ENDNOTE

Prototyping Criptech Arts Futures

The very first Deaf Club in the metaverse is housed in a navy Victorian, twinkling against a crepuscular sky. A neon marquee sign that reads "DEAF CLUB" invites visitors into a brightly lit space. It opens into an expansive interior—one much larger than the exterior suggests—replete with art, film, and artifacts of Deaf culture and history.

Created by lead artist Melissa Malzkuhn with the support of engineers and 3D designers, this virtual gathering space is both a living museum of Deaf storytelling and artistry and a reincarnation of Deaf clubs that were once a vital community hub. Third-generation Deaf, Malzkuhn weaves her family's story into the rich tapestry of Deaf club culture, which historically has been a hyperlocal fixture adjacent to Deaf schools and communities. Yet in *DEAF CLUB*, the art—which sprawls across three floors and a rooftop terrace—was curated through a global call for submissions and represents the work of almost 50 Deaf artists, including Christine Sun Kim and Jon Savage. Its movie theater features significant moments from Deaf history, including Malzkuhn's grandfather's renowned ASL performance of "Jabberwocky." In the bar, matchboxes replicate those from Deaf clubs from decades past, and a large clock shows DST, or "Deaf Standard Time." At the entrance of the rooftop bar, a monumental statue of a figure signing "I love you" honors Troy Kotsur, the first Deaf man to win an Academy Award.

Commissioned as a prototype by the CripTech Metaverse Lab [1], this project activates the potential of virtual reality (VR) as immersive archive, as community platform, as new storytelling space. Indeed, navigating through the environment Malzkuhn and the developer team have lovingly rendered reveals the Deaf community's vibrant diversity and cross-disability representation. Avatars are poised in mid-sign with each other, some using Protactile, a tactile sign language for DeafBlind people. *DEAF CLUB's* avatars, even if not fully realized, signify VR's potential for embodied communication.

Although the figures are effectively frozen animations, they represent a corollary point on the development roadmap of VIVERSE, the metaverse platform for which it was built. Malzkuhn, who also runs a research lab focused on developing motion-capture-based signing in extended reality (XR), wants to populate this world with avatars who can sign with each other in real time. For now, the available technology can support neither sign language nor captions, although the art on display speaks volumes about who this space is designed for. The prototype is a significant step toward claiming space for Malzkuhn's community in a rapidly-forming virtual landscape.

DEAF CLUB emerged from a cross-institutional and cross-sector collaboration that brought together a national cohort of disabled creatives to experience immersive artworks and collectively envision accessible metaverse futures. *DEAF CLUB* was one of three commissioned VR artworks shown at Gray Area Festival 2023, including Indira Allegra's *TEXERE: A Tapestry Is a Forest* and Nat Decker's *Touch*, which explored the creative possibilities and desires for crip-centered VR interactions. Rising from the crucible of disabled experience, and incubated by the lab, these prototypes embody the complexities of criptech art as an artistic practice as well as an organizational process rooted in access.

CRIPTECH ART AS SPECULATIVE PRACTICE

In the introduction to this issue, we characterized criptech art for its radical capacity to "break through the boundaries of medium" [2], with particular attention to extant technologies. This essay bookends this framing by turning that lens on the networks and systems in this interdisciplinary field. As guest editors who have shepherded Leonardo CripTech Incubator [3]—a field-building program for criptech art—from its inception, we offer some reflections on its unfolding. Even as the works in this issue map a new terrain for creating, communicating, and collaborating, they expose chasms in the landscape of art, science, and technology. In an era of profound technological shift defined by algorithms and big data, as well as climate crisis, the impact of these changes on disabled people, especially those who are Black, Brown, Indigenous, and/or LGBTQ+, is becoming disproportionately amplified. It is increasingly difficult to disentangle our aesthetic values from our technologies and ways of knowing with tools like ChatGPT, Midjourney, and Gemini that are tempering human ability, creativity, and expression.

Criptech art is not simply the aesthetic expression of access practices, challenging as they may be to navigate; it crips the very sociocultural systems that mobilize art and technology. This approach understands access not just as a way of doing, but as a way of being and knowing. It conceives of access not as a physical ramp into the building but as interconnecting paths and information systems that render the buildings' walls and hours mutable. Access might be the easy reach with which one can pluck a dandelion growing from a sidewalk crack, or the

 https://doi.org/10.1162/leon_a_02514

unapologetic soundscapes of blind wayfinding through cane taps and clicks, or a piano's arpeggios and runs "tuning" a new cochlear implant, or the affirming presence of access doulas circulating access guides and visual descriptions to help online participants navigate virtual spaces. Though complex, these notions of access more accurately represent the challenges and possibilities of cultivating more equitable, interdependent, and regenerative media art ecosystems.

One of crip technoscience's commitments is to embrace "access as friction" [4]. Access as friction moves beyond a compliance model brokered by the Americans with Disabilities Act in 1990, whereby access is juridically regulated. Instead, access becomes a form of contestation and experimentation, a coalition-building, anti-assimilationist politics that can be practiced by everyone.

Leonardo CripTech Incubator sought to bring this praxis to the ecosystem itself, creating a platform for disability innovation in media art by cripping the manifold processes by which work is made. In art and tech spaces, engagement, if any, with disability culture has often been limited to thinking about accommodation or accessibility ad hoc. But by supporting the lifecycle of an artistic idea from conception through dissemination, the Incubator aligns with disability culture's reimagining of access as an experimental, open-ended process. The initial cohort of artists were invited to create with technologies to build new aesthetic engagements and paradigms that they could explore through residencies, workshops, talks, publication, and exhibition. In this respect, crip technoscience practices are worldbuilding strategies in art practice as well as creative ecosystems.

Leonardo CripTech Incubator emerged in the early stages of the pandemic, its understanding of access shaped by a profound shift to virtual life. Although the flexibility of virtual platforms was a boon, at every turn we encountered inaccessible systems that revealed the precarity of our collaborations together. Even as the pandemic accelerated the retrofit of such tools for access, the slow and imperfect integration of captions into videoconferencing tools, our engagement with these tools, necessary as they were, revealed the inaccessibility of that infrastructure. It is perhaps fitting that criptech is often translated into "cryptic" or "kriptech" by automatic captions—"crip" is always erased, and never a possibility recognized by speech-to-text software. Indeed, this scenario highlights the ways assistive technologies and access labor are unrecognized, hidden, or even denied, especially in black box systems that are by nature opaque [5].

Access is creative, to be sure, but it is also work. Despite the rapid deployment of artificial intelligence (AI) for access as in automated captioning and automated alt-text, there is no access bot. Requiring time, patience, intimacy, and relational efforts, access is best done by people. Yet this especially human labor hinges on technologies and temporalities created by capitalist systems. We found ourselves at times stymied by this reality.

Leonardo CripTech Incubator is a platform for artists to prototype their own works; it is also a prototype for a crip arts media ecosystem. We understand this as a commitment to "ensuring cross-disability representation at every node of this network and transforming research infrastructures" [6]. This prototyping happened in real time—even as we designed access forecasting into our program—since the incubator was "consent-informed and highly responsive to the needs of its artists and partners, embodying a crip politics of care" [7]. Within this model, access was an ongoing practice, always in the making.

According to Carolyn Lazard, "accessibility is a promise, not a guarantee. It's a speculative practice" [8]. Within an institutional context, Lazard acknowledges, accessibility must be malleable and shaped in real time by the needs of the community. But Lazard's widely adopted guide for the arts also invokes accessibility as a horizon in some near (or perhaps distant) future that we have not yet arrived at—a north star we can't witness with our naked eye, but we certainly can with the James Webb Space Telescope and its gorgeously rendered alt-text descriptions.

In many ways, Leonardo CripTech Incubator and CripTech Metaverse Lab are also engaged in access as a speculative practice. This practice not only fully commits to "blue sky" imagining of barrier-free technology, but also undertakes the critical work of charting a path to what Leah Lakshmi Piepzna-Samarasinha names a "disabled future" [9] in our present. Invoking the radical spirit of "crip futurity" that Alison Kafer calls for [10], this approach combats ableism's erasure of disability from imaginations of the future.

AGAINST OBSOLESCENCE, AND TOWARD SYSTEMS OF CARE AND REPAIR

Media art—and criptech art—live on the bleeding edge of technology. Through this work, we pressed against very real limits in code, software, and hardware, not to mention technical expertise and institutional processes. These practices are precariously tethered to the cycle of the software update, ever at risk of impending obsolescence. Synchronized to the speed of disruption, it is fundamentally at odds with crip time and slow technology [11]. Working within existing art, technology, publishing, and philanthropic frameworks, the flexible, anti-capitalist pace of crip time spurns the metronome of production. Deliverables—whether the artwork, the application, the artist statement, or the grant report—adhere to temporal schemas that align with financial years, bracketed by funding periods. We are not the first to voice this critique: in "How to Be a Person in the Age of Autoimmunity," Lazard writes that capitalism views "the body as an exploitable resource and attempts to render it indestructible and unstoppable with the aid of technology" [12]. Instead of yielding to the speed of disruption and the product cycle or completely opting out (or, in the parlance of one's refusal of work, "fuck off" [13]), we might instead follow the slower speed of repair and care—which acknowledges the fragility of bodies and technologies.

In its engagements with technology, media art might seem to obscure intimate care relationships. Yet much criptech art requires sustained care and attention too. BlinkPopShift's *Prosthetic Memory*, created with a bespoke AI to serve as an

experiential archive for an artist with long-term amnesia, needed frequent visits to recalibrate it, asking "those who engaged with the installation to participate in communal caretaking" that mirrored its creator's self-care practice [14]. One could just as easily imagine a haptic transducer blowing out the amps before its exhibition opening, requiring soldering and tinkering to revive its sensory outputs, or an algorithmic installation whose code needs revision to boot up on new hardware. Much media art lives on the precipice of breakdown. Enmeshed with complex technological systems such as cloud storage and the power grid and dependent on compatibility with the next software update, media art requires multivalent forms of attention that extend beyond the artist's purview.

Such tending—one would think more characteristic of nurturing plants than running machines—echoes acts of care that are central to crip aesthetic and politics. "Crip-made access" or "care webs," writes Leah Lakshmi Piepzna-Samarasinha, advance a model of "solidarity not charity—of showing up for each other in mutual aid and respect" that demonstrates how disabled people are agents in providing care for each other [15]. This ethic of mutual aid is central to *Skinny*, artist Sandie Yi's material documentation of her intimate relationship of care with Rahnee Patrick, whose skin grows 100 times faster than average. Yi supports Patrick with her personal hygiene, such as showering, massage, and at times, peeling her excess skin for relief from inflammation. Honoring this process as a profound time of connection, Yi crafted delicate sewn pods that cradle Rahnee's skin flakes in tender constellations on framed panels. "Care webs" model resilience in a time of civic upheaval and planetary collapse and are founded on the idea that all beings are interdependent. The same ethos extends to technologies in criptech art.

In this issue's introduction, we highlighted Laura Forlano's collaboration with Itziar Barrio as a revelation of the circuit of care between humans and machines; Forlano must tend to the smart insulin pump on which her survival depends. This routine of breakdown and repair characterizes the attention needed for criptech art, particularly practices that utilize advanced technologies. So too must we attend and nourish the fragile, burgeoning ecosystems we are prototyping.

Recently, California enacted "The Right to Repair Act"—joining the European Union and other U.S. states like New York and Minnesota—signaling a shift to repairable designs, sustainability, and user agency. In criptech art, repair is a process intrinsic to regenerative worldbuilding. In this respect, it offers an urgent corrective to narratives of technosolutionism and progress embedded in much contemporary technology. The right to repair legislatively secures a consumer's right to choose the terms of repair for their devices and requires manufacturers to make available appropriate tools, parts, software, and documentation. While a significant step toward mitigating the epic trash heap of retired technology, it more significantly combats the very ideology of planned obsolescence. Planned obsolescence is a form of technoableism as it renders inert the criphacks and community-derived access for a particular iteration of a device [16]. The right to repair recognizes that tools are sustained by sociocultural structures—like customer support and user-created tutorials—that depend on continuity and agency. To embrace a politics of care and repair in technological devices and communities is to counter the market's unceasing appetite for new product cycles. With the exigencies of digital citizenship, criptech art leans into prototyping to practice renewal and regeneration.

Prototypes make arguments [17]. But they are also arguments in the sense that they offer evidence for what can be. As prototypes, both the artworks and ecosystems of Leonardo CripTech Incubator—and others like *Practicing the Social*, *Dandelion Rebellion,* and Tangled Art's #CripRitual—turn to care and repair to resist a product-based, labor-intensive system that extracts the very best of us and leaves little behind. They enact care webs informed by crip-made access as the infrastructure for technosocial development. So conceived, criptech art prototypes repaired futures.

VANESSA CHANG
LINDSEY D. FELT

Acknowledgments

We thank the Leonardo program and editorial teams for supporting the development of CripTech Incubator and this special issue, and to the authors within these pages. Many thanks to Claudia Alick—program curator, disability justice educator, dramaturg, and access doula—who helped us dream up Leonardo CripTech Incubator and played an instrumental role in its development. Many of these reflections emerged from and crystallized through early and frequent conversations with Claudia, as well as the CripTech artist fellows. We are also grateful to our many partners and collaborators, including Ground Works, Beall Center for Art + Technology, Gray Area, Santa Barbara Center for Art, Science and Technology, Thoughtworks Arts, and Berkeley RadMad Disability Lab, who made this work possible.

References and Notes

1 CripTech Metaverse Lab is a collaboration between Leonardo/ISAST and Gray Area dedicated to generating collective, participatory access in immersive media through an experiential lab and commission process. Learn more at leonardo.info/criptech/metaverselab.

2 Carolyn Lazard, "Carolyn Lazard on Illness, Intimacy and the Aesthetics of Access," Frieze (28 February 2022): www.frieze.com-/article/carolyn-lazard-edna-bonhomme-interview-2022 (accessed 5 October 2023).

3 Leonardo CripTech Incubator is an art and technology fellowship for disability innovation, whose pilot ran from 2022–2023. Learn more at leonardo.info/criptech.

4 Aimi Hamraie and Kelly Fritsch, "Crip Technoscience Manifesto," *Catalyst: Feminism, Theory, Technoscience* **5**, No. 1 (2019) p. 10.

5 Louise Hickman, "Transcription Work and Practices of Crip Technoscience," *Catalyst: Feminism, Theory, Technoscience* 5, No. 1 (2019).

6 Vanessa Chang and Lindsey D. Felt, "Cripping Media Art Ecologies," *Ground Works: Vibrant Ecologies of Research* (4 August 2022): groundworks.io/journal/commentaries/11 (accessed 10 October 2023).

7 Chang and Felt [6].

8 Carolyn Lazard, *Accessibility in the Arts: A Promise and a Practice* (New York: Recess, 2019) p. 10.

9 Leah Lakshmi Piepzna-Samarasinha, *The Future Is Disabled: Prophecies, Love Notes and Mourning Songs* (Vancouver: Arsenal Pulp Press, 2022).

10 Alison Kafer, *Feminist, Queer, Crip.* (Bloomington: Indiana Univ. Press, 2013).

11 Slow technology is a design philosophy first espoused by Lars Hallnäs and Johan Redström that urges technology to be "aimed at reflection and moments of mental rest rather than efficiency in performance." See Hallnäs and Redström, "Slow Technology—Designing for Reflection," *Personal and Ubiquitous Computing* **5** (2001) pp. 201–212.

12 Carolyn Lazard, "How to Be a Person in the Age of Autoimmunity": projectrowhouses.org/howtobeapersonintheageofautoimmunity/ (accessed 5 October 2023).

13 Mel Chen, Mimi Khúc, and Jina B. Kim, "Work Will Not Save Us: An Asian American Crip Manifesto," *Disability Studies Quarterly* **43**, No. 1 (2023). Chen, Khúc, and Kim call for a refusal of work as a visceral expression of disability justice that disentangles value and productivity: "I want to carefully, intentionally, curate what I put labor towards, by assessing not how they make me worthy but how those labors themselves might be worthy."

14 Lindsey D. Felt, "M Eifler's Prosthetic Memory as Speculative Archive," *After Universal Design*, Elizabeth Guffey, ed. (London: Bloomsbury Publishing, 2023) p. 182.

15 Leah Lakshmi Piepzna-Samarasinha, *Care Work: Dreaming Disability Justice* (Vancouver: Arsenal Pulp Press, 2018) p. 18.

16 Ashley Shew, *Against Technoableism: Rethinking Who Needs Improvement* (New York: W.W. Norton & Company, 2023).

17 Alan Galey and Stan Ruecker, "How a Prototype Argues," *Literary and Linguistic Computing* 25, No. 4, 405–424 (2010).

VANESSA CHANG *is a writer, curator and scholar of media art, the history and philosophy of technology, and embodiment. She holds a PhD in Modern Thought and Literature from Stanford University. She is Director of Programs at Leonardo/ISAST.*

LINDSEY D. FELT *is a writer, curator, and lecturer at Stanford University in the Program in Writing and Rhetoric, where she received her PhD in English. Her research examines disability-led technological innovation. She is also the Disability and Impact Lead at Leonardo/ISAST.*