

REGIONAL TRENDS IN

TECH AS ART

Supporting Artists Who Use Technology as a Creative Medium



**Summary Report from
Seven Regional Roundtables**

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Introduction

In June 2021, the National Endowment for the Arts published *Tech as Art: Supporting Artists Who Use Digital Technology as a Creative Medium*. This report is the culmination of a nearly two-year research study into artists whose practices are rooted in digital technologies. Launched in partnership with the Knight Foundation and Ford Foundation, with research conducted by 8 Bridges Workshop and Dot Connector Studio, the report explores the broad spectrum of tech-centered artistic practice, as well as the networks, career paths, and hubs of activity that support this work.

Prior to the report publication, the Arts Endowment organized a series of seven virtual field meetings between June 15-24, 2021. These roundtable gatherings welcomed 116 artists, funders, administrators, academics, writers, educators, activists, and other field leaders, in addition to representatives from the Knight Foundation, Ford Foundation, and National Endowment for the Arts. Convenings focused on distinct geographic regions anchored by the cities of St. Paul, Minnesota; Detroit, Michigan; Philadelphia, Pennsylvania; New York, New York; Miami, Florida; Santa Fe, New Mexico; and San Jose, California. Participants discussed challenges, existing assets, and practical steps for building the arts and technology field across the nation from the ground up. Through advancing regional conversations, the Arts Endowment sought to both strengthen regional arts and technology networks and develop an array of practical action steps for potential field supporters that complement *Tech as Art* findings and recommendations.

About this report

This brief summary report highlights a wide-ranging set of near- and long-term action steps aimed at supporting the arts and technology field identified during regional roundtables. Beyond the breadth of topics and types of actions, these suggestions are directed at a variety of potential leaders, from funders to arts service organizations, arts institutions, academic programs, arts and technology hubs, city and state governments, and community organizations. No one entity can do it all.

Each organization has a unique position within the creative ecosystem that provides an opportunity to engage with and support the arts and technology field. Some organizations may find tech-centered art intersecting with their existing goals, networks, resources, or programs. Other organizations may choose to initiate new partnerships or activities. We hope that this report reveals the breadth of possible actions and also inspires leaders to see the many ways they can support this field. As organizations across the country connect with and bolster support for tech-centered art, the cumulative impact can potentially build sustainability for artists and create a solid foundation for the field's growth—locally, regionally, and nationally. However, this long-term goal requires the action of many independent organizations, both those already invested in tech-centered arts as well as newcomers to the field.

The COVID-19 pandemic revealed both the potential and the need for expanded access and creativity across digital technologies, as well as the importance of critical reflection and debate. Artists are already at the forefront of this work. Tech-centered artists are developing distinctive forms of expression as well as tools for engaging with technology and lenses for seeing its impact on our lives. With greater support, they can play a vital role in the years to come. Outside of the context of the pandemic, artists have nurtured a burgeoning field that encompasses a spectrum of artistic practices. Their work offers many connection points for communities to experience, learn, and create. The action steps in this report present a roadmap for organizations to engage with this work and find a footing in the vibrant conversations and creativity growing across the country.

Intended audience:

- Cultural organizations, educational institutions, and other entities looking for successful models and best practices to support artists and arts programming engaging with creative technology and emerging media forms.
- Artists and collectives working with creative technology and emerging media forms.
- State/Regional/Local Arts Agencies and other entities serving as support infrastructure for the broader arts and cultural field.
- Entities looking to develop initiatives focusing on diversity, equity, and inclusion, particularly in the fields of art, science, and digital technology.

Methodology

Each field meeting included a series of breakout sessions and large group conversations facilitated by contractors from 8 Bridges Workshop and Dot Connector Studio. Participants shared resources and challenges, and brainstormed practical next steps for advancing the field within their own organizations. Participants also developed action steps of relevance for fellow funders, arts presenters, arts service organizations, and other field supporters. Commonly raised topics and strategies are featured below, followed by highlights from each meeting.

Conversations encompassed many topics, including both overlapping concerns as well as unique contributions. The material below works to avoid redundancies and showcases just a selection of the many rich ideas that arose in conversations. This report includes several appendices to feature additional content captured from the breakout sessions, along with a list of participants and organizational affiliations.

Observations

While each roundtable uplifted experiences and discussions specific to a region, this section provides a summary of recurrent themes and broad recommendations observed across all seven roundtables:

- Access to Technology & Training
- Advancing Equity & Social Justice
- Broadening Funding Strategies & Support
- Digital Preservation
- Continuing Regional Conversations

ACCESS TO TECHNOLOGY & TRAINING

Hardware and software can be expensive, and the lack of access among venues and audiences has long been a barrier for artists and arts organizations. Furthermore, roundtable attendees widely acknowledged that having access to equipment alone has limitations when it comes to process and execution, unless it were accompanied by adequate technical expertise and guidance. Therefore, access to skilled expertise and technical assistance is of equal concern and importance when addressing digital divides.

- **Bridging digital divides:** Tech-focused artists and organizations recognize their value and can act as mentors by teaching digital literacy and encouraging creative expression using web-based technologies, code, and computation. Attendees suggested the development of programmatic partnerships offering arts/tech workshops and trainings could help communities address digital divides (and align with digital inclusion initiatives focused on broadband access) and bring community-based approaches to the development of digital skills.
- **Converge thought leaders:** Attendees suggested activities, such as convenings, trainings, and program initiatives, intended to bolster partnerships between thought leaders in the tech-focused arts community and community leaders focused on digital literacy and computer science/STEM initiatives, closing digital divides, rural broadband access, expanding broadband in tribal communities, and disability advocacy.
- **Touring as access:** The capacity of the arts and cultural field to engage with digital or emergent technology could be expanded by offering mobile and touring arts-and-technology initiatives that reach individuals whose opportunities might be limited by geography, ethnicity, economics, or disability.
- **Lending equipment:** Numerous field meetings came to similar recommendations regarding a potential cost-sharing solution: a central repository for equipment to be lent or rented for exhibitions/installations. Resources such as equipment libraries or a regional database of equipment existing across institutions could relieve individual artists and organizations from the expense of purchasing in-demand equipment such as high resolution/high lumen projectors, virtual reality headsets, motion sensors, or devices for installations like tablets or monitors. As a starting point, participants suggested self-organizing to share resources at the local or regional level.

i **HELPFUL RESOURCES:** The National Endowment for the Arts' *Tech as Arts* report provides readers with existing partnership models and resources to identify key nodes of activity and learning hubs in the section titled Interconnected Communities, Hubs, And Gathering Spaces (Pg. 48-55). Additionally, the commissioned essay by Agnes Chavez, founder of STEMArts Lab, "*How Artists Can Bridge the Digital Divide and Reimagine Humanity*," explores her experience partnering with new media artists to overcome digital divides throughout rural parts of New Mexico ([read essay here](#)).

ADVANCING EQUITY & RACIAL JUSTICE

Topics related to social justice and racial equity arose at every field meeting. Many tech-centered artists and organizations directly address intersections of race and technology in their practices, are deeply committed to democratizing access to digital tools, or utilize digital technologies to envision future alternatives to present injustices.

- **Broadening access:** Roundtable conversations underscored the need to support existing arts/tech initiatives that aim to broaden participation in computational science and advance equity in the technology sector, as well as develop more pathways for those whose opportunities to experience or engage with arts/tech initiatives are limited by geography, ethnicity, economics, or disability.
- **Audience development:** Multiple convenings noted that partnerships with community-based cultural organizations could expand participation at the local level and have the capacity to reach beyond the audiences of arts and technology organizations and arts institutions.
- **Sharing financial resources:** Attendees suggested demonstrating a commitment to inclusion through sharing resources, explaining that well-resourced organizations could purchase equipment to leave behind at a host cultural organization after an event. Doing so could strengthen local capabilities while cultivating longer-term relationships through action and financial investment rather than words alone.
- **Indigenous knowledge systems:** Participants identified an opportunity to delve into ethical questions surrounding technology practices by centering Indigenous frameworks and worldviews, encouraging funding for convenings, collectives, centers, and artistic installations devoted to this work.
- **Disability justice and tech:** Hire tech-centered artists in partnership with disability justice advocates to make digital programming both more accessible and more creative.

i **HELPFUL RESOURCES:** The *Tech as Arts* report provides examples of how inequities across arts and technology sectors spurred the development of organizations and hubs focusing on creatives of color and other marginalized communities (pg. 50). **Case studies** also provide examples of tech-focused artists working to advance equity and racial justice through their creative practice. For example, the case study featuring **Stephanie Dinkins** (pg. 91-92) shows how an artist can act as a catalyst for dialogue examining the ethics of artificial intelligence and how it intersects with race, gender, aging, and our future histories; the case study featuring **Amelia Winger-Bearskin** (pg. 101-102) examines ways that Native and Indigenous perspectives and values systems can inform foundational components of the tech industry. Additionally, the **commissioned essay by Ari Melenciano**, “*Artist Perspective: Building Afrocentric Technoculture and Community*,” provides insight on her journey to establish Afrotectopia, an arts organization focused on technology, Black culture, and activism ([read essay here](#)).

BROADENING FUNDING STRATEGIES & SUPPORT

Many participants described falling in-between or outside of discipline-based funding categories. Artists also recounted being deemed “too artsy” for science funders and “too techy” for arts funders. In addition to sharing challenges, participants offered a number of concrete ideas for funders interested to improve support for the field.

- **Review Guidelines & Categories:** Explicitly reference creative code and emergent forms at the intersection of arts and technology in grant guidelines, eligible activities, and/or funding priorities. In addition, ensure all discipline funding categories welcome interdisciplinary work as well as supporting projects that experiment with unfamiliar (and difficult to categorize) territory.
- **Support Collective Creation:** Tech-focused arts projects often rely on collaborative processes which run counter to grants and awards that focus on individual artist projects. In contrast, artists advocated for funding structures and application processes that are specifically geared towards project support for arts collectives and collaborative partnerships.
- **Research & Development:** Nearly every field meeting raised the need for research and development funding. Recommendations included funding categories that encourage the creation of new work through iterative processes, prototype testing, and developing projects over multiple installations at different venues and communities.
- **Open-Source Tools:** Attendees underscored the value of open-source tools and the free resources developed by artists for the purpose of expanding participation. Funders can learn more about the community’s needs through resources such as Nadia Eghbal’s [Roads and Bridges: The Unseen Labor Behind Our Digital Infrastructure](#) and [Working in Public: The Making and Maintenance of Open Source Software](#), as well as this report published in 2021 from a convening of contributors to the open source arts community, [“Open Source Software Toolkits for the Arts \(OSSTA\): A Convening”](#) by Lauren Lee McCarthy, Thomas Hughes, and Golan Levin.
- **Chasing Technology Trends:** Attendees warned against the tendencies of funders and presenters to follow technology trends by supporting or dropping funding for particular technologies alongside fluctuations in hype and media coverage. Participants suggested instead more tech-centered arts funding on an ongoing basis.
- **Rapid-response funding:** Models of funding developed in response to the COVID-19 pandemic serve as examples of less arduous and more agile grantmaking. Attendees suggested learning from these processes to maintain the availability of rapid response funds and streamline general grant processes.
- **Values alignment:** In navigating relationships between artists and corporations, attendees emphasized the importance of values alignment, as well as writing these agreements into contracts. Active Voice Lab’s [Prenups](#) provide examples of topics to discuss before starting a working relationship.
- **Reflection:** Attendees noted the importance of reflecting on ethics and corporate practices within the technology industry. Artists can potentially play a role in facilitating such efforts and an artistic lens can provide unique vantage points for understanding these pressing problems, for example the Processing Foundation’s [Logic School](#) and the [School for Poetic Computation](#).

- **Partnerships:** While the need for revised funding strategies is evident, roundtable attendees recognized the potential of science and technology-oriented companies to provide new avenues of support through special partnership initiatives such as artist residencies, commissions, grants, and sponsorships.
- **Hiring Practices:** In addition to providing infrastructure for the field, funders and arts institutions can hire creative technologists and practitioners to help rethink digital strategies and approaches, such as designing for accessibility or conducting special initiatives.

i **HELPFUL RESOURCES:** The *Tech as Arts* report, includes examples of **funder-led initiatives** (pg. 75) and suggestions for funders to ensure opportunities welcome projects related to the intersection of arts and technology (pg. 77). The commissioned essay by Eleanor Savage of the Jerome Foundation, *“Funder Perspective: Broadening Support for Arts and Technology,”* is a call for funders to rethink traditional support models and embrace frameworks that are as dynamic as the work itself ([read essay here](#)). In addition, the National Endowment for the Arts has created a **two-page guide for public arts funders** interested to improve support for digital initiatives and technology-focused arts projects.

DIGITAL PRESERVATION

The topic of digital preservation arose across each roundtable discussion, as the ephemeral quality of digital technologies presents challenges for both artists and institutions. Many artworks produced in recent years will be at-risk of becoming unavailable to future audiences due to technological obsolescence if actions are not taken in the near-term to advance conservation, archival, maintenance, and preservation methods for born-digital work. Roundtable attendees emphasized areas where support could be helpful to begin mitigating these pressing issues.

- **Map the field:** Funders can invest in field mapping to better understand existing assets and resource gaps existing across the arts and cultural fields.
- **Planning and Implementation Funds:** Strategic grantmaking investments can incrementally build institutional knowledge, develop best practices for digital conservation, and simultaneously support the small field of individual conservators skilled in this area.
- **Support Technical Infrastructure:** While preservation depends on individual conservators and their practices, it is also dependent on a persistent technical architecture to support born-digital work. Organizations that are critical to maintaining the technical infrastructure for variable-media artworks could be an area where more research is needed to build understanding of their value, as these entities are frequently overlooked by arts and cultural funders.
- **Training Digital Conservators:** Beyond building up staff capacity at collecting institutions, attendees underscored the need for academic programs to train future conservators of digital artworks. Participants identified this need as a promising target for foundation investment.

CONTINUING REGIONAL CONVERSATIONS

Participants encouraged holding more events that convene artists, organizations, and funders in support of strengthening the regional arts infrastructure for arts and technology activity. In addition to deepening conversations on arts and technology practices and identifying gaps in support, such gatherings provide an opportunity to brainstorm practical, actionable steps for advancing the field locally and regionally. The roundtables covered in this report are just one example of a starting point. Further conversations and convenings are a core component of developing plans and frameworks that will ultimately better serve artists, arts organizations, and community members.

- **Host Events & Convenings:** While organizations dedicated to arts and technology already host a variety of conferences and events that serve vital needs within the field, there is still a distinct need for arts service providers, institutions, and funders to host gatherings that integrate arts and technology practices into the larger arts ecosystem. This will strengthen regional arts infrastructure by increasing opportunities to share knowledge, build new relationships, and integrate often siloed networks.
- **Develop shared terminology:** The language used to describe and categorize intersections of arts and technology arose as a concern at every meeting. Attendees expressed the importance of fostering conversations within the field surrounding terminology and encouraged reflection by funders and organizations on their own language and categories.
- **Broaden networks:** Research underrepresented voices in the field, as well as emerging leaders representing intersecting networks. Send personal invitations to convenings and ensure they are “in the know” about any related upcoming opportunities.
- **Continued learning:** Potential supporters interested in developing a greater understanding of the field and related terminology may wish to dive into *Tech as Art* as a starting point. Additionally, supporters may wish to seek out some of the many references mentioned in that publication and in the appendices of this report, including books and anthologies (*Art & Electronic Media*, *The Art Happens Here: Net Art Anthology*, *Coded Territories: Tracing Indigenous Pathways in New Media Art*, *Digital Art*); online publications (*Immerse*, *Leonardo*); podcasts (*Abolition Science*, *Voices of VR*); arts and technology festivals and conferences (*Afrotectopia*, *Arts Electronica*, *Eyeo*, *Gray Area Festival*); film festivals (*ImagineNATIVE*, *Tribeca Immersive*); arts and technology hubs and/or venues (*Allied Media Projects*, *ARTECHOUSE*, *Eyebeam*, *Serpentine*), and technology-infused public art festivals (*Harvestworks’ Art and Technology on Governors Island*, *Aurora*, *Currents New Media*, *Northern Spark*), to name just a few.

Next Steps

In organizing the seven regional gatherings covered by this report, the Arts Endowment strived to plant seeds for future locally and regionally organized conversations and initiatives. The topics above provide far-reaching avenues where funders and organizations can provide meaningful impact. Additionally, the highlights in the pages that follow collect dozens of specific suggestions applicable across regions, as well as actionable next steps that respond to local or regional strengths.

The insights shared throughout the *Tech as Art* report and related [commissioned essays](#), during the official [launch event](#), and in this summary report represent just a small portion of the momentum and knowledge that have been building throughout the field for decades. Many artists and field supporters generously shared their time, energy, and expertise for these efforts. We are grateful for all of the participants who contributed to this research and hope that the action steps and resources shared in this report and appendices provide fodder for more organizations and funders to find their own paths into supporting and advancing this field.

i FUNDING TIP: Organizations seeking to build on these recommendations or develop their own ideas for advancing the field may consider submitting an application for a **Media Arts grant** through the National Endowment for the Arts. As of March 2022, the Media Arts funding priorities include a special focus on projects that build organizational capacity and expertise to support technology-focused arts practices across all artistic disciplines and forms.

Regional Briefs

See Appendix A
ROUNDTABLE ATTENDEES

Attendees at every roundtable surfaced a unique set of cultural assets existing within each region, representing a range of organization types, practitioners, and areas of expertise. In addition, participants provided thoughts on how community leaders might build upon existing cultural assets to strengthen regional arts/tech infrastructure serving artists, organizations, and community members.

The following briefs represent highlights of the themes and broad recommendations captured from each of the seven roundtable discussions in the following regions:

- Midwest: St. Paul, MN
- Midwest: Detroit, MI
- Southwest: Santa Fe, NM
- Southern: Miami, FL
- Northeast: Philadelphia, PA
- Western: San Jose, CA
- Northeast: New York, NY

See Appendix B

JAMBOARD Data

MIDWEST REGION

ST. PAUL, MN

This virtual roundtable held on June 15, 2021, gathered participants from across the Midwest, with many attendees concentrated in Minnesota’s Twin Cities of Minneapolis and St. Paul. The roundtable was held just over a year after the killing of George Floyd, two months after the killing of Daunte Wright, two weeks after the killing of Winston Smith, and less than two days after the death of protestor Deona Knajdek. Participants engaged in racial justice work shared experiences of organizational exhaustion, compounded by the COVID-19 pandemic, and also underscored the need to center racial equity and social justice in both the tech and art sectors. Multiple field meetings discussed this topic in earnest, it is a through line in the field scan report, and it is woven into many of the proposed action steps shared throughout this document.

Select Challenges & Needs

- **Digital Divides:** Urban and rural divides, such as lack of broadband infrastructure, as well as digital divides that impact artists and audiences within cities
- **Siloed Networks:** Various pockets of technical expertise across various arts/non-arts networks and institution types with no formal mechanisms for regular knowledge-exchange and resource sharing
- **Funder challenges:** Finding knowledgeable grant panelists and modeling technology-related behaviors/best practices expected of funded organizations
- **Expectations:** External pressure on artists to offer solutions to social and political challenges

Select Action Steps & Ideas

Broadening Networks & Connections

- Connect with existing hubs at makerspaces, libraries, museums, and online arts/tech communities to discover untapped potential for engaging new audiences.
- Incorporate interdisciplinary artists working with technology into existing arts lecture series.
- Establish artist residencies that strategically connect tech-focused artists within issue-driven organizations focused on social justice initiatives.
- Explore platforms such as Discord, Roblox, and Minecraft to engage and find new audiences.

Convenings & Events

- Establish networking events for arts and technology practitioners and supporters.
- Host events that bring together tech-centered arts practitioners with local and national arts education communities, such as National Art Education Association (NAEA).
- Hold a convening on digital access in Minnesota: digital inclusion + arts/culture networks.
- Build on the 2019 Processing Community Day Minneapolis to gather artists in conversations around tools and root global tool-building efforts in local meet-ups.

Knowledge Building & Resources

- Provide a forum to facilitate routine knowledge-exchange and build relationships between dispersed Midwest arts/tech networks.
- Develop more training opportunities, including pathways for non-artists and newcomers, to engage with the field, drawing on models such as Better World Museums' +Community Amplify Voices Program—supporting diverse women and LGBTQ+ creators to develop world-building skills.
- Graduate programs can train contemporary art curators to navigate the arts/tech field and best practices for presenting such work.
- Program partnerships with tech-focused arts organizations and/or post-secondary institutions with new media programs can boost on-staff technical expertise and digital literacy programs.

Funding

- Revise grant guidelines or programs to fund projects that span disciplines.
- Extend funding beyond object- or output-based projects; support R&D. For example, an artist project may consist of developing an open-source software tool to be used by artists globally.
- Develop ways geographically-bound funding can support digital projects not confined by geography.

See Appendix B

JAMBOARD Data

MIDWEST REGION

DETROIT, MI

Many participants attending this virtual roundtable held on June 16, 2021, were centered around Detroit, Michigan, and identified a largely untapped opportunity for arts and technology creators and supporters to engage with industry hubs and commerce, including player such as the auto industry and robotics specialists in the region. Participants also raised the concern of relying on technologies that deprioritize accessibility, privacy, and the security of the user, noting these challenges as a broad policy concern for the field. As in many roundtables, participants raised terminology as a topic for greater analysis and discussion, and noted “digital social practice” as one key thread within an expansive field.

Select Challenges & Needs

- **Bringing work to scale:** Artists and organizations face a challenge in bringing works to scale because of limited access to the right tools and expertise, tech-related partnerships, and funding.
- **Educational Tiers:** Need more arts/tech entry points for newcomers, including basic coding training in schools and post-secondary institutions, and more professional development pathways for advanced students to improve skills.
- **Matchmakers:** Need more arts/tech pathways or programs that regularly connect across networks and organizations, such as pairing artists and technologists with opportunities to build relationships and share skills at local and national levels.

Select Action Steps & Ideas

Broadening Networks & Connections

- Engage K-12 schools and arts educators with arts/tech exhibitions and opportunities.
- Foster relationships with the [Michigan STEM Council](#).
- Pilot cross-sector residencies or mutual exchange programs with local technology companies. For example, technology experts could work with organizations to help develop and install artist projects.

Convenings & Events

- Include arts/tech sessions or learning tracks at regional arts conferences, symposiums, or festivals.
- Regularly host meetings to connect community leaders with key players in the local arts/tech field.
- Host an event highlighting the value arts/tech initiatives could bring to “creative placemaking” and urban planning circles, particularly given the historical roots of technology within the region’s economy.

Knowledge Building & Field Resources

- Build opportunities for hiring artists into capital projects intended to bridge the digital divide, such as expanding broadband, to conduct digital literacy and computer science initiatives.
- Makerspaces could act as a regional arts/tech service or help center that can offer expert technical assistance for artist projects and installations.
- Increase coverage of regional arts/tech activity and national resources by commissioned essays, interviews, or feature articles; or establishing a writing residency or fellowship covering the field.
- Cultivate awareness of the value arts/tech can bring to “creative placemaking” circles, particularly given the historical roots of technology within the region’s economy.
- Launch a database of tech-centered arts practitioners and organizations open to working as consultants or taking on commissioned projects as a resource for organizations seeking to improve digital capacity.

Funding

- Build staff expertise to improve support for tech-focused arts projects and relevant programming. For example, on a statewide level at the [Michigan Council for Arts and Cultural Affairs](#).
- Break down barriers to technological access through community resources and partnerships. One model of this approach is Design Core’s 2021 [Community Tech Hub](#) design challenge.
- Invest in “[third places](#)”—supportive, welcoming, and transformative gathering spaces outside of work or home—for artists and collaborators to incubate and create in an informal environment.
- Offer support for orgs that are fiscally sponsored projects or without a parent/university affiliation.

See Appendix B

JAMBOARD Data

SOUTHWEST REGION

SANTA FE, NM

This virtual roundtable held on June 17, 2021, gathered participants from across the Southwest region, with many attendees concentrated in Santa Fe. Limited broadband access arose in relation to multiple contexts, including the need to upgrade capabilities within older adobe and stucco buildings, as well as the lack of connectivity in rural and tribal communities. Reflecting on the opportunities and digital divides observed throughout the COVID-19 pandemic, attendees described access to technology as a necessity for engaging in contemporary life, akin to a human right. Beyond access and entry points, participants discussed the need for more robust career paths for the many students emerging from arts and technology programs, in addition to career advancement and professional development support for mid-career artists in the field.

Select Challenges & Needs

- **Significant infrastructure gaps:** Major challenges noted include lack of technical infrastructure, limited access to skilled technical expertise for developing arts/tech projects or installing exhibitions, as well as limited funding opportunities to hire necessary technical expertise.
- **Pathways and pipelines:** Need support for teachers to integrate arts/tech within existing curriculum and develop educational pathways. In addition, early career artists experimenting with technology have limited access to developmental programming, such as mentorship, training, or paid opportunities.
- **Knowledge gaps:** Museums, arts organizations, and artists with less arts/tech experience need more knowledge-sharing opportunities and direct connections to experienced arts/tech practitioners. In addition, there is a tendency to conflate arts/tech practices with general uses of technology as a communications medium, such as in digital marketing or streaming events online.

Select Action Steps & Ideas

Broadening Networks & Connections

- Establish a consortium of research universities that can bring arts/tech funding and resources into the field from sources like public and private science funders and technology corporations.
- Foster connections between tech-centered artists and science museums that may have adequate expertise and resources to support exhibitions of their work.
- Form an arts/tech working group that intersects with local digital infrastructure and broadband access initiatives to promote arts/tech initiatives as a way to address digital divides and build digital literacy for those whose opportunities to experience or engage with arts/tech initiatives are limited by geography, ethnicity, economics, or disability.
- Connect with Native communities and institutions like the [New Mexico Fiber Arts Center](#) to introduce artists that merge traditional art forms with digital tools and artistry.

Convenings & Events

- Host open-source tool creators for in-person community building opportunities.
- Host local arts/technology festivals or touring programs to reach and serve rural communities.
- Draw inspiration from low-tech solutions like bookmobiles to reach less-connected communities.

Knowledge Building & Field Resources

- Less experienced organizations and artists should consult with knowledgeable practitioners to develop stronger proposals and more feasible projects.
- Counter organizations' limited exhibition capabilities by developing portable resource packages that can support different types of arts/tech projects.
- Well-resourced institutions partner with smaller cultural institutions for arts/tech exhibitions. Use project budgets to purchase necessary equipment and leave as a resource for the smaller institution.
- Create a central location to list national funding opportunities for artists using technology.

Funding

- Pilot a funding program for exhibition-based organizations and venues to present arts/tech projects.
- Provide support to improve technical infrastructure for older buildings to accommodate digital projects.
- Build on COVID-19 rapid-response practices to normalize expedited funding processes.

See Appendix B

JAMBOARD Data

SOUTHERN REGION

MIAMI, FL

During this virtual roundtable held on June 22, 2021, participants highlighted the potential of tech-based artworks in public spaces to expand access and reach new audiences, particularly during the COVID-19 pandemic. However, they also described the bureaucratic hurdles in south Florida related to mounting work in public space, emphasizing a need for regional conversations on streamlining these processes. Attendees further called attention to the potential of mobile and web-based projects to reach audiences where they already consume content, suggesting more robust support for work on these platforms. More broadly, participants highlighted the potential for arts and technology projects to invite communities to be part of the process rather than consumers alone.

Select Challenges & Needs

- **Arts infrastructure gaps:** Traditional arts venues have limited technical capabilities and staff expertise to adequately present arts/tech exhibitions or performances; arts organizations already stretched thin, with expanding their digital capacity and knowledge perceived as a heavy and expensive lift.
- **Gentrification:** Lack of affordable spaces for artists to create or present work due to gentrification.
- **Access to resources:** Few learning spaces or hubs for arts/tech practitioners outside of academic settings. In addition, few opportunities to connect with the broader arts and cultural field.

Action Steps / Ideas

Broadening Networks & Connections

- Consider ways digital engagement departments can engage with arts/tech practitioners. For example, commission internet-based artists and collectives to create projects that boost online program offerings.
- Expand cross-fertilization among university programs, with arts/tech practitioners leading public conversations on ethics, digital divides, and the consequences of technology policies/practices.
- Community innovation labs can merge technology-based creative expression with civic engagement.
- Collaborate with design/architecture firms to include arts/tech projects in new constructions.
- Partner with local makerspaces to expand educational offerings.

Convening & Events

- Host convenings and events to build connective tissue between arts/tech practitioners and cultural service providers located across the Southeast region.
- Combine arts/tech discussions and knowledge building with community creativity and exhibitions. Example: MUD Foundation's [2021 ART + HACK + DATA](#) events.
- Offer digital literacy or arts/tech themed workshops led by arts/tech practitioners, with a focus on bringing programs to areas where opportunities to experience or engage with arts/tech initiatives might be limited by geography, ethnicity, economics, or disability.

Knowledge Building & Field Resources

- Develop professional opportunities, such as a paid fellowship for emerging local artists that includes travel to national arts/tech festivals and related conferences for learning and expanding networks.
- Establish multi-generational mentorship opportunities focused on developing arts/tech skills.
- Designate affordable, accessible spaces for project development and presentation.

Funding

- Support co-commissioning of projects and touring programs to share costs and reach new audiences.
- Refine grant categories and guidelines to better invite cross-disciplinary and collaborative arts/tech projects.
- Fund not only equipment purchases, but the appropriate technical expertise, professional development, and educational programming expenses needed alongside such equipment.
- Invest in artist careers for the long-term rather than a finished product.

See Appendix B

JAMBOARD Data

NORTHEAST REGION

PHILADELPHIA, PA

During this virtual roundtable held on June 22, 2021, participants identified differences within the region, contrasting Pittsburgh’s arts and technology activity centered around Carnegie Mellon University with a perceived lack of a core “scene” in Philadelphia. Moreover, attendees underscored the intersection of social justice, digital equity efforts, and artistic practices. Noting the historic exclusivity of both technology and arts sectors, attendees encouraged intentionally countering this exclusion across many levels of funding, presentation, networking, access to equipment and education, and more.

Select Challenges / Needs

- Pathways for growth: Need established pathways that support and encourage young, aspiring arts/tech practitioners with stronger representation and better opportunities to grow in this field. In addition, more intellectual infrastructure to provide critique, feedback, and cultural for the new generation of arts/tech practitioners.
- **Community investment:** Artists are doing the work of addressing digital divides and social issues, yet the opportunities for new media artists or tech-centered artists to operate as key cross-sector partners are rare. In addition, perceptions of local philanthropy were seen as partial to more traditional arts forms and institutions.
- **Technology bandwagon:** Tendency for funders, presenters, and organizations to follow technology trends—creating a surge of opportunities followed by a drop off.

Select Action Steps / Ideas

Broadening networks & connections

- Integrate arts/tech into existing efforts to advance digital literacy and access; for example, creating an art module in the City of Philadelphia's [digital navigator](#) program.
- Tap expertise of existing academic initiatives as models for cross-disciplinary labs that offer residencies, mentorship, and funding, such as the University of Pennsylvania's [Robotics Art Residency](#), [Frank-Ratchye Studio for Creative Inquiry](#), and [Drexel's ExCite Center](#).
- Build upon existing models for STEAM-focused learning activities, such as Drexel University's [Summer STEAM Program](#) for youth.
- Develop programs with intentional partnerships and connecting communities to other entities, like [MIT OpenDoc Lab](#).

Convening & Events

- Host a convening around media, tech, and equity.
- Develop the intellectual infrastructure of the field to nurture understandings of the history of this work, as well as to advance cultural commentary and constructive criticism.

Knowledge Building & Resources

- Develop the intellectual infrastructure of the field to nurture understandings of the history of this work, as well as to advance cultural commentary and constructive criticism.
- Support critical writing and feedback that fosters analysis, debate, and discussion, from commissioning writing to hosting/funding writing residencies.
- Continue to make arts/tech programming, such as university lectures, available virtually to audiences beyond current students even after COVID-19 restrictions end. Ensure high-quality transcription and closed captioning to expand access.
- Support activities that document best practices for installing, exhibiting, and preserving new media art to educate the arts and cultural field.

Funding

- Support touring, reinstallations, and subsequent presentations of projects, in addition to funding new work.
- Funding regrant programs could build capacity of local municipal arts funders and service providers.
- Fund interorganizational collaboration, enabling organizations to partner rather than competing for funds that support similar efforts.

See Appendix B

JAMBOARD Data

WESTERN REGION

SAN JOSE, CA

During this virtual roundtable held on June 23, 2021, participants focused on terminology as a central point of discussion. Participants critiqued the binary established in the phrase “arts and technology,” as well as an associated individualistic Western worldview that runs counter to collective creation. Attendees further spoke of corporate co-opting of the term “innovation,” emphasizing that phrases such as “innovation” and “tech-centered” speak to particular audiences of funders, investors, and collaborators, but may not be meaningful for the audiences who artists want to reach and serve.

Select Challenges / Needs

- **Perceptions:** Artist-run organizations focused on arts/tech struggle to achieve the level of sustainability and recognition as more traditional arts organizations; outsiders might already assume they are “successful” or well-funded due to their intersection with technology, and often conflate arts/tech with Big Tech.
- **Brain drain:** Losing practitioners with arts/tech expertise to corporate employment
- **External pressure:** Pressure to create something tangible and profitable instead of fostering the same level of creative experimentation allowed in other arts disciplines; power imbalance of corporate funding influencing artistic process/product
- **Exhibition/Preservation:** Need matchmakers to connect institutions with practitioners trained to support the presentation and conservation of arts/tech projects; a new set of parameters needed to encapsulate distinct strategies necessary to exhibit/conservate each project. In addition, artists struggle with maintaining stable platforms and online storage for projects, which raises questions of how works will be accessed and visible within the art canon 100+ years from now.

Action Steps / Ideas

Broadening Networks & Collaborations

- Educators serving all ages and skill levels can connect with arts/tech curriculum and learnings developed by [Processing Foundation Teaching Fellows](#).
- Build relationships with cross-disciplinary labs, such as the [Deep Humanities and the Arts Initiative at San Jose University](#), which seeks to integrate the humanities and arts into technology systems and approaches, and the [Leonardo Lab Series at Arizona State University](#), which positions artists as drivers of social change.
- Connect with and tap expertise of organizations influencing the future of technology and arts, such as [Logic Magazine/School](#), [World Wide Web Consortium \(WC3\)](#), [Feminist.AI](#), and [Gray Area Foundation](#).

Convenings & Events

- Convene like-minded alumni networks (Processing Fellows, Logic School Alumni, Leonardo Network) where they can interact in more deeply engaged ways.
- Establish avenues to routinely convene across sectors as part of everyday activity. For example, a regional network bringing together arts/tech practitioners, supporters, and experts.
- Facilitate international learning and collaboration through programs that welcome artists from abroad or foster connections like ZERO1's [International Exchange](#).
- Host events that bring new media conservationists in conversation with institutions

Knowledge Building & Resources

- Support initiatives that examine and re-envision arts/tech/media through Indigenous lenses and worldviews.
- Launch a program that enables artists and technologists to work together on undirected research with the newest technologies, with the possibility of an accelerator for commercial ventures that can return funding for additional non-directed research.
- Involve corporate partners for the research, development, and exhibition of arts/tech projects.
- Create a program that connects artists with resources for documentation and archiving, i.e: [Joan Mitchell Create a Living Legacy \(CALL\)](#) but for digital art.

Funding

- Create a regional hub or arts/tech entity that can act as a lead applicant for grants and could provide or distribute financial support.
- Support funding to expand upon existing projects which may have started at a residency or fellowship.
- Learn from existing funding models, such as [City of San Jose unrestricted operating grants](#) for projects, programs, and creative entrepreneurs.

See Appendix B

JAMBOARD Data

NORTHEAST REGION

NEW YORK, NY

During this virtual roundtable held on June 24, 2021, attendees discussed the challenges of labels and entry points. Genre-defying artists expressed being pinned down by categorization. Dividing “arts” and “technology” into separate arenas rather than an entwined creative endeavor potentially reinforces assumptions and excludes creators rather than expanding the field. In addition, while the internet creates entry points and inter/national circulation of resources and community discourse/contributions, this activity is typically not visible to funders or arts service providers. Participants further noted a lack of stable career paths and a need for more authentic bridges between artist-run spaces, non-profit cultural organizations, and tech companies.

Select Challenges & Needs

- **Parallel Universes:** Need to bridge divides between those immersed in the work/field and those outside; a lack of integration between arts/tech and other contemporary practices, programs, and priorities
- **Education:** Accumulating specialized education and experience as a barrier to entry; individuals do not have equal access to entry points and there are still individuals and communities whose opportunities are limited by geography, ethnicity, economics, or disability even within a well-resourced city such as NYC. Additional challenges exist for funders and service providers to accommodate the variable levels of expertise existing across the field.
- **Perceptions:** Technology viewed as a distribution or communications mechanism rather than an art medium
- **Technical Support:** Gap in technical expertise to properly install and maintain tech-centered art, a challenge deepened by the wide range of technologies employed by artists. Heavy reliance on the artist to install and maintain works.

Select Action Steps & Ideas

Broadening Networks & Collaborations

- Invest in network-weaving activity: support and connect the organic networks that grow out of extended artistic practices, such as [Musical Theater Factory](#)'s work to foster community among XR theater creators.
- Connect with the [Hive NYC Learning Network](#) (Hive NYC), a city-wide learning laboratory for educators, technologists, and mentors to design innovative connected educational experiences for youth.
- Coordinate with other organizations in the field to establish interlinking support for artists following different pathways and at different phases of their careers.
- Build upon models for international cultural exchange. For example, the [Quebec-New York artist exchange program](#), a partnership between New York State Council on the Arts and the government of Quebec.

Convenings & Events

- Host convenings or meetings with intersecting arts networks, such as the [Association of Performing Arts Professionals](#), to share best practices and experiences presenting arts/tech projects and performances.
- Set up intergenerational meetings and demonstrations of how digital media projects are made—the software and hardware needed to create artistic projects.
- Form an alliance that convenes regional arts/tech orgs regularly to advance the field and share resources.

Knowledge Building & Resources

- Establish a regional alliance to integrate communities and share resources, such as space and equipment, and strategize how existing resources and cultural assets can effectively reach individuals, especially youth, whose opportunities might be limited by geography, ethnicity, economics, or disability.
- Promote understanding the field's history—among audiences, venues, and practitioners.
- Map key arts and technology activities/meetups across the U.S.
- Assist artists in exploring different business models such as B Corporations and other investment frameworks outside the nonprofit arena. Support artist business/career development—[NEW INC](#) as a model.

Funding

- Develop adaptive and iterative funding models to support unfamiliar or experimental work—the [Awesome Foundation](#) as an example.
- Provide rapid funds or regrant programs that support individual artists, projects, and meet-up activities across genres, including local and interregional networking activities.
- Fund collaborative and co-created projects, as well as budget lines for staff to support artists, and provide direct outreach and technical assistance to demystify grant guidelines for prospective arts/tech applicants.

APPENDICES

Resources & Starting Points

This report contains many “ways in” for new and existing supporters to engage, learn more, and bolster the growing arts and technology field. Some recommendations involve ambitious efforts, such as developing an equipment lending library or training preservationists. Other suggestions dovetail with arts organization priorities that have solidified over the past year related to equity, racial justice, and expanding digital access. Many action steps are manageable, small efforts that in the aggregate can lead to significant change at local, regional, and national levels.

In addition to following up on ideas outlined above and diving into the lists of specific resources included in appendices, readers seeking to learn more can reference the research report and supplemental materials that sparked this effort:

Tech as Art: Supporting Artists Who Use Technology as a Creative Medium

Guide for Public Arts Funders

Commissioned Essays

Meet the Artists: Video Series to accompany the Artist Case Studies in the report

APPENDIX A

Roundtable Attendees

St. Paul, MN

Torrie Allen	Arts Midwest
Paige Dansinger	Better World Museum, and Horizon Art Museum
Drew Digby	Arrowhead Regional Arts Council
Sue Gens	Minnesota State Arts Board
Jeremy Holien	Perpich Center for Arts Education
Henriette Huldisch	Walker Art Center
Sherry Huss	Maker Faire
Gulgun Kayim	City of Minneapolis
Jen Krava	Forecase
Ben Moren	Minneapolis College of Art + Design
Sarah Peters	Northern Lights.mn
Eleanor Savage	Jerome Foundation
Hyunjin Seo	University of Kansas
Andy Sturdevant	Springboard for the Arts
Jeff Thompson	Stevens Institute of Technology
Pramila Vasudevan	Aniccha Arts

APPENDIX A

Roundtable Attendees

Detroit, MI

Annamarie Borucki	Midtown Detroit, Inc.
Cézanne Charles	rooftwo
Sam Coons	Neighborhood Arts Development, City of Detroit
Pat Elifritz	Museum of Contemporary Art Detroit (MOCAD)
Megan Elliott	Johnny Carson Center for Emerging Media Arts
David Gier	University of Michigan School of Music, Theatre & Dance
David Hassler	Kent State University
Vikram Kalidindi	Cranbrook Center for the Arts
Sacramento Knox	The Aadizookaan
Laura Mott	Cranbrook Art Museum
Marisa Olson	Digital Studies Institute, University of Michigan
Leslie Raymond	Ann Arbor Film Festival
Rochelle Riley	City of Detroit
Omari Rush	CultureSource
Sophia Softky	Allied Media Projects
Alison Watson	Michigan Council for Arts and Cultural Affairs

APPENDIX A

Roundtable Attendees

Santa Fe, NM

Jamie Blosser	Santa Fe Art Institute
Agnes Chavez	STEMarts LAB
Jen Cole	Arizona State University
Chris Coleman	Clinic for Open Source Arts
Derek Dyer	Utah Arts Alliance
Jason Foumberg	Thoma Foundation
Adriana Gallego	Arts Foundation for Tucson and Southern Arizona
Debra Garcia y Griego	New Mexico Department of Cultural Affairs
Jenice Gharib	New Mexico Arts
Blake Kammerdiener	SXSW
Allyson Kennedy	National Science Foundation
Joshua King	AURORA
James Lujan	Institute of American Indian Arts
Patsy Phillips	IAIA Museum of Contemporary Native Arts
Matt Thomas	The Paseo Project

APPENDIX A

Roundtable Attendees

Miami, FL

Diliana Alexander	FilmGate Miami
Elizabeth Boone	Miami Light Project
Jennifer Deafenbaugh	Nation of Makers
Wendy Fishman	University of North Carolina, Charlotte College of Art + Architecture
Rosie Gordon-Wallace	Diaspora Vibe Cultural Arts Incubator
Sabine Gruffat	University of North Carolina - Chapel Hill
Sandro Kereselidze	ARTECHOUSE
Leilani Lynch	The Bass, Miami Beach
Jay Mollica	Perez Art Museum, Miami
Rodolfo Peraza	MUD Foundation
Ysabel Pinyol	Monira Foundation
Chana Sheldon	Museum of Contemporary Art, North Miami
Craig Watkins	University of Texas at Austin
Amelia Winger-Bearskin	Studio Amelia
Jordan Young	South Arts

APPENDIX A

Roundtable Attendees

Philadelphia, PA

Nuala Cabral	Independence Public Media Foundation
Jane Golden	Mural Arts Philadelphia
Youngmoo Kim	ExCITe Center, Drexel University
Golan Levin	Frank-Ratchye STUDIO for Creative Inquiry, Carnegie Mellon University
Allie Linn	United States Artists
Adriel Luis	Smithsonian Asian Pacific American Center
Paula Marincola	The Pew Center for Arts and Heritage
Louis Massiah	Scribe Video Center
Naima Murphy Salcido	Monument Lab
Alan Price	Center for Immersive Media, University of the Arts
Caroline Record	Antimodular Research
Judilee Reed	William Penn Foundation
Sabrina Roach	National Digital Inclusion Alliance
Jason Schupbach	Drexel University
Orkan Telhan	Weitzman School of Design, University of Pennsylvania
Andrew Cameron Zahn	CRUXspace

APPENDIX A

Roundtable Attendees

San Jose, CA

Kerry Adams-Hapner	City of San Jose, Office of Cultural Affairs
Anne Bown-Crawford	California Arts Council
Vanessa Chang	Leonardo/ISAST, CripTech Incubator
Adam Fong	William Flora Hewlett Foundation
Rudolf Frieling	San Francisco Museum of Modern Art
Shari Frilot	Sundance Institute
Rhonda Holberton	San Jose State University
Cristóbal Martínez	San Francisco Art Institute
Christine Meinders	Feminist.AI
Emiko Ono	William and Flora Hewlett Foundation
Ravi Rajan	California Institute of the Arts
Asta Roseway	Microsoft Research
Dorothy Santos	Processing Foundation
Danielle Siembieda	Leonardo/ISAST
Barry Threw	Gray Area Foundation for the Arts
Shamsher Virk	ZERO1

APPENDIX A

Roundtable Attendees

New York, NY

Wayne Ashley	FuturePerfect Creative Studio
Nadav Assor	Ammerman Center for Arts & Technology, Connecticut College
Halsey Bergund	MIT Open Documentary Lab
Billy Clark	CultureHub
Jean-Pierre Dion	Quebec Government Office, New York
Rashin Fahandej	Emerson College
Lauren Gardner	Bold Machines + Babycastles
Rachel Ginsberg	Cooper Hewitt Smithsonian Design Museum
Karen Helmerston	New York State Council on the Arts
Zach Kaplan	Rhizome
Nora Khan	Rhode Island School of Design
Maya Man	Google Creative Lab
Dan O'Sullivan	Tisch School of the Arts
Carol Parkinson	Harvestworks
Aankit Patel	City University of New York
Brandon Powers	Musical Theatre Factory
Lisa Richards Toney	Association of Performing Arts Professionals (APAP)
Roderick Schrock	Eyebeam
Dan Shanahan	Torn Space Theater
Sydney Skybetter	Brown University
Kira Wisniewski	ART + Feminism
Dustin Yellin	Pioneer Works

APPENDIX B

LINKS TO JAMBOARDS FROM REGIONAL ROUNDTABLES

A combined document with Jamboard data from the seven regional roundtables is available upon request by emailing mediaarts@arts.gov.

St. Paul, MN—June 15, 2021

- Group 1: <https://jamboard.google.com/d/1zfXmUdoq94HQW2b4KqvDdV2Mf6J5TZePO7TElcqDjgl/viewer?f=5>
- Group 2: https://jamboard.google.com/d/1JNuGbiQeFGna_RJEqa_13vavnIKDWI9mH-Zww3Fr6Tg/edit?usp=sharing
- Group 3: https://jamboard.google.com/d/10lowq0UINICAOd33fL15_0fa_dYDqX24DvLZ3zYEOfQ/edit?usp=sharing

Detroit, MI—June 16, 2021

- Group 1: https://jamboard.google.com/d/1KWjms8cV5XK6lIK_TKclh87I6UWwVgs51Qj4TPjzLw/viewer?f=0
- Group 2: <https://jamboard.google.com/d/151pXzKEut0YLbsEsKSadCdjKUir5Ns-LI-237VUivQY/edit?usp=sharing>
- Group 3: <https://jamboard.google.com/d/14GRVfN08mDDnTkG1Av6siw2D9arU7yAjuH6PtsyUrSc/edit?usp=sharing>

Santa Fe, NM—June 17, 2021

- Group 1: https://jamboard.google.com/d/12Y-P1oXxq_wHzJZ7rswDnuu6XpwmOPOM3whpDIbyvLg/viewer?f=0
- Group 2: <https://jamboard.google.com/d/1qzb3N9WAQFn5H1DCDHdnnTH-oH9UVxFGDxTywh0T6uc/viewer>
- Group 3: <https://jamboard.google.com/d/1la-KWhHRR0c0IDnhEwfqDIBAGO8ezllBsIzvMiflmzA/viewer?f=03>

Miami, FL—June 22, 2021

- Group 1: <https://jamboard.google.com/d/1hRhS1R7puP0gYXP7-VelUFvHXKkoxajZeNTdE8MphhA/viewer?f=0>
- Group 2: https://jamboard.google.com/d/1BVQF1Iiwymo7Y-x3vYrmdr-vUtZRGzTyi_o4uTom1Ek/viewer?f=0

- Group 3: <https://jamboard.google.com/d/1tzx4Ib1fecJE2A2BY7poZglTpYFgNpPbhTjCR3TTYXs/viewer?f=0>

Philadelphia, PA—June 22, 2021

- Group 1: <https://jamboard.google.com/d/1GAbOwEPC3ea8Dzm7NR18dCTT1jewLJI1Y4OeU23mWc4/viewer>
- Group 2: <https://jamboard.google.com/d/1KSm9y1jaUYriomSIhMp3snJg-WN17JmOPUI2YrtD-nI/viewer>
- Group 3: https://jamboard.google.com/d/1d9rPzwsSVOmUBAhF_HilMA6KLenAOtfWzmLG4LoRzng/viewer

San Jose, CA—June 23, 2021

- Group 1: https://jamboard.google.com/d/1zCCbGokUnBs3VOeQd9ZhVT3ss0iEdZ7nPio_dAzzoZw/viewer
- Group 2: https://jamboard.google.com/d/14TThyAuLimWanokg6lK_pJCU4xWk4nC0889cyKXoGio/viewer
- Group 3: https://jamboard.google.com/d/1XlOKp5QXoDkG_CYS0wkvW6Nx6D1BFKBM42WGVnep1pI/viewer

New York, NY—June 24, 2021

- Group 1: https://jamboard.google.com/d/1zsqFcsYKJUKF_3C7xQSjSuFR6x-6f-HQQ2X07WQ6ZKs/viewer
- Group 2: https://jamboard.google.com/d/1XmCIZYYcElkudM_X5kH2YYrV3NTjdHIR-ToIqGMjOIQ/viewer
- Group 3: https://jamboard.google.com/d/16B7Hx12Ah1dxrXk6_g3TkV8-QzEU-cxw-SYoEZ2YOWc/viewer