

ALTERNATE

# REALITIES

Research in Atlanta's Field of Augmented Reality

*Interview with Maribeth Gandy Coleman, PhD*

BY SHADY RADICAL



The overall research goal for this particular project was to use AR environments to allow users to engage in virtual communication scenarios and to experience those situations through the "eyes" of avatars or virtual participants to reveal the impacts or biases on the interaction and to study various forms of cultural conduct.



An AR headset allows a participant to practice teamwork skills with healthcare teams in the operating room environment by role playing stressful scenarios where power dynamics, bias, and cultural differences could impede effective communication. A key feature of the experience is that the trainee can experience the scenario from the point-of-view of different virtual team members. This project was done in collaboration with Emory University School of Medicine.

Augmented reality (AR) is “integrated virtual content in a physical world as though that content were with you,” registered in 3D, as described by Dr. MariBeth Gandy Coleman, a principal researcher, scientist and Director of the Interactive Media Technology Center at The Georgia Institute of Technology (GT). Think Pokémon Go, the yellow first down line on the football field, or a televised game’s “virtual try-on” feature for eyeglasses names at Warby Parker or the app that allows you to place furniture in your home space at Ikea. Through AR-enabled hardware like a smartphone, eyewear or headsets, we can see, hear and/or feel digital content in our physical environment in real-time. Cameras and sensors use Simultaneous Localization and Mapping (SLAM) techniques to capture environmental data allowing for precise tracking, relative positionality, and accurate projections. While this

content is designed to enhance our experience of reality, documentaries like *The Social Dilemma* (2020) or *A Glitch in the Matrix* (2021) demand we ask if that is all it does, can do, or will do.

### THE SPECTRUM OF XR

Our experience lies on a spectrum, with totally virtual at one end and completely physical at the other end. Virtual reality (VR) is completely sealed off from the physical world and requires some assistive technology like a headset, earpieces, and/or gloves. Extended Reality (XR) or Mixed/Merged Reality (MR) are umbrella terms that describe different combinations of real and virtual content. While all technologically-enhanced experiences are expressions of XR, AR and MR differ by levels of human interactivity with digital content; the relation between

the apparatus and the body; and the type of software and/or hardware required for application.

### INTRODUCING DR. COLEMAN

Dr. Coleman has worked in augmented reality for the past 20 years and is currently working around the shift in virtual content and how we use technology in our everyday lives. As a Human-Computer Interaction Researcher she is interested in new media, how we apply AR to problems, and how we can improve peoples’ lives. For example, she explains how Zoom and other software like it, were not designed for or imagined as a communication device for everyday casual conversations and/or the transmission of sensitive auditory information that the COVID-19 pandemic

necessitated due to new distance requirements. “Having a rectangle with a talking head in it is not the right display for all of these other kinds of interactions,” she said. “While this has always been a concern for technologists, social distancing and the sudden spike in telepresence usage has made these issues to prioritize, creating opportunities in research and development and participatory projects.”

### IMTC

Aside from her research, Dr. Coleman also directs the Interactive Media Technology Center (IMTC) at Georgia Institute of Technology. IMTC is a great example of how interdisciplinary this field is becoming. Not situated in any one school at GT, the Center brings together faculty and students from across the university to tackle issues and solve problems. It is important for the design of technology to be informed by cultural studies, public policy, sociology, gerontologists and disability researchers and professionals. If we don’t, we can quickly find ourselves as the protagonist lighting for our humanity in some sort of “Black Mirror” episode. Interestingly, at IMTC, “Black Mirror” is a series of cautionary tales.

Researchers at IMTC design, develop, and test applications and technology, as well as train non-technologists or non-expert operators on use. Are you easily distracted by movement in your peripheral vision (i.e. your neighbor texting, tapping a pencil, or playing video games on their tablet) when trying to focus in on the biochemistry course lecture? With Cognitive AR aid the noise in your environment can be diminished and the voice of the lecturer enhanced to provide a better-quality learning experience. But what if this technology can be programmed to diminish the visual and audio information emitting from socially, economically, or politically undesirable subjects as registered through the justice system? While this may seem like a solution to the U.S. mass incarceration problem by reducing the cost of physical imprisonment, systemic racism and disproportionately high exoneration rates of people of color, this type of mechanism can only exacerbate an already huge problem. Experiences of





In 2007 a Georgia Tech team began researching what visual elements of an AR experience are needed to trigger realistic physiological and behavioral responses in users. This AR testbed presented the user with a scary virtual "pit" in the floor of an otherwise normal physical room. Ten years later the team built an updated version of the pit to explore how advancements in computer graphics have affected the users' experience.

2007

2017

alienation and "social death" as a result of enslavement and perpetuated by the racial capitalism would be intensified through a virtual exiling.

### OTHER PROJECTS - NASA, COGNITIVE AR, SMART HOMES

Therefore, research needs to be guided towards more positive outcomes for everyone. Dr. Anne McGlaughlin, Professor and Director of Learning, Aging, and Cognitive Ergonomics (LACElab) at North Carolina State University works with agencies like, the National Aeronautics and Space Administration program (NASA) to create taxonomies of variables that can affect the use of cognitive aids and toolkits to "support non-expert operators with complex tasks." Variations in technology literacy, expense, and disabilities or limitations are all factors that affect accessibility and how aids can be used, like in Smart Homes. Smart Homes is an area of increasing popularity for AR due to health and aging factors that produce people in need of assisted living. By incorporating AR technology in the home we, as a society, can aid in the security, comfort, and convenience of vulnerable communities and quickly improve quality of life. However, the level of efficiency and benefit depend on the technological literacy of the users. This is where training is the key determining factor.

### SPECIAL EFFECTS, AR, AND FILM INDUSTRY IN GEORGIA

Augmented Reality in film production is usually a part of the diegesis appearing as a really cool part of the mise-en-scene produced by the special effects (SFX, SPFX, FX or F/X) or visual effects (VFX) department. The availability of technology has made it easy for FX or VX artists to incorporate visual features into the storytelling. "A lot of that stuff actually looks better than what we do because it can be rendered off-line," says Coleman. The real-time/off-line divide depends on the rendering techniques and time constraints. AR requires real-time and super-fast rendering, while film production can use off-line, slower and more expensive techniques, with more precision and definition.

### TOP AR DEVELOPERS IN GEORGIA

Georgia is at the forefront of an 80 billion dollar gaming and entertainment industry due to Georgia's production tax incentives, venture capital funding programs, and leading research labs at GT, Savannah College of Art and Design, Georgia State University, and Emory University. Participatory studies attract a diverse group of people with different backgrounds, talent, interests, and professional affiliations. There is no doubt that our everyday lives will become more dependent on and influenced by

AR technology, from how we experience art and cultural programming to gaming designs in Stroke recovery programs.

AR and VR companies are also leading the nation in design and development. Spinning Rock, a Mixed Reality Studio, partners with artists and brands to produce AR experiences on Instagram and Snapchat, on the web, or installed in our physical environment. CaptivatAR: Human Experiences in Digital Reality creates AR treasure hunts attracting potential customers to physical stores and companies through geomarketing tools. Atlanta's film, television, and entertainment industries offer so many resources and opportunities for artists and creatives seeking to produce interesting and new content. Earlier this year Trick 3D studio and Music Matters Productions announced Music Matters XR Stage, Atlanta's first Extended Reality (XR) soundstage. With state-of-the-art technology and tech-savvy crew, Atlanta's film, television and entertainment industry will surely surpass other big cities in virtual production.

### GAMING - SERIOUS GAMES AND GAMING CONVENTIONS/ EXPOS IN ATLANTA

In addition to the production studios and resources, Atlanta hosts a number of Gaming expos and conferences attracting people from all over the world. Between DragonCon in September, MomoCon in May, Southern-Fried Gaming Expo in August, and DreamHack in November, there are plenty of fans and enthusiasts converging in this small city to trade secrets, share new technology, and geek over new applications, software, toys, and tools. From weekend gamers to professional technologists Atlanta has a range of activities and opportunities to support virtually any level of interests, like virtually. ©