap in their overall concerns; both challenge the ways we consider the world. They just communicate these concerns in different ways.

A number of years ago, when I was teaching at the University of Colorado, Boulder, I took part in a visual arts research seminar called *Visualizing & Communicating Disaster*. It was made up of faculty from both the arts and sciences whose individual research focused on disaster, and it was a chance to come together with others researching similar issues from different disciplines and perspectives. We met once a week for a semester to share research, ideas, and concerns. The scientists, who were mostly on the front lines of climate change research, struggled with how to translate and transmit their research to the public effectively. It was interesting for me to consider, as a media artist, since we talk so much about media literacy

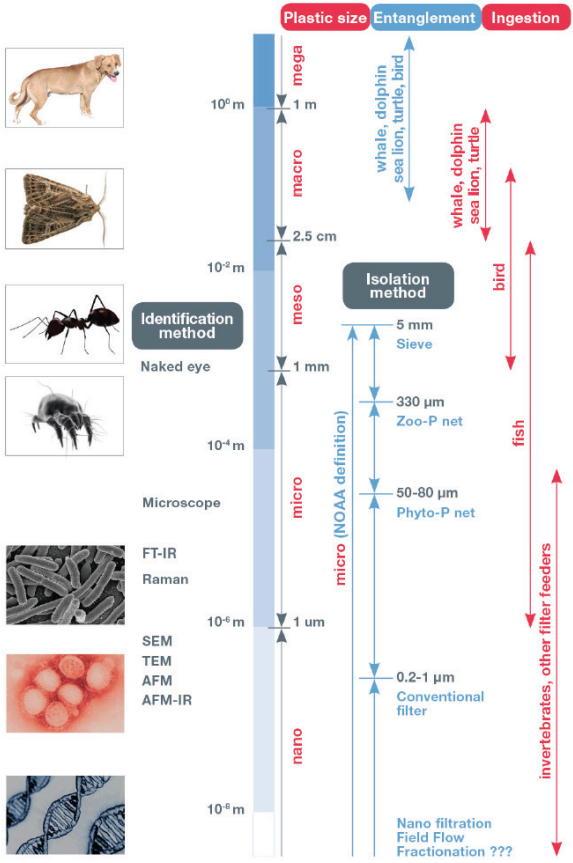
and how visual information is transmitted. This translation effort seemed to me to be one particular area where perhaps the arts and sciences could come together.

I'd love to hear more about how you approach the issue of communicating research and, within that, maybe we can tease out some common threads and reveal more about our individual research along the way.

Dr. Lorena Rios: I am a visual person, so I always use graphs and pictures to show my research results or to explain a chemical concept in classes. I am constantly drawing or asking students to close their eyes and visualize a chemical concept or idea.

When I think about microplastic pollution, I picture microplastic particles as a vehicle moving toxic chemicals, viruses, and bacterium through the ecosystem. When I see a sculpture representing a fish with plastic fragments, it looks so beautiful that I cannot think of these particles as bad things. Sometimes I think that if we make pretty things with plastic debris, we could potentially forget the danger inherent in the plastics, you know?

Plastics are so wonderful and beautiful; for example, I love balloons because they are colorful and festive. It was a challenge for me to stop using them. It is painful to see how many people still use them despite warnings about the dangers and consequences of those balloons for birds and other animals.



Infographic sourced from the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection, "Reports and Studies No. 90: Sources, Fate, and Effects of Microplastics in the Marine Environment: A Global Assessment," 2015, pg. 15. Image courtesy of Dr. Lorena Rios.

Plastic debris comes in different sizes (pictured on prior page): mega, macro, meso, micro, and nano plastics. We can explore the different sizes to understand the danger to various organisms leading up to humans.

CB: This is really interesting to think about—how to transform something we tend to see as useful or even beautiful (like balloons) into something more reflective of its realities and consequences. How might we see the truth behind the thing?

The graphic you included is intriguing. I am especially drawn to the images of the microscopic—they suggest we need to look closer, under the surface. The graph also suggests that there is a lot we can't see and might never see. How can we visualize the invisible?

I like that you say this: "I am constantly drawing or asking students to close their eyes and visualize a chemical concept or idea." It implies that we need to use our imaginations in order to really understand the problem with microplastic pollution. How do we engage people's imaginations?

I recently read an article about your research, and I was especially interested in how it began with a story:

> *On August 1, Jeremy Frech was about to embark on a kayaking outing with his family at Pancake Bay Provincial Park, on the Canadian shore north of Sault*

Ste. Marie, when the waves began to build. While the paddlers waited out the rough seas, Jeremy's mother recalled a curious incident. The day before, she met a young boy on the beach who had collected a handful of white pellets, not sure what they were.

Intrigued, Jeremy poked through piles of debris, the usual driftwood and detritus that wash ashore, and there they were—dozens of pea-sized plastic beads. [1]

The story helps ground my attention. It's easy to imagine being there, to see what Jeremy saw, and to make the leap to understanding how the plastic beads fit within the overall ecosystem.

In my own work, I often look to narrative structure to help complex issues resonate. I blur the lines between fact and fiction in attempts to engage viewers' imaginations—I see it as a strategy for encouraging viewer engagement and participation. I'm interested in thinking about how collectively imagining the future might help to shift its actual unfolding and how narratives—especially those pointing toward science fiction—help to broaden potentials for the future.

Could you recount a story about microplastic pollution that really stuck with you? Maybe one scenario where the effects of microplastic pollution were particularly acute?

LR: The first time I went to the North Pacific Gyre, I saw many beautiful seabirds, albatrosses, flying around. Then

I noticed that they picked up “food” from the ocean that turned out to be plastic fragments. This was difficult for me to witness. A black-footed albatross needs to travel long distances to get food for itself and its chicks.

When I analyzed the microplastics from the Great Lakes for the first time, the results were so surprising mainly because the sizes were smaller than the microplastics found in oceans. The colorful, perfectly rounded micropellets were found to be about 0.5 mm or smaller. That was really worrisome due to organisms that can easily confuse these small pellets with natural food, ingesting them by mistake.

It is important to mention that a lot of people do not know the risks of plastic pollution, therefore plastics are used without a second thought. In my opinion, if we do not change our behavior related to the use of plastics, we are playing with the future of our children.

CB: I keep thinking about why we don’t pay attention to this. Why don’t we know the risks? A lot of it seems like common sense. It’s easy to imagine that plastics are bad for organisms to ingest; I think we all intuitively know this to be true. And yet we still don’t seem to be motivated to stop it from happening.

Your story is interesting and the way you describe the beauty of nature that is so threatened is quite palpable. I like your images as well—and seeing them all together in the grid like that. It tells a story and it is easy to connect










Images courtesy of Dr. Lorena Rios.

the dots. In the pictures, I keep finding myself drawn to the colourful bits—it's like what you were talking about with the beauty of a balloon.

But the micropellets you found were so small. Referencing the chart you shared above, they were just below visibility to the naked eye. Can you explain a bit about the micropellets themselves? Where do they come from? Are they left over from industrial practices? Is the process that manufactures the pellets a visible one?

From what you describe they sound quite beautiful—colourful, perfectly rounded—but as your story and research shows, the reality of microplastics and their environmental impact is much more terrifying.

Your photos and story make me think about photographer Chris Jordan's *Midway: Message from the Gyre*,[2] an ongoing series for which he photographs the stomachs of dead baby albatrosses. They're beautiful and terrifying at the same time and do a good job of forcing us as viewers to stop, look, and consider the effects of pollution. But those images talk about plastics in a different way than your research does. With microplastics, the effects are so much harder to "see," while in Jordan's images the danger is so obvious. Can you explain a bit about the direct effects of microplastics—on organisms and the environment?

LR: Most microplastics are synthetic polymers, from petroleum. These polymers are long chains formed

of small units called monomers. Polymers have huge molecular weight and therefore they are considered inert and cannot interact with the cell membrane. However, it was found that nanoplastics can penetrate the human placenta and microfibers can be found in human lungs.

In my opinion, microplastic pollution has two sides: one bad and one good. Why? Because microplastics can adsorb toxic compounds from their surroundings: we might assume that they are good because they can clean the waters of oceans or freshwaters, such as the Great Lakes. However, the first problem is that organisms are unable to distinguish microplastics from natural food. The negative side is collecting these microplastics from waters; we do not have a magic vacuum to remove them.

CB: Do the effects take a long time to manifest?

LR: The plastic debris from big items is an eyesore. However, it has been demonstrated that smaller sizes of plastics—those that cannot be easily seen—do more damage to the environment and to organisms.

The kinetics (time) of the sorption (adsorption and absorption[3]) of microplastics can take weeks, months, or years based on the size and type of synthetic polymer. Smaller sizes, nano to macro, concentrate more toxic compounds at faster speeds. Smaller organisms like microalgae can concentrate toxic compounds, too, but not in higher quantities like microplastics. However, there

is sometimes a higher concentration of microalgae than microplastics in waters close to a coast. In the North Pacific Gyre, called the "eastern garbage patch," it was found in 1999 that the ratio by mass of microplastics to microalgae was 6:1. In 2007, the ratio we found was 44:1. This represents forty-four kilos of plastic debris for each kilo of real food! In this case, plastic debris represents a huge issue. In the waters close to the California coast, the ratio is lower (about 2.5:1). We do not know the ratio in the Great Lakes yet—it's my next research topic!

CB: Are the effects and impacts more visible than the micropellets themselves?

LR: This is an excellent question. There are many researchers looking for this answer. What are the real effects of microplastics on the food web and in human health? The quantities of micropellets in the environment are huge—billions or trillions of particles—but the effects will only manifest years or generations from now. Although we know that microplastics are a new source of toxic compounds, we do not have enough evidence to understand their effects on organisms or environments. We still need to test the concentration of toxic compounds in microplastics and their ingestion by organisms to properly relate their effects. There are some experiments in labs analyzing the kinetics of adsorption and desorption from water to microplastics to organisms. However, in the natural environment these effects are not yet known.

CB: It's interesting that there is a positive side to microplastics—I had no idea! It seems like a minimal benefit, though. Adsorbing toxins is great but not if another toxin ends up polluting organisms and ultimately ourselves. It sounds like a nightmare of a feedback loop.

I also find it interesting to think about what we know and don't know with regard to the issue. It seems like a lot of what we've been talking about has to do with what people are able to see. As if the only way to really get people to respond to an issue (and push governments) to stop the influx of microplastics into the environment is to first see the effects of it. To *show* people how much danger there is for us, for future generations, for the planet itself.

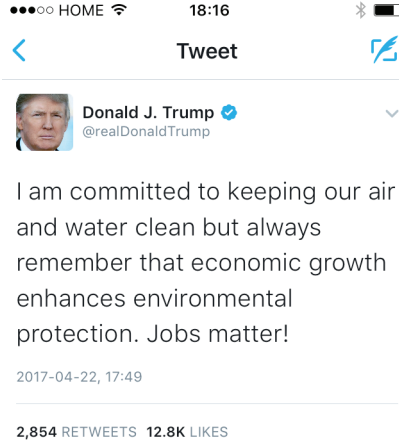
But I wonder—why do we need to see the issue to believe it? Why are we unable to deal with problems before seeing their effects? Why do we always have to be reactive instead of proactive?

You see these effects and potential effects of microplastics everyday in your research and teaching, and you work hard to get the rest of us to pay attention, to see it. As we work together to think through how we might best communicate these ideas visually, I keep coming back to a more fundamental question: are we even capable? Are you optimistic about our ability to make necessary changes?

LR: I am very optimistic about changes in our behavior with plastics, but it will take time. I honestly think that young people, from K-12, are paying attention and if we educate them well about plastic pollution, they will bring the solution to the table. Many older people also want to change their habits and they agree that plastic pollution is a problem that affects us all.

CB: It seems like what we really need is an overall shift in thinking, which will perhaps result from a commitment to listening to the warnings of scientists like yourself. I'm just trying to think through this: is there a point to trying to convince people (by people, I guess I mean, the masses) given the timescale we're up against? Once we will be able to really see it, it will be too late.

Did you see this?



All tweets that follow are courtesy of Christina Battle.

It's language like that in Trump's tweet that causes me to wonder how to shift the focus. It's that *but*.

Here's Canada's version:

The argument of jobs over environment is common among politicians—and, I think, among a lot of people as well. It suggests that we need a shift in thinking before shifts in policy can be possible. For whatever reason, people don't seem to *believe* in the dangers of plastics and other environmental contaminants. I mean, we know how important it is to have access to clean drinking water, yet we see what is happening in Flint, Michigan, a city that hasn't had clean water for at least three years. Here in Canada many of our First Nations communities suffer from the same problem.

We see images like these all the time:

annä @skeletonanna · Apr 24

it has now been three years to this day that flint, michigan has been without clean water and still nothing has been done #FlintWaterCrisis

87 67

TIME

TIME @TIME · 21 Jan 2016

Go behind TIME's **Flint** water crisis cover ti.me/1KtjF0h

17 440 288

Paul Aufiero @aufierp · Feb 15

Canada's First Nations still have **water crisis**. Will they finally be getting some help? hrw.org/news/2017/02/1…

5

Natalie Mae @NatalieMae31 · 13 Dec 2016

Water crisis in Cape Breton **Canada** First Nation community is an emergency... #WaterIsLife

Water crisis in Cape Breton First Nation community is an emergency, ...

Officials from Health Canada, Indigenous and Northern Affairs and a group of engineers will be coming to Potlotek First Nation next Tuesday to addr...

cbc.ca

And yet nothing seems to change. People still ignore it.

So, again: is it just an issue of communication? It seems more of a matter of shifting thoughts and perspectives—a cultural shift. How might we use the tools of media culture to work in favour of fostering this shift in thinking?

I've been thinking about the March for Science that took place across the United States last week. The protests seem to illustrate the need for a cultural shift more than anything else. We're not even close to rallying together to stop a specific issue like microplastics in the environment. We're still debating whether we should believe in science in the first place! Right now in Canada the issue might not seem as overtly polarized, but we also suffer from ignoring the science of climate change. How is this possible?! How did we get here?!

The protests over the weekend seem to indicate a collective gesture toward a basic agreement: *I believe in what scientists are saying*. I feel like these images are a great counterweight to some of the underlying problems and might help to shift our thinking—for making this sensibility visible. They might remind people that there are many who feel the same: that scientific research and environmental protections are important.

My research is focused on the tools of technology—especially social media—and how they shift our engagement with information. I'm particularly interested in how they alter the ways we engage with images—how they shift the ways we expect images to be.

The images above operate much like the language of the internet itself: they are funny, witty, and easily digestible. There is a sense of irony but not cynicism. They feel optimistic despite the gravity of the situation they visualize. Those who generated the protest signs and posted the images not only used social media as a tool to expand the conversation (many of these tweets quickly went viral) but the images, and especially the language within them, are informed by social media itself. I wonder how you feel about this form of communication. Is there something in these images that might be useful for thinking through how we talk with people about microplastics?

LR: Here are some pictures from my campus at the University of Wisconsin-Superior, where they know about my plastic pollution research. Local news even reports

about UWS working on plastic pollution. It is disheartening to see what I saw last Friday....

So many plastic flags! With the wind, the plastics were broken into smaller sizes.

What does this mean? Is nobody really listening? This was very disturbing to see on my own campus.

With regard to your questions about the protest images: I am not sure how to answer this because of the reality

Images courtesy of Dr. Lorena Rios.

on my own campus. Pictures speak a thousand words. In my opinion, we need people in power to stop doing contradictory things, for their actions to no longer contradict their words. (It looks like this is the fashion of the times!) It's particularly worrisome that there are individuals in government offices who do not believe climate change is real. We share this planet and therefore need to work together in keeping it safe.

CB: Ha! Those red plastic flags and the university's use of them is exactly the thing. It's such misguided thinking—a major disconnect. I think you're right in that they aren't listening. Maybe what is needed is for you and your group to place a sign above the plastic markers reminding people of the dangers of plastic! Make visible the full story for those who walk by them everyday. Remind them of just what happens when those little bits of red plastic fall off the flags and are exposed to your campus and the greater environment. Turn it into a meme!

LR: I have one permanent exhibition in the Science Building. Here are some pictures of the stand. From time to time I change the plastic samples.

This is good behavior to study. Maybe the people in charge that authorized the plastic red flags do not know about this environmental issue!

For people who see garbage everyday, their eyes eventually get used to it and never again really "see" the

Images courtesy of Dr. Lorena Rios.

garbage. This is true of most people with regard to plastic debris. I noticed that, during my seminars, people were impressed with the plastic debris pollution, asked many questions, and showed concern, but many of them then returned to their habits of using plastic. Their newfound level of awareness lasted only a short amount of time.

CB: Let's talk for a minute about Kelly Jazvac's work. Specifically, the plastiglomerates she's shown as ready-made works in gallery exhibitions. In a recent essay about Kelly's work, Kirsty Robertson considers how plastiglomerates might help to make visible the otherwise difficult-to-grasp issue of plastic pollution.

> *The ready-made geologic being of plastiglomerate speaks to more than pollution: also geology, the deep time of Earth, colonization, human-animal knowledges, currents of water, and the endless unfolding and collapse of life on Earth.*[4]

I find her evocation of geologic timescales as especially insightful. Plastiglomerates make visible a glimpse of what we might expect in the future. They document a transformation, a potential landscape where plastic and the earth, our earth, are completely intertwined. They look beautiful on the surface but upon closer inspection they are twisted and fragmented, they're not quite right.

What do you imagine our future environment will look like if we don't quickly change our relationship to microplastics?

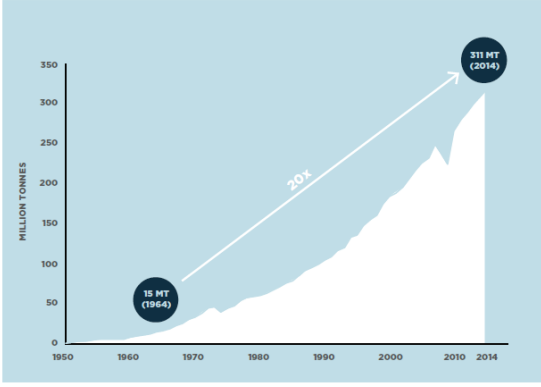
Plastiglomerate samples collected by geologist Patricia Corcoran and Kelly Jazvac at Kamilo Beach, Hawaii, 2012. Photo credit: Jeff Elstone. Images courtesy of the artist.

LR: Studies show a clear tendency toward an increase in plastic production without an increase in the technology used to recycle plastic debris. It has been suggested that if we continue with this tendency, by the year 2050 there will be more plastics than fish in the ocean!

Plastics are not biodegradable. They can be here forever—quite literally—because they break down into nano-size plastic debris. This raises our concern because of negative impacts on organisms and their ecosystems: air, water, sediments, oceans, and freshwaters—all the environmental ecosystem compartments.

The most important thing to keep in mind is that plastic debris pollution is everywhere on the planet and that

FIGURE 1: GROWTH IN GLOBAL PLASTICS PRODUCTION 1950–2014

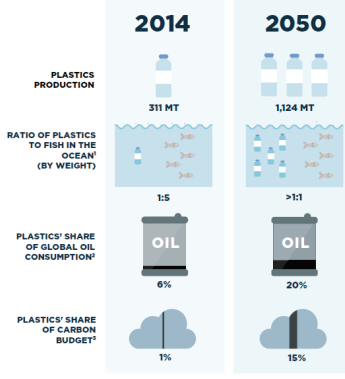


Note: Production from virgin fossil-based feedstock only (does not include bio-based, greenhouse gas-based or recycled feedstock).
Source: PlasticsEurope, *Plastics – the Facts 2013* (2013); PlasticsEurope, *Plastics – the Facts 2015* (2015).

the debris can be fragmented into microplastic particles that can concentrate and transport toxic compounds that affect multiple organisms. Humans will not be the exception. To put it into perspective, fish can ingest microplastics contaminated with toxic compounds and these compounds will then be transferred through the food web. Macroplastics are a huge problem, too, because they get tangled with big marine mammals and form synthetic reefs in the ocean.

While microbeads from cosmetic products are not the main source of microplastics, these are well associated

FIGURE 5: FORECAST OF PLASTICS VOLUME GROWTH, EXTERNALITIES AND OIL CONSUMPTION IN A BUSINESS-AS-USUAL SCENARIO



Above and left: infographics sourced from the Ellen MacArthur Foundation, "The New Plastics Economy: Rethinking the Future of Plastics," 2016. Above: pg. 28. Left: pg. 25. Images courtesy of Dr. Lorena Rios.

with plastic pollution. Think of all the synthetic material we use in “normal” situations: for instance, synthetic clothing is another large source of microfibers. Microbeads and microfibers are the perfect size to concentrate toxic compounds and are easily confused with natural food by most aquatic organisms.

In the end, what we make is what we eat. If a fish eats plastic fragments contaminated with toxic compounds and we eat this fish.... The next question: what happens to our bodies? ■

[1] Phil Bencomo, “Microplastics: Pollutants in a Small Package.” *Lake Superior Magazine*, October 1, 2015. http://www.lakesuperior.com/the-lake/lake-superior/microplastics-pollutants-in-a-small-package/

[2] Chris Jordan, *Midway: Message from the Gyre*, 2009-ongoing. Photographic series. http://www.chrisjordan.com/gallery/midway/

[3] Absorption refers to when a substance is incorporated into another of a different state: for instance, when a liquid is absorbed into a solid. Adsorption refers to the bonding of ions and molecules solely on the surface of a material.

[4] Kirsty Robertson, “Plastiglomerate,” *e-flux Journal* #78, December 2016. http://www.e-flux.com/journal/78/82878/plastiglomerate/

Infographic sources:

Page 3: Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection, “Reports and Studies No. 90: Sources, Fate and Effects of Microplastics in the Marine Environment: A Global Assessment,” 2015. Available for PDF download here: http://www.gesamp.org/publications/publicationdisplaypages/reports-and-studies-no.-90

Pages 24—25: The Ellen MacArthur Foundation, “The New Plastics Economy: Rethinking the Future of Plastics,” 2016. Available for PDF download here: https://www.ellenmacarthurfoundation.org/publications/the-new-plastics-economy-rethinking-the-future-of-plastics

Originally from Edmonton (AB), **Christina Battle** is currently based in London (ON). Her works are often inspired by the role of official and unofficial archives and our notions of evidence. She explores themes of history and counter-memory, political mythology, and environmental catastrophe. She is especially interested in how our engagement with media shapes our understanding and interpretation of information. Her current research focuses on thinking critically about the tools of technology, especially social media, as part of contemporary language and considering the role that they play in how we receive visual information and expect it to be. www.cbattle.com

Dr. Lorena Rios Mendoza is an Associate Professor of Chemistry in the Department of Natural Sciences at the University of Wisconsin–Superior. She graduated in Mexico with distinction with a Doctorate of Chemistry Oceanology and her BS is in Chemistry. Dr. Rios's expertise is in environmental chemistry pollution. She has researched marine plastic debris pollution along California beaches and in the Pacific Ocean since 2003. After moving from California to Wisconsin she began to study plastic debris contamination in the Great Lakes. Dr. Rios participated in the first-ever collection of microplastic samples from the Great Lakes in 2012 and in the second collection in 2013. She went to the North Pacific Gyre, known as the "Eastern Garbage Patch," for seen weeks during summer 2014. She has presented her research findings at the American Chemical Society's national conference (2012–16) and the International Association for Great Lakes Research conference (2015–17). Based on her research findings on microplastic pollution in the Great Lakes, plastic pollution has been noticed by the public and lawmakers in Wisconin, Minnesota, and other states.

Kelly Jazvac is an artist who works with an interdisciplinary team of scientists, writers, and artists to research plastic pollution. Jazvac's recent exhibitions include "Sharp and Numb," Art Gallery of Southwestern Manitoba, Brandon; "Song of the Open Road," Contemporary Art Gallery, Vancouver; "Atmospheres of Form," Parisian Laundry, Montreal; and "A Stratigraphic Fiction," the Berman Museum of Art, Collegeville, PA. Her work has been written about in *e-flux Journal*, *Hyperallergic*, *C Magazine*, *The Huffington Post*, *Magenta Magazine*, *Border Crossings*, *Canadian Art*, Artforum.com, *The New Yorker*, and *The Brooklyn Rail*. She has upcoming exhibitions at Fierman Gallery, New York, and Or Gallery, Vancouver

Gallery TPW acknowledges the generous support of our funders:

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