

Victoria Vesna: Inviting Meaningful Organic Art-Science Collaboration

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Abstract – We asked Victoria Vesna for an interview upon investigating her recent collaborative project, *Noise Aquarium*, through which, together with an interdisciplinary group, she brings awareness to a general audience of underwater noise pollution in relation to the plankton and their plight of co-existence with micro-plastics in the ocean. The discussion that

ensued resonated as to fruitful artistic process, contribution to science, and the organic nature by which many of her most meaningful collaborations evolve to produce art.

Victoria Vesna is motivated through the pursuit of organic collaborations that enable her to explore interesting areas of science while injecting her artistic training as a lens to raise awareness of that research to broad audiences. Her recent appreciation of plankton led to envisioning *Noise Aquarium* (figures 1 and 2), a large interactive virtual display that projects 3-D scans of specimen obtained through unique scientific imaging techniques and immerses the audience in an “aquarium” of diverse planktons projected to appear as large as whales. Through their presence alone, audience participants activate destructive underwater pollution noise such as fracking and sonar, demonstrating how we are implicated by inaction.

When we asked how her study of plankton led to *Noise Aquarium*, Victoria told us:

“About five, six years ago, Alfred Vendl, director of the Scientific Visualization lab at the University of Applied Arts in Vienna visited nanoscientist Jim Gimzewski’s lab at the the California NanoSystems Institute (CNSI) which is where we have the gallery of the UCLA Art-Science Center. He was particularly attracted to the *Blue Morph* piece I developed with Jim because of the butterfly wing visualizations and later included that work in an art show in Vienna. We started informing each other of what we are doing on occasion through newsletters and emails.

“It was a slow developing relationship at first, but a year later, I was a resident artist at the Angewandte (University of Applied Arts), developing the *Hox Zodiac* project and we hung out in cafes and exchanged ideas in person. Soon after, he started work with the scientists from the department of biology and zoology at the University of Vienna, developing a database of plankton. He suggested I do artwork with that and when I looked at the visualizations, they were stunning – I was particularly impressed that these micro-creatures were 3D scanned!

But I had no idea what to do with the imagery or how I would work with it. Truthfully, I had not much knowledge about plankton at that point, but seeing this diverse beauty, my curiosity was aroused and I started on a journey.”



Figure 1. Plankton serve as one of the primary basis of the marine food chain and are as a result a crucial component of the Earth's ecosystem. Scientists believe that phytoplankton contribute between 50 and 85 percent of the oxygen in Earth's atmosphere (Photo Credit: Glenn Bristol.)



Figure 2. Blowing up the 3-D scanned microcreatures to the size of a whale confronts the audience with the complexity and beauty of these diverse creatures. Deep Space 8K, Ars Electronica 2018. (Photo credit: Glenn Bristol.)

“That sequence is typical of how I start working with scientists. It is through dialogue, friendship and shared curiosity.”

“A graduate student in Alfred's lab, Martina, created animations with the 3D scans and I did my own research and observations learning further about plankton. 3-D scanned planktons re-animated looked amazing and so diverse that I got excited as I started to envision how to show off how great plankton are. Learning that they produce so much oxygen on earth – as much as 80% – was new to me believe it or not.”

When we asked her further about that fascination with plankton, she said:

“Sound has always been central to my work – going back to when I formed a post-punk band while in art school. A decade ago, I worked on a large installation, *Water Bodies*, that included issues around all the issues with underwater sound pollution. *Noise Aquarium* really started with a question rarely asked: How does noise pollution affect plankton? We know how it affects whales and dolphins and we hear about that because as they move through sonar they make sound in response, but I couldn't find anyone to tell me about effects on plankton. It took me awhile to realize why that is not happening is because we are confronted with tremendous complexity. There are thousands of varieties of species of plankton and a whole ecology where some eat each other and some have some properties and others have other properties, but if you are using the classic scientific reductionist methods like those that follow a clam or a dolphin and grab the data, you just can't do that with plankton – it's just not possible.”

When we suggested audio had been a critical component for many artists we've interviewed, Victoria said:

“When using sound in VR, some artists just slam quadraphonic sound at you while you watch eye candy, but I wanted the sound to move around the participant as it naturally would (see figure 3). I worked closely with Paul Geluso who is expert in surround sound composition to create an immersive audio experience. The visual pulls you in, and drives you, but the sound is felt throughout your body. We got sound samples from the science community and didn't want to play just one sound at a time as that's not the underwater environment. There is much to be explored in how sound is overlapped when it hits you in conjunction to what is being visualized. When our sound work testing started, I had to calculate how long people would put up with it before leaving the room. The noise experience is unbearable actually, but it is a faithful reproduction of the underwater experience. I left it so it is blasted at you no more than 30 seconds, but remind people that this goes on continuously. With the technology it's good to make the noise because it is not something we see as it happens so far away from us on land but it affects us all. We all eat plastic now, whether we admit it or not, and nobody really knows how micro and nano plastics affect our general health. It could very well be that many diseases are related to this but because of the complexity involved, no one knows what this means for humanity.”

We we asked her about making any contribution to science, Victoria said:

“I think the most general problem facing science is that: How do you use popular reductionist methods on these and other complex problems that we are facing? When I asked scientists about plankton species and underwater noise pollution, I found them scratching their heads and we couldn't really find anybody pursuing this as a focused research in regards to plankton. So in a way, it is speculative questioning what is happening at the bottom of the food chain. Then, two years ago in the midst of working on this, I saw a video of plankton eating micro-plastic which totally freaked me out as I could imagine it working its way up the food chain. I started emphasizing it with noise and wondering how do you make this really

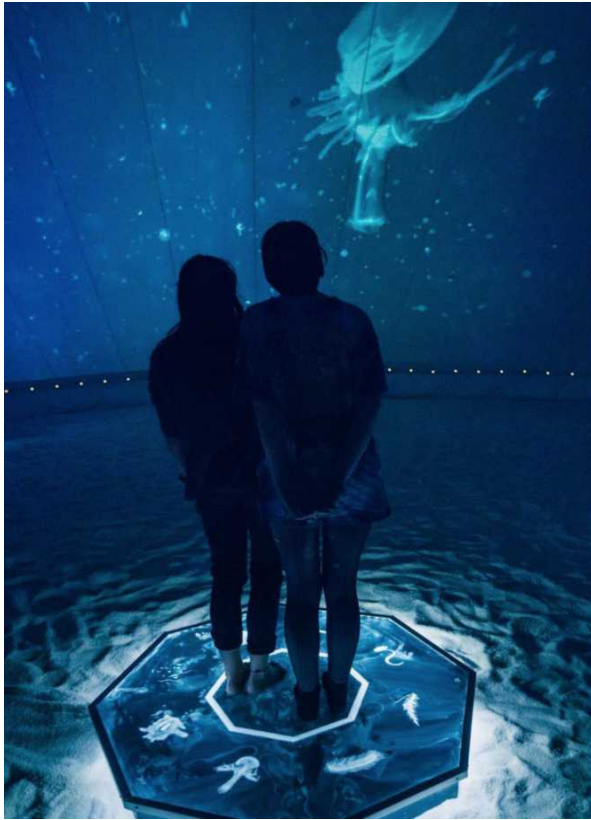


Figure 3. Audiences generate destructive anthropocentric noise such as fracking and sonar produce, until perfectly centered at which point all the plankton return and we hear whale song – as a reminder we are both at the top of the food chain and affected equally (Photo credit: Glenn Bristol.)

effective. The urgency really hit me. We could all benefit from good science and so my contribution is at a minimum to motivate the funding of this research by pointing out the potential significance.”

As it was evident Victoria wanted to get many people to experience *Noise Aquarium*, we asked her about its iterations. She said:

“Martina and I had sound in the art and visualization in Vienna and pulled it all together in Los Angeles, and then last year we did it the way we felt it should ideally be done – at Ars Electronica’s 8K Deep Space. Glenn Bristol joined us as we had to reprogram everything for that space, but I was happy to do it because it gave me an opportunity to learn through it. Now we are looking at different ways to get the same message and experience out to people. We have an augmented reality set up where we have posters that when you look at them with a picture phone, you see the different species and hear the sound as well. We have a linear version that uses very basic large scale video projection that could be sent to places like Croatia that have little funding – they live by the Mediterranean that is being destroyed.”

“The only thing I request for those who don’t have the funds is that they make it as large as they can and as loud as possible. Although I am not a big fan of head-mounted immersive, when I was last in Vienna, Glenn showed a VIVE/Oculus rendition to me and I had to admit that it was very cool. It works because you are in the middle of it and as such it is a good approach for smaller audiences.”

When we asked Victoria about the long timeline associated with making *Noise Aquarium*, she said:

“I see people try to work by putting people from different disciplines together artificially and it almost never works because it takes a lot of time to create common ground and resonance. My students are always asking me, 'how long did it take you to do this?' and they think 'oh my god' when I tell them it took five years. They want to get results instantly, but no, it takes much session time and commitment so in that way it is very similar to the process of scientists — we artists are also practitioners, we are experimentalists, and yet often we part ways with the theoreticians because our work is not solo work. I think there is an important slow process for anybody wanting to collaborate – if you are a painter, or a graphic designer, or anybody who is good at what you do – where you want to check out all the angles and figure out where you fit in and what can you do to make another kind of amalgamate or fusion.”

“At one exhibition it was interesting seeing all the different responses to art-based research and even scientists saying why art-science collaboration was important now. There was once a time when we artists were all considered visualizers but that’s not it anymore — there is a

certain shift where there is respect for an expansive role of artists. That awareness is still minimal but it is growing. I feel it is necessary and so I think my role in *Noise Aquarium* is representative of a role artists could to play in these urgent times.”

When we asked her to elaborate on the role, Victoria said:

“As Bucky Fuller would say many times, art is one of the few disciplines that is taught to be comprehensivist. Art is about connections, experiences, and public interactions, and if we don't attract the audience we don't do a good job of that. In my opinion, when we are sharing our work, the audience should be diverse — definitely beyond the typical gallery audience toward a larger audience. As comprehensivists we are capable to pull in many different aspects of a theme to create a complexity map which each one of us puts through our own filters to make it unique. When done fully, the artist's research process has its own complexity as we aren't just following one methodology — if we are, I'm not on board with it. Trying to imitate humanities or trying to imitate sciences in methodology just doesn't work. It takes on different shapes depending on the people involved and the subject matter that is at the center — there is not one formula to follow. If the chemistry of the people is very good — we like each other and hang out with each other outside work and party together — then we can get into crossing over our language and methodology barriers.”

By two-thirds through the interview, we were convinced that the evolution of the collaboration that led to *Noise Aquarium*, but also her other pieces like *Bird Song Diamond* (and others listed on her arts projects page at <http://victoriavesna.com/index.php?p=projects>), speak loudly to her motivation and process of organic art-science collaboration. When we asked her to comment on that, Victoria said:

“In the case of *Bird Song Diamond*, I walked into it the same way I did with the planktons — clueless but curious. It was an incredible learning experience where I learned so much about bird song, language, artificial life, robotics, machine learning, natural systems... But most of all, I learned to listen to birds and this is a valuable gift I wants to share with audiences. Many around the world did and he was saying that the paper that they wrote is read by, well... you can count on one hand or a few more experts, but the amount of people who got to see *Bird Song Diamond* that pointed back to his research really stunned them. And that research was funded by the National Science Foundation who really appreciated what was going on after they were initially kind of 'hmmm'. I think it's about taking something that very few people read and talk about and use and putting it out to the public. And this is something that is happening more and more repeatedly and increasingly scientists are noticing how including an artist in their proposals gives them an edge when they put the next grant together.”

“We artists are in a better position to talk about the whole idea of complexity and public outreach and awareness. And science is now under such an attack from this current administration — as is art. It is important that we hang together.”

“It's not just my art that gets enriched, the science gets enriched — both of our brains are changed and the sweet spot is where together you've reached that place that is in between where you can't tell if is it art or if is it science (see figure 4). Another example is the *Hox Zodiac* project, a decade long collaboration with neuroscientist Siddharth Ramakrishnan. When I asked him why collaboration was important to him, he said it was just a completely different thing for a scientist to take a completely different approach about a topic that they are thinking about — where they have very specific methodologies and have to remain in a reductionist mindset. If he can take an excursion with a different approach, he has a different mindset when he goes back into the research and this can alleviate his brain from the kind of dull repetitive stuff that often happens in the lab.”

“So I think it goes both ways. The reductionist mindset can help the artistic mind at times by

keeping the mind engaged — I find it necessary and I encourage this with the UCLA ArtSci center. I do it with my classes. Everywhere I go I try and connect people. Social engineering on two sides of campus is my strategy so I suggest food and drinks and hanging out on the agenda. As a teacher of mine once said, 'after the third drink there are no disciplines.'"



Figure 4. Plankton sample: *Tomopteris helgolandica*: Volumetric rendering out of stack images, mesh structure adjustment (Image credit: Victoria Vesna.)

When we asked Victoria to give us a final perspective on her life, she said:

"I have been curious about nature and science as long as I have known myself. I had really bad science teachers and so I became an artist and had to learn it on my own. I find that, on the other side, many scientists had a bad art teacher. I am interested and passionate about breaking this artificial divide and it is critical now with climate change and all the complexity facing humanity."

"I don't believe in artificially putting these things together. Scientists have so much pressure just to do their research that I can't stand interrupting them with my stuff unless they invite it in somehow. It can be tough going at first. And it would be the same other way around. If someone walked into my studio and wanted to collaborate, my first thought might be 'whatever'."

3-D scanning and rendering process:
<http://noiseaquarium.com/workflow/> and
<http://noiseaquarium.com/data-acquisition-and-analysis/>

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