

The background of the entire page is a composite image. The top half features a dark blue, futuristic circuit board pattern with glowing orange and yellow light points. The bottom half shows a woman with short brown hair wearing a white VR headset and large white headphones. She is wearing a dark red button-down shirt and a green skirt. She is gesturing with both hands in front of her, as if interacting with a virtual environment. In the background, there are blurred museum-like displays, including a sculpture of a person and some colorful spheres on a stand.

**ARC**

**EMERGING  
TECHNOLOGIES  
ROUNDTABLE**

**AI**

# **Responsible Artificial Intelligence & The State of Digital Art in Atlanta**

**Report Four**

December 2022



# Members

**Muhammed Ahmed**

*Research Scientist at Opendoor*

**Jessica Anderson**

*Research Scientist and Director of DataWorks at Georgia Tech*

**Chairman Kerry Armstrong**

*Board Chairman of the Atlanta Regional Commission and Managing Director of Development and Investment Services at Pope & Land Real Estate*

**Brandon Branham**

*CTO and Assistant City Manager at City of Peachtree Corners*

**Dr. Marilyn A. Brown, CEM, NAS, NAE**

*Regents' Professor School of Public Policy at Georgia Tech*

**Frank Fernandez**

*President & CEO at Community Foundation for Greater Atlanta*

**Eric Ganther, AICP**

*Senior Project Manager at HNTB*

**David Giguere**

*Geospatial Administrator at Atlanta Regional Commission and Co-Chair of the Emerging Technologies Roundtable*

**Robert Herrig**

*Director of Supply Chain and Advanced Manufacturing at Metro Atlanta Chamber*

**Mark G. Lauby**

*Senior VP and Chief Engineer at North American Electric Reliability Corporation*

**Mayor Tom Reed**

*Mayor of the City of Chattahoochee Hills and Co-Chair of the Emerging Technologies Roundtable*

**Anna Roach**

*Executive Director and CEO of the Atlanta Regional Commission*

**Laura Rogers**

*Deputy Director at The Ray*

**Dr. Nashlie Sephus**

*Applied Science at Amazon AI and Founder & CEO at The Bean Path*

**Dr. Sweta Sneha**

*Founder and Executive Director of Healthcare Management & Informatics at Kennesaw State University, Professor of Information Systems & Security at Kennesaw State University*

**Elizabeth Strickler**

*Senior Lecturer and Director of Entrepreneurship Programs at Creative Media Industries Institute at Georgia State University*



# ARC EMERGING TECHNOLOGIES ROUNDTABLE

The fourth meeting of the Emerging Technologies Roundtable (ETR) was held on July 29<sup>th</sup>, 2022. Roundtable members explored two emerging technology topic areas: **Responsible Artificial Intelligence**, presented by **Dr. Nashlie Sephus**, and **The State of Digital Art in Atlanta**, presented by **Jessica Anderson**.

**Dr. Nashlie Sephus** is an Amazon AI Tech Evangelist for Amazon Web Services (AWS) and the Founder & CEO of The Bean Path, a non-profit organization in Jackson, Mississippi providing technical advice and guidance to the community. Dr. Sephus' presentation on Responsible AI described how Metro Atlanta's strong technology ecosystem is supporting the creation of companies and opportunities for the region. Dr. Sephus highlighted her experience as the CTO for the visual recognition technology company Partpic, helping to build their image recognition application before Amazon's acquisition of the company. Post-acquisition, Dr. Sephus moved to Amazon where she works on a team developing facial recognition systems, reducing dataset and algorithmic bias, and improving accuracy and confidence in facial recognition. During her presentation, Dr. Sephus shared the solutions and services offered by AWS and demonstrated the AWS Name Pronunciation Tool developed using Amazon Polly, a text to speech application, as a great example of how Responsible AI can promote inclusion by teaching your colleagues how to pronounce your name. As a person with a difficult to pronounce surname, I was delighted to hear how well the Name Pronunciation Tool managed 'Giguere'.

Dr. Sephus described the differences between traditional software solutions, where human language is used to specify the software requirements, and machine learning (a subfield of artificial intelligence) solutions relying on the capabilities and limitations of the available datasets. There is an expectation in traditional software that customers are *not* involved in software testing. However, in machine learning there is an expectation that customers *will* remain involved in the software testing and feedback process. Constant testing and user feedback are necessary as machine learning developers are not always completely aware of what (or how) the machine learning model is learning. An example of the challenges in understanding how a model is learning was highlighted when, during the development of a binary gender classifier, the team noticed that images containing smiling men were misidentified and classified as women. The team later determined the cause was the underlying dataset used to train the algorithm contained many images of smiling women and included fewer images of smiling men.

Dr. Sephus described the broad suite of AWS services available across Amazon's machine learning stack and how her team is working to reduce bias and improve 'fairness, explainability and privacy' throughout Amazon's machine learning offerings that include image, speech, and text recognition, as well as healthcare and industrial applications. Dr. Sephus explained that Responsible AI should include the following attributes:

- » **Privacy and Security:** User Identifiable data is protected from theft and exposure and any data that is used is done so legally.
- » **Fairness:** AI systems should be monitored for harmful disparities across vulnerable populations or subpopulations.
- » **Explainability:** Since artificial intelligence is a relatively young industry, are we able to understand how the system operates? Can we provide an explanation for its decisions?
- » **Robustness:** How difficult is it to confuse or obfuscate a system using adversarial or malicious approaches?
- » **Transparency:** Since it is not possible to deploy a perfect algorithm or dataset, are users able to understand the limitations and shortcomings of a system?

Dr. Sephus gave the Roundtable several examples of the challenges and concerns raised around the use of facial recognition platforms, including difficulties around identifying transgender and non-binary people; the misappropriation of images found on image platforms like Flickr for use in surveillance technologies and governments banning the use of facial recognition technology in policing. To learn more about how to use artificial intelligence and machine learning responsibly, Dr. Sephus suggested Amazon's Responsible Machine Learning webpage for resources and tools. Additionally, Dr. Sephus suggested the following books related to data and algorithmic bias:

- » *Weapons of Math Destruction* by Cathy O'Neil
- » *Algorithms of Oppression* by Safiya Umoja Noble
- » *The Ethical Algorithm* by Michael Kearns and Aaron Roth
- » *The Black Box Society* by Frank Pasquale

**Jessica Anderson**, Research Scientist and Director of DataWorks at the Georgia Institute of Technology, offered the presentation: **The State of Digital Art in Atlanta and Possible Futures**. Jessica provided an overview of digital art, an introduction to the artists, groups, venues, and academic programs associated with digital art in Atlanta, and a tour of the broader trends in digital art including ownership models, non-fungible tokens (NFTs) and generative art. Jessica explained that digital art is a continuum, from physical artwork that is presented through digital mediums (e.g., scanned paintings displayed on a screen), to art that is edited or created using digital tools (e.g., digital photography), to art that is natively digital, created and experienced completely within digital environments (e.g., generative art and virtual reality experiences). Because trust is strongest through firsthand experience, artists can use digital art as an avenue to express ideas and shape opinions more deeply with those experiencing and interacting with digital art.

Jessica explored four affordances, or ways an object may be used, associated with digital art.

1. **Encyclopedic:** Referencing and visualizing databases of collected information.
2. **Spatial:** Simulating a navigable environment.
3. **Interactive:** Users can impact and alter the artwork.
4. **Procedural:** Programming with defined rules can generate artwork that never looks the same twice.

Jessica shared the work of several local digital artists including Eddie Farr, Neel Shivdasani, Thulani Vereen, Chris Ahnberg, Salvador Iglesias and Meptik, as well as civic organizations like the Atlanta Downtown Improvement District and Fulton County Public Art's Future Lab supporting and presenting digital art in Atlanta. Examples of local venues and galleries focusing on digital art include DIGATL, Georgia Tech's Ferst Center for the Arts and Illuminarium. Academic programs building digital expertise among emerging artists in Atlanta include Georgia Institute of Technology's Human Centered Computing, Digital Media, and Center for Music Technology programs, the Savannah College of Art and Design's Immersive Reality, Interactive Design and Game Development, and Visual Effects programs, Georgia State University's Creative Media Industries Institute, and Spelman Design and Innovation Laboratory.

Exploring the current and future states of broader trends in digital art, Jessica shared examples of virtual reality (VR) experiences (e.g., Marshmallow Laser Feast), 360° Immersive Projection (e.g., ARTECHOUSE), and Artificial Intelligence Art (e.g., Refik Anadol). Jessica explored several trends she is witnessing, describing the increased adoption of virtual reality for remote work through digital twins, Immersive projection as a new outlet for the entertainment industry and the merging of creative skills with technology skills through the

adoption of AI-powered tools. Expanding on artificial intelligence-powered tools, Jessica shared the Craiyon website. Introducing Roundtable members to generative art, she prompted thought-provoking questions around the creation and ownership of Generative AI-derived artwork before closing her presentation by sharing her firm belief that the Atlanta digital art community can influence the broader global art world through its regionally and culturally Atlantan representation.

## Key Insights on Artificial Intelligence and Digital Art from an AI

Earlier installments of the Emerging Technologies Roundtable report contain key insights distilled from the topic area presentations, conversations, and related pre- and post-topic research. As a limited experiment, and because this report focuses on artificial intelligence, we will turn to the artificial intelligence research company **OpenAI** and use their recently released conversational AI model called **ChatGPT** to explore several key themes. Since ChatGPT is optimized for dialogue, we asked the platform questions on topics related to artificial intelligence uses and limitations, as well as generative art. Below are the unedited questions we submitted, followed by the unedited ChatGPT responses.

### What is responsible AI?

“Responsible AI refers to the use of artificial intelligence in a way that is ethical, transparent, and fair. This means ensuring that AI systems are designed in a way that does not perpetuate bias, and that they are accountable to humans for their actions. It also involves considering the potential impacts of AI on society and taking steps to mitigate any negative consequences. Responsible AI involves a commitment to using technology in a way that is beneficial to society and that respects the rights and dignity of all individuals.” - ChatGPT

### How can local governments use AI to better serve their residents?

“Local governments can use AI to improve a variety of services and functions that benefit their residents. For example, AI can be used to analyze data on traffic patterns and congestion to identify areas where traffic management strategies are needed. It can also be used to monitor and manage public utilities, such as water and electricity, to improve efficiency and reduce costs. Additionally, AI can be used to automate and streamline administrative processes, such as issuing permits or processing applications, to improve the overall efficiency and effectiveness of local government operations. Overall, local governments can use AI to improve a wide range of services and functions that benefit their residents.” - ChatGPT

### Can artificial intelligence help local governments develop zoning codes?

“Yes, it is possible that artificial intelligence (AI) could be used to help local governments develop zoning codes. Zoning codes are used to regulate the use of land in a given area, and they can be complex and difficult to develop. AI algorithms could be used to analyze data on land use and other factors to generate recommendations for zoning codes that would be effective and fair. Additionally, AI could be used to help local governments automate the zoning code enforcement process, allowing them to more efficiently monitor and enforce compliance with zoning regulations.” - ChatGPT



## How will generative AI impact the creativity of human artists?

“The impact of generative AI on the creativity of human artists is likely to be mixed. On the one hand, generative AI may provide artists with new tools and capabilities that allow them to create novel and unique works of art. For example, generative AI algorithms may be able to generate new and unexpected visual or auditory compositions that can serve as inspiration for human artists. On the other hand, the widespread use of generative AI may also pose a threat to the livelihood of some human artists, as AI-generated content may be able to compete with human-created art in some cases. Overall, the impact of generative AI on human artists is likely to be complex and varied, and will depend on how the technology is used and developed.” - ChatGPT

## What are the current limitations of AI?

“There are many limitations to current AI technology. One of the main limitations is that most AI systems are only capable of performing the tasks that they have been specifically trained for. They are not able to apply their knowledge to new situations or to think outside of the box in the way that humans can. Additionally, current AI systems are not able to learn in the same way that humans do. They require large amounts of data to be fed to them in order to learn, and they are not able to learn from their own experiences in the way that humans can. Finally, current AI systems are not able to understand and process natural language in the way that humans do, which limits their ability to communicate with us.” - ChatGPT

## Key Insights on Artificial Intelligence and Digital Art from a Human

### AI is still in its Infancy

Artificial intelligence in the age of digital computing can trace its origins to the mid-20<sup>th</sup> century, with its earliest applications likely viewed as primitive by the standards we have become accustomed. However, even though artificial intelligence has existed for decades, the technology is considered early in its development. It is only in recent years that we've seen rapid advancements in the creation and adoption of applications for broad consumer use. *As the field of artificial intelligence matures and general-purpose AI models begin to arrive, communities and regulators alike should be prepared for AI systems to be proposed and implemented in new and unexpected ways.*

### We use Artificial Intelligence every day

As expressed in the Emerging Technologies Roundtable Report One of 2022, our regional residents interact with artificial intelligence (AI) each day when they use facial recognition to gain access to their smartphone, receive recommended content when they visit social media platforms and video streaming services, and communicate more efficiently using automated spelling and grammar suggestion tools. We are using AI systems when we request driving directions or ask our digital voice assistants, like Siri and Alexa, to perform a task. What is invisible to us as users are the varying levels of bias and accuracy found in the models used to train and develop the AI. We expect interactions with these systems to deliver high quality results with very high accuracy and little to no bias. However, because these systems are developed by fallible humans, the results will often reflect our imperfections and biases. *Governments should require accountability and transparency*

*acknowledgments from any company developing artificial intelligence products so we, as consumers, can understand the use cases the system is designed and optimized for, as well as the potential ‘side effects’, inaccuracies and limitations present in the system.*

## Interacting with Digital Art

Consumers are offered increasingly immersive experiences that blend and blur the line between digital and physical experiences, allowing creatives and artists a broadening selection of tools to connect with audiences and express their visions. Meow Wolf’s installations in Santa Fe, Las Vegas and Denver are world renowned for imaginative and unique interactive environments. Closer to home, Van Gogh: The Immersive Experience in Atlanta uses light and sound to create immersive spaces, virtual reality that places you inside the inspirations behind his iconic works and interactive exhibit spaces to connect visitors to art more deeply. Illuminarium, also in Atlanta, offers several immersive, cinematic experiences using 360-degree projections that fill the space. Digital technology makes it possible to scale experiences to any space, allowing artists and property owners to tailor their creations to the available physical environment. *Local governments interested in developing temporary and permanent art installations within their communities should consider the imaginative possibilities found when partnering with digital artists in the Atlanta region and fusing physical spaces with digital art and technology.*

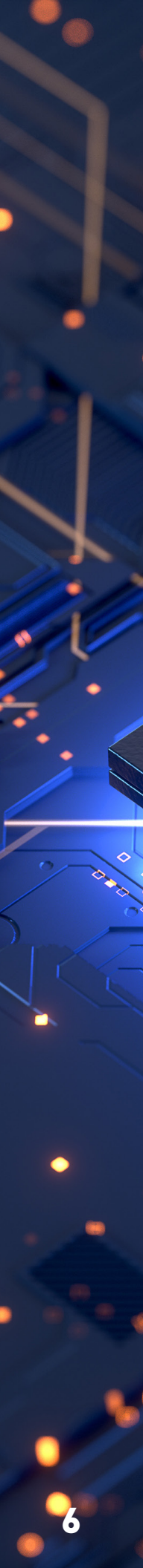
## On the Horizon

During the July 29th, 2022, Emerging Technologies Roundtable meeting, members were invited to synthesize and blend the presented information with their industry knowledge to shape a vision of possible futures for Metro Atlanta over the next decade. The following future scenario weaves together plausible themes revealed during Emerging Technologies Roundtable sessions and topic research, offering a fictional review of an imaginary immersive entertainment company in 2032.

## Scenario: Immersive Environments Driven by Your Imagination

Atlanta’s newest entertainment concept, FourthWall, opened its doors to the public and introduced us to the future of immersive entertainment. Leveraging the latest in generative artificial intelligence and LED volume technology used in film and television production, FourthWall allows guests to create and infinitely modify deeply immersive and highly detailed digital environments in real-time. Unlike the small immersion walls becoming popular in upscale homes, university classrooms and city planning departments, FourthWall offers what is billed as ‘the largest experiential LED volume in the Western Hemisphere’. Boasting one million cubic feet of fully enclosed space, FourthWall has the highest-resolution displays commercially available covering nearly every square foot of the walls, ceiling, and contour-adjustable flooring.

Guests entering FourthWall must wait until their reservation time before they are allowed to visit the volume, where they receive a brief orientation to the building, staff and technology. Following orientation is the *Creation* stage, where guests are invited to describe the visuals that will be displayed in the digital space (e.g., Gently undulating Martian landscape at night with astronomically correct sky, 1930’s Parisian Art Deco Nightclub in Pigalle) using natural speech to ‘build’ a unique, dynamic, and interactive digital world. You may recall



researchers testing OpenAI's *Dialoguer* (licensed by FourthWall) published findings last year suggesting significant levels of voice/ethnicity bias and difficulty recognizing certain accents and less common dialects, but a FourthWall representative explained during our visit that improvements to the model have almost eliminated the reported bias. FourthWall has also invested heavily in reducing generative AI bias, promoting equitable artistic representation, and improving digital depictions of human and humanoid likenesses. We found *Dialoguer* worked well in interpreting and rendering a guest's voice-delivered description in impressively minute detail, prompting for clarity and specificity only when needed. While we have heard anecdotal evidence from former staff suggesting certain keyword prompts are unavailable for interpretation and visual generation, we did not experience any censorship flagging during our visit. If you are one of an increasing number of consumers wishing to protect your voice signature from unlicensed appropriation, FourthWall offers manual character entry as an alternative to voice interaction, with nearly every active language of the world supported by both voice and character input. Interestingly, tried-and-true character entry appears to have a slight advantage, demonstrating increased prompt/intent accuracy.

In the *Roam* stage, guests are transported 'anywhere their imagination can carry them' and are free to explore and interact with the digital world of their creation in the full 200x100ft (60x30m) environment. Full body haptic suits and lightweight, mixed reality eyewear are available for guests interested in the ultimate immersive experience, including voice and touch interaction with guest and AI-generated virtual entities. Small, angular-bodied drones covered in lightweight coated materials, are precisely controlled to form complex objects aloft. Powerful laser projectors, positioned discretely near the volume ceiling, amplify the immersive experience by tracking and projecting the guest-specified airborne design elements onto the drone surfaces operating in the vertical dimension.

Vast computational power, cutting edge artificial intelligence models, and hundreds of camera/microphone arrays are required to support FourthWall's immersive environment, but critics have expressed concern that deploying what is in essence a massive surveillance system for entertainment purposes erodes expectations of personal privacy, voice, and likeness ownership, and normalizes the drift toward deploying even greater state-sponsored surveillance technologies to monitor the public. Given surveillance concerns, coupled with an industry trend away from user ownership of Generative AI prompts and toward algorithm owners, it is not unreasonable to imagine a future where all guest voice utterances and character entry descriptions are captured and cataloged, becoming property of FourthWall, with the most imaginative and visually compelling outputs being refined and made available for purchase on XR asset marketplaces by third party digital world developers. Government, tasked with balancing consumer protections while allowing space for private enterprise to continue advancing our technological primacy, must work hard to maintain their human perspective and focus in this near-incomprehensible technological landscape.



# About the Emerging Technologies Roundtable

Initiated in 2021, the Atlanta Regional Commission's Emerging Technologies Roundtable is comprised of subject matter and issue experts from the Atlanta community. Emerging Technologies Roundtable members meet quarterly to explore, advise, and report on the ways in which emerging technologies may impact how we will live, work and travel in our region over the coming decade and beyond. Each Emerging Technologies Roundtable report is designed to better prepare ARC staff and the governments we serve to plan for preferred outcomes by providing actionable insights on plausible futures.

## References

AI Traffic Signals in Atlanta, <https://the-atlas.com/projects/ai-traffic-signals-in-atlanta>

Amazon's Responsible Machine Learning, <https://aws.amazon.com/machine-learning/responsible-machine-learning/>

Atlanta Digital Art Week, <https://www.atlantadowntown.com/do/atlanta-digital-art-week-at-underground-atlanta>

Atlanta Downtown Improvement District, <https://www.atlantadowntown.com/adid>

Chris Ahnberg, <https://www.instagram.com/chrisahnberg/>

Craiyn Generative Art, [www.craiyn.com](http://www.craiyn.com)

Creative Media Industries Institute, <https://cmii.gsu.edu/>

DigATL, <https://www.instagram.com/digitalatl/>

Earsketch, <https://earsketch.gatech.edu/>

Eddie Farr, <https://www.instagram.com/freaughouse/>

Entertainment Intelligence and Human-Centered AI Labs, <http://eilab.gatech.edu/>

Fulton County Public Art Futures Lab, <https://publicartfutureslab.com/>

Georgia Tech Digital Media, <https://dm.lmc.gatech.edu/>

Illuminarium, <https://www.illuminarium.com/atlanta/>

Meptik, <https://www.instagram.com/meptik/>

MidJourney Generative AI Art, <https://midjourney.com/>

Neel Shivdasani, <https://www.instagram.com/neel.shivdasani/>

OpenAI ChatGPT, <https://chat.openai.com/chat>

Salvador Iglesias, <https://www.instagram.com/saintsalvii/>

ShotSpotter, <https://www.shotspotter.com/>

Spellman Design and Innovation Laboratory, <https://www.spelmanil.org/>

Thulani Vereen, <https://www.instagram.com/2lanivereen/>

Van Gogh: Immersive Experience, <https://vangoghexpo.com/atlanta/>



Atlanta Regional Commission

[atlantaregional.org](http://atlantaregional.org)