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Playing with Ancestral Waters: Community Portals along the Mahicannituck (Lower Hudson River) Watershed

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Playing with Ancestral Waters: Community Portals along the Mahicannituck (Lower Hudson River) Watershed

Natan Diacon-Furtado* & Water Justice Lab Youth Scientist Fellows and Staff**

Community Portal (2024—) is an instrument for embodied collaborative listening with local and ancestral waters. The Mahicannituck (lower Hudson River), a tidal estuary connecting upstate New York and the Atlantic Ocean, serves as an inspiration and site for this work. The cyclical movement of its waters constitutes a flow towards and away from Indigenous, colonial, cultural, and industrial legacies. This hybrid essay shares fragments of *Community Portal*'s co-development within these waters and across three participatory design playtests conducted by a community of artists, educators, and high-school-aged youth science fellows. Utilized in game design to elicit user feedback during development, playtesting is presented here as a methodology for the collaborative community design and development of assistive tools that adaptively re-use and re-imagine colonial technologies of science and media. Playtesting with and in these waters presents an opportunity for further collaborative development of technologies that unite social practice, science, and engineering, a process that this essay terms 'visionary engineering.'

Keywords: community, imagination, improvisation, intuition, listening, play, reality, visionary engineering, water

The Mohican name for the lower Hudson River, 'Mahicannituck,' means 'river that flows both ways.' It is a tidal estuary spanning 153 miles from the Atlantic Ocean at New York City's harbor to the Federal Dam in Troy, New York. Each day its waters shift with the tides, flowing to and from sacred Mohican / Munsee lands, the Ellis Island immigration station, the birthplace of the Hudson River School (famous for its style of landscape painting), the start of the Erie Canal and origins of the Industrial Revolution in the United States. Though it is of great Indigenous, colonial, cultural, and industrial importance, this river has been repeatedly severed from the communities that live beside it through toxicity, poverty, and harmful urban planning. Its waters have been 'treated as a dumping ground for industrial and municipal waste' (Riverkeeper, 2025) and still regularly test as unsafe and unhealthy. Yet, the Mahicannituck's waters continue to flow.

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** A full list of 2025 fellows and staff can be found at: https://www.mediasanctuary.org/project/water-justice-lab (accessed on 30 March 2026).

We are a community of artists, educators, and high-school-aged youth science fellows living and learning with these waters at the estuary's northern edge in Troy, New York. The cyclical movement of the Mahicannituck's waters towards and away from Indigenous, colonial, cultural, and industrial legacies has inspired us to begin sensing similar shifting tides within ourselves. *Community Portal, Recuperating Ancestral Waters* (2025) is a creative experiment in listening with our local watershed as a means of sensing the ever-shifting ancestral and polluted states of the waters both around and within us. This summer we played with these waters, and they played with us. We invite you to come play with us too.

We stand on the muddy silt shore and dip our hands into the cool waters. We listen for something we can understand in the ever-shifting static tones that Tanajae shapes with the twirling of her finger in the river water filling our bowl-shaped antenna. 'Attention,' we hear through the static. 'ATTENTION!' we all repeat—letting that something know they have been heard. 'Radio,' we hear next as Tanajae spirals her finger towards the bottom of the bowl. 'RADIO!' we acknowledge—as our play transforms into communication and connection.

Listen with us

This essay presents narrative, photographic, and audio fragments from three playtests of the *Community Portal* (2024—) instrument for embodied collaborative listening with local and ancestral waters. A playtest is an iterative participatory design process traditionally used in game design to elicit user feedback during development. These playtests were conducted by the collaborative artist and designer Natan Diacon-Furtado with high-school-aged Youth Scientist Fellows of the Water Justice Lab. The fragments published here highlight three methods developed by fellows during playtests for using the instrument in a creative and scientific exploration that is both self- and site-specific. It is our hope that presenting these playfully discovered methods inspires others to have fun navigating their own inner and outer waters, expanding our playtests beyond the Mahicannituck.

Water Justice Lab (WJL) is a water quality monitoring and education program located in Troy, New York. WJL is a collaboration between the water advocacy organization Riverkeeper, and The Sanctuary for Independent Media, which uses 'art, science and participatory action to promote social and environmental justice and freedom of creative expression' (The Sanctuary for Independent Media, 2023). Collaborating WJL Youth Scientist Fellows were Polly (Polina) Napelenok, Sumaiya Momenath, and Tanajae Owens, guided by the youth mentor Ileya du Boulay. Their play was greatly facilitated and made possible by the artists and NATURE Lab co-directors Kathy High and Ellie Irons, summer intern Atlas Seres, volunteer Doug Reed, and Riverkeeper's community science coordinator Sebastian Pillitteri. The theoretical framing

Figure 1. Water Justice Lab Youth Scientist Fellows and Staff with Natan Diacon-Furtado, *Community Portal, Recuperating Ancestral Waters*, 2025. © All rights reserved, courtesy of the authors.

and technical specifications comprising a majority of the written portions of this hybrid essay are authored by Diacon-Furtado. This writing is reflected and refracted by the techniques and methods for technologically assisted call and response with our waters, which were developed by WJL Youth Scientist Fellows during their playtesting at various locations throughout the Mahicannituck (lower Hudson River) watershed.

Community Portal was originally designed by Diacon-Furtado as a doctoral candidate in Electronic Arts at Rensselaer Polytechnic Institute in Troy, where WJL is based. Diacon-Furtado created this instrument in an attempt to explore and re-connect with water and listening-based knowledge practices across their own Quaker, Sephardic Jewish, West African, Native Brazilian, settler, arrivant, and Indigenous ancestries. Disconnected and severed from many of these practices through time and force, their work explores the possibility of appropriating widely available mass market technologies to reconnect with the wider array of technological possibilities available to us from our pasts and hopefully our futures.

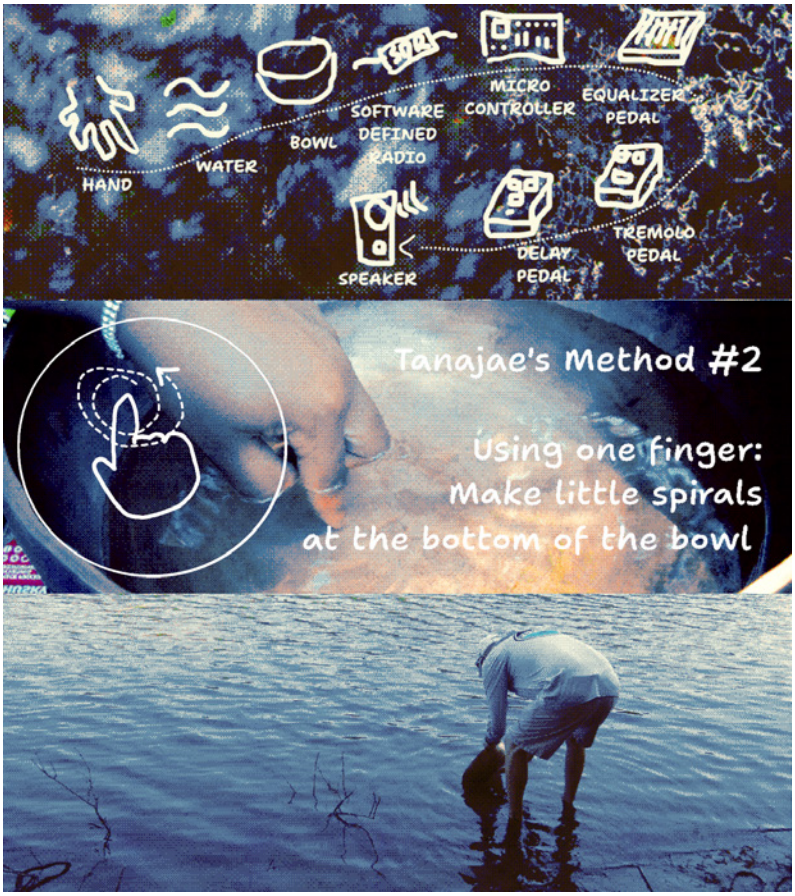


Figure 2. Water Justice Lab Youth Scientist Fellows and Staff with Natan Diacon-Furtado, *Community Portal, Recuperating Ancestral Waters*, 2025. © All rights reserved, courtesy of the authors.

This work adaptively re-uses readily available laptops, micro-controllers, radios, and antennas to assist in communicating with our waters. As an open-source project, all necessary code and guides to build your own *Community Portal*, with links to required hardware and software, are available as open-access information from the project's website.[1] In addition to the three playfully discovered methods presented in this essay (Fig. 1, 2, 5), anyone who chooses to build their own instrument is encouraged to uncover further methods that resonate with and in their own bodies and ancestries.

This resonance is aided by the site- and self-specific salt and minerals that flow both ways between us and the waters around us. The Black Studies scholar Christina Sharpe (2016) posits that dissolved minerals form a cyclical relationality between water and us that exists beyond linear conceptions of time. The same salt moves in and out of bodies and water over 260 million years of residence time (Sharpe, 2016, p. 268). These minerals materially connect our pasts, presents, and futures. *Community Portal* amplifies these conditions so that they can be readily sensed through sound.

Ranging from clear speech to impassioned noise, the cultural producer, artist, housing advocate, and author Rasheedah Phillips (2025), of the duo Black Quantum Futurism, reminds us that the '[t]he significance of understanding sound as a carrier of complex information becomes particularly poignant <...> in contrast to the predominance of visual culture that is a feature of modern Western European culture' (Phillips, 2025, p. 261). *Community Portal* aids in sensing and accessing this complex information within our local waterways and ourselves. Though it may not be understandable in our current contexts, the call and response facilitated by this instrument engages communication as a source of connection—and connection as a source of communication beyond time and place.

This is achieved by turning a closed radio system into an open and collaborative process for water-based exploration through the use of a liquid antenna. Liquid antennas were first proposed and tested in 1999 as an alternative antenna design for transmitting and receiving electromagnetic signals (Huang et al., 2021). Water-based liquid antennas perform this task by utilizing a closed-loop of ionic (salt) liquid. *Community Portal* replaces this closed system with an open bowl that can be filled by collaborator hands and waters (Fig. 3). The ever-shifting ionic mineral content of these collaborations audibly affects reception, amplifying signals provided by a modified software-defined radio (Fig. 4). This radio continuously sweeps the FM spectrum to provide an ever-shifting palette of words and sounds to playfully make meaning with. Do the minerals that amplify and allow us to sense this complex information form a communications network that we can learn to tap back into?

WJL invited Diacon-Furtado to explore this question by continuing to develop the *Community Portal* instrument within the framework of a laboratory science program. In this program, youth fellows learn to perform water quality testing with professional lab instruments, processing water samples from over 150 miles of the Mahicannituck watershed. Data collected from this sampling is included in Riverkeeper's water quality program informing local water recreation and is utilized to support water quality laws and initiatives. Fellows produce radio broadcasts and podcasts as civic media on these topics and explore issues such as dam removals and wastewater treatment.

In general, WJL fellows utilize proprietary commercial scientific instruments and media production technologies to assess and communicate external water conditions. Bringing the Community Portal instrument into this setting proposes a shift from focusing on the waters that flow both ways along the Mahicannituck to the waters that flow both ways between us and this watershed. The playtest format was chosen so that fellows would not feel daunted by such a proposition and so that they would feel free to immediately collaborate in playing with such an instrument and playfully discovering ways in which it might be utilized. Within this format, experiments with technologically assisted call and response are allowed to be meaningless and meaningful at the same time. Presenting this instrument in a context of play rather than scientific testing allows it to act as what the game and

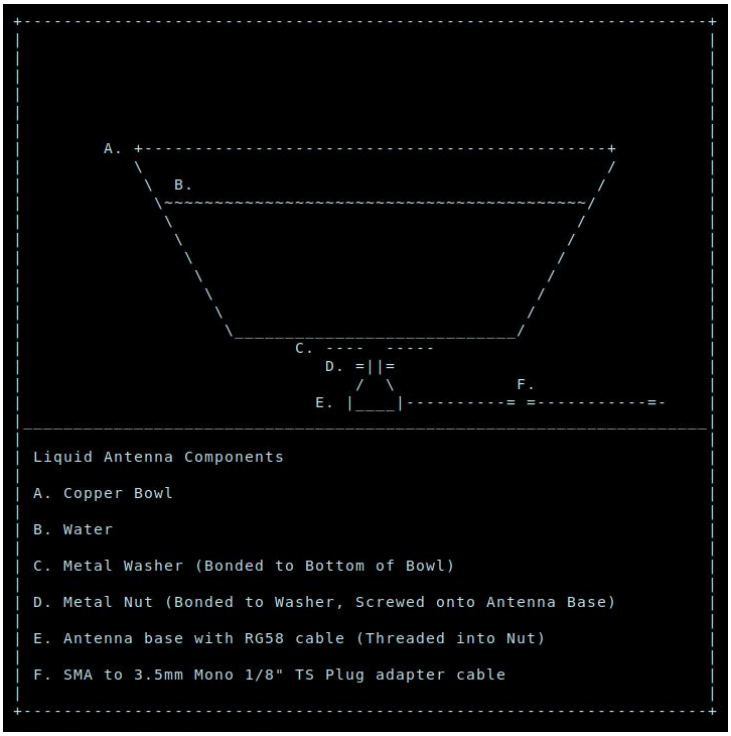


Figure 3. Liquid antenna diagram. Natan Diacon-Furtado, *Community Portal*, 2025. © All rights reserved, courtesy of the authors.

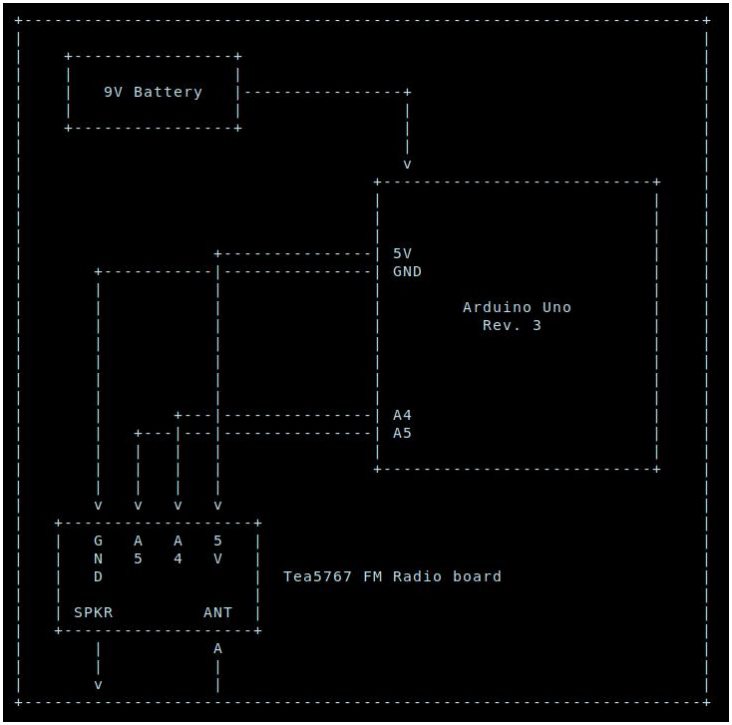


Figure 4. Software Defined Radio Diagram, Natan Diacon-Furtado, *Community Portal*, 2025. © All rights reserved, courtesy of the authors.

play scholars Sarah Lynne Bowman and Kjell Hedgard Hugaasa (2021) term a 'transformational container.' For Bowman and Hugaasa (2021), 'the goals of [a] transformational container are to facilitate the exploration of self, envision new configurations of community, and transfer insights from these experiences to one's life through integration practices' (p. 18).

As transformational containers, this instrument and its playtests serve as portals that expand our senses of community and connection with and in our waters. Playing with these waters through technologically assisted group and individual vocal and rhythmic call and response, we have begun to expand our sense of the materialities, temporalities, and relationalities that greatly constellate and expand this community and connection across time and space.

Our antenna isn't working in the lab. The tap water that fills its bowl is filtered and processed and silently disconnected from the same waters that joyfully play with us outside. 'What's missing?' Ileya asks the fellows in the room. 'Rocks!' Polly exclaims. We rush outside to collect rocks and experiment with adding them. Each rock that we add stirs up a response of sound. Combining one big rock and four small ones seems to allow us to receive and transmit sound each time we move our hands in the water. 'It's like we're making a potion!' Atlas shouts.

 Listen with us

Playing with our waters allows us to switch between the scientific realities of the lab and the individual and communal cultural realities of our embodied mineral memories. Standard lab equipment measures the reality of our water systems as imposed by an imagination of destruction and disparity; it requires the memorization of a 'proper' procedure to operate. Unlike standard lab equipment, *Community Portal* invites us to intuit and improvise how our bodies were once used (and could be used again) to communicate across time and space. It helps us to recuperate abilities that the theologian and scholar of African American spirituality and mysticism Barbara A. Holmes (2020) reminds us 'our ancestors possessed <...> and used <...> in ways that we have long forgotten' (p. 31). It is an instrument intended to assist all who have been stripped of, or been denied access to, these ancestral abilities and knowledges with recovering them in site- and self-specific contexts.

We are learning to play and listen with our waters again as they continue to flow towards and away from Indigenous, colonial, cultural, and industrial legacies. Living and playing along the shores of the river that flows both ways clarifies the need to communally recuperate ancestral technologies that disrupt 'the uni-linear transmission of information into our realities' (Phillips, 2025, p. 261). As the activist healer and writer adrienne maree brown (2017) emphasizes, '[w]e are living now inside the imagination of people who thought economic disparity and environmental destruction were acceptable

costs for their power' (p. 3). Standing in the currently waste-filled waters of the Mahicannituck helps us sense this imagination's attempts to exclude us from our own ancestral waters 'as enemy, fright, other' (brown, 2017, p. 21). We are reminded by the scholar of Indigenous and colonial histories Coll Thrush (2011) that these attempts to turn our ancestors into spirits with no embodied claim to self and space are a colonial tool to excuse and allow this continued disparity and destruction (p. 69). We must, in the words of the artist and sociocultural investigator Marlon Jiménez Oviedo (2022), 'find [our] own reality' (p. 12). *Community Portal* is an invitation to listen for these realities within each of our waters.

Oviedo (2022) suggests we 'recuperate' these realities through 'communal aesthetic practice that feels like it belongs to [us] and is not imposed from the outside' (p. 12). As Oviedo (2022) expands, 'recuperation seeks to innovate, to embody things of the past with new perspectives, to make them relevant for the circumstances of the present, and the future' (p. 2). Put simply by brown (2017), '[i]t is our right and responsibility to write ourselves into the future' (p. 3). Through play, we are learning to listen with the minerals shared between our bodies and our waters that directly connect us with these futures, continuing to exist for hundreds of millions of years (Sharpe, 2016, p. 268).

Recent scientific findings validate this perspective. As Holmes (2020) confirms, '[t]heoretical physics suggests that, even when separated, entities that have once been in contact will react to changes in the other' (p. 29). For Phillips (2025), this 'suggests that our engagement with time can be an act of creation and innovation, where temporal boundaries are not barriers but horizons to be explored and expanded' (p. 27). *Community Portal* aims to explore and expand these horizons through self- and site-specific call and response that is communicative and connective. This technologically assisted play engages with time as materiality (salt and minerals) and relationality (ancestry) that flow both ways through us, our waters, our pasts and our futures.

In playtesting *Community Portal*, we see an opportunity for further collaborative development of technologies that unite social practice, art, science, and engineering. We call this kind of play that engages innovatively and creatively with time and possibility 'visionary engineering.' Visionary engineering combines the process of exploratory engineering with the practice of visionary fiction.

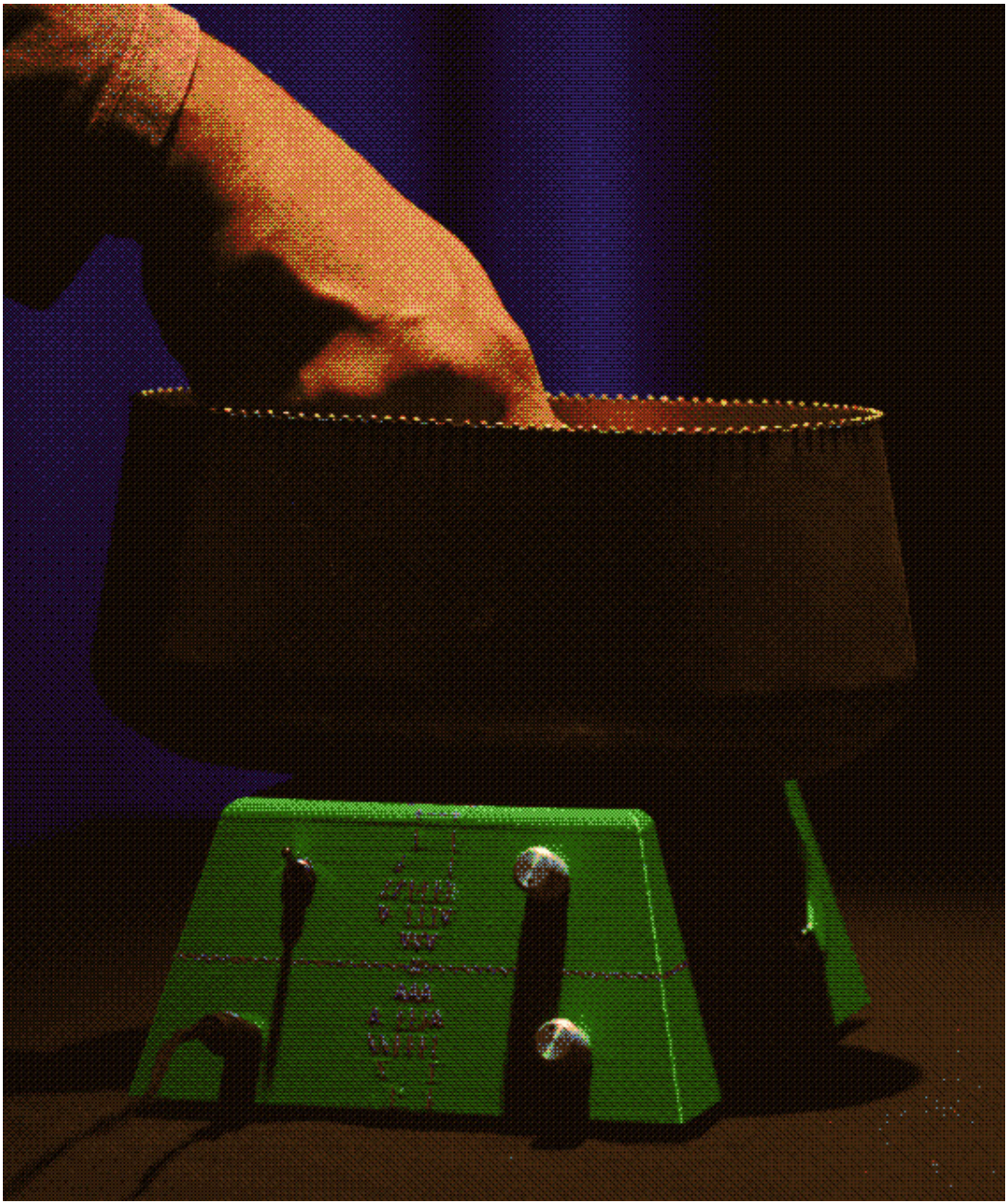
Coined by K. Eric Drexler, the 'godfather of nanotechnology' (Regis, 2004), '[e]xploratory engineering involves designing things that we can't yet build' (Drexler, 1991, p. 76). Visionary fiction, as defined by brown (2017), 'is constantly applying lessons from our past to our future(s)' by engaging 'the practices of collaboration and adaptation and transformative justice [as] science fictional behavior' (pp. 160, 198). Thus, visionary engineering proposes the use of intuition, imagination, and improvisation to design things that we once could build and hope to build again. It lays claim to the 'intuitive knowledge, experience, and scientific discoveries' available to all of us as 'a primal human response to an enigmatic cosmos' (Holmes, 2020, p. 121). Visionary engineering playfully engages with the material, relational and

Figure 5. Water Justice Lab Youth Scientist Fellows and Staff with Natan Diacon-Furtado, *Community Portal, Recuperating Ancestral Waters*, 2025.

temporal, to bring these primal and scientific perspectives and technologies back into connection and communication.

As visionary engineers, we engage intuition, imagination, and improvisation through play that has, in the words of Phillips (2025), 'the power of reclaiming and rewriting one's history and future by understanding and manipulating the fundamental principles of reality' (p. 293). Drawing from theories of live action role-play (LARP), the *Community Portal, Recuperating Ancestral Waters* (2025) playtests at WJL harness play's inherent power to 'facilitat[e] the shift from one state of consciousness to another' (Bowman and Hugaasa, 2021, p. 18) and transport us from inhabiting an imagination of destruction and disparity to living in the vast possibilities of imagination within each of us. Play with a cultural-scientific instrument that is still in development provides a 'transformational container' for our varied imaginations, intuitions, and improvisations by welcoming them all into a visionary engineering project. In the process, we hope to, as Bowman and Hugaasa (2021) describe this, 'inform our self-concepts, our worldviews, and our definitions of community' (p. 7) in lasting but ever shifting and renewing ways.

Figure 6. Fun Stuff Design and Azuré Keahi with Natan Diacon-Furtado, *Community Portal*, 2025. © All rights reserved, courtesy of the authors.



Community Portal is continually being developed to incorporate the techniques and methods we develop through play. In collaboration with the industrial designers Dierdre Shea and Julian Goldman, of the sustainable product development studio Fun Stuff Design, and the interdisciplinary artist Azuré Keahi, it has been re-designed (Fig. 6) to allow for easier operation in our watershed. *Community Portal* now includes waterproofing, built-in speakers, a dedicated audio line-out for effects that can make the words and sounds it receives easier to understand, and a custom-designed antenna connection mechanism that allows for the quick swapping of different bowl antennas. This latest version has been donated to WJL as a permanent instrument to be used by Youth Scientist Fellows in the lab and in the field.

In this essay, we have presented the *Community Portal* playtests as our first foray into a community practice of visionary engineering. We hope that this 'device <...> of the heart and mind' (Holmes, 2020, p. 216) inspires the playful and collaborative development of other such technologies beyond our local context. Our goal is that this relational, temporal, and material play enlarges the possibility for others to adaptively re-use and re-imagine colonial technologies of science and media in ways that explore and expand their senses, for themselves and in their own communities.

Like Drexler's (1991) exploratory engineering, this visionary engineering project 'seeks to construct <...> a rough understanding of future technological capabilities' (p. 78). And in so doing, it seeks to intuit and reconnect with the technological possibilities of our pasts. As reminded by brown (2017), '[l]osing our imagination is a symptom of trauma' (p. 163). What does it mean that the scientific instruments available to the fellows, and to all of us, for the exploration and understanding of our watersheds are so disconnected from the ancestral waters that, in the words of Phillips (2025), are 'seen throughout the diaspora' as facilitating 'one of the main types of divination [ancestral communication] practices used in Indigenous African cultural and spiritual practices' (p. 78)? What does it mean to engage directly in the co-creation of a technology that seeks to remedy this? Will you help us find out?

We are helping the state determine the health of these waters. In this serious context, our antenna seems out of place, but the fellows want to hear what the water in which we are working sounds like today. All we hear at first is static. But Tanajea rubs a wide circle around the inside of the bowl and gets an immediate burst of words from the radio. Polly joins in, and more and more words seem to rush out of the radio's speakers. They tune the signal with their bodies and imaginations. We smile and laugh as we listen.

 Listen with us

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Authors' Bios

Natan Diacon-Furtado (all pronouns) is a collaborative artist and designer of visionary engineering projects that expand notions of ancestry and self through play. Trained as an anthropologist and architect, they are currently a doctoral candidate in Electronic Arts at Rensselaer Polytechnic Institute in Troy, New York, USA. They have been the subject of two solo museum shows, at the Aomori Contemporary Art Centre and Indiana University's Wiley House Museum, with additional exhibitions at the Venice Biennale of Architecture,

Delft Architectural Biennial, and Buenos Aires Biennale of Architecture. In addition, their design work has been named one of the 'World's Greatest Places' by *TIME Magazine*.

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Water Justice Lab (WJL) is a collaboration between Riverkeeper and The Sanctuary for Independent Media. Through our water quality monitoring program and related programming, WJL educates communities about water justice, aids in developing the advocacy capacity of North-Central Troy, and strengthens a network of environmental justice advocates focused on water issues within the Hudson River (Mahicannituck) Watershed.

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