

Introduction to Project

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Hello, and welcome to NEWMT, the Neurodiverse Educational Wearable Music Tech project

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We are a research practice partnership between Arizona State University and the Neurodiversity Education Research Center (or NERC, for short). We are creating long-term equity in computer science education by co-designing curriculum with fellow middle school teachers for neurodiverse and autistic students. This project uses Wearable Music Sensors to create embodied, cooperative learning experiences to support neurodiverse students' development of computational thinking (or CT) concepts and workplace skills.

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Our project aims to make neurodiversity a baseline, rather than an exception, for designing computational education curriculum. We use experiential workshops, labs, and culminating showcases to demonstrate how our curriculum can extend beyond the classroom. We want to increase learning for our diverse learners as well as future employment opportunities in the modern workplace. By combining STEAM education with computer science and the arts, such as music, performance, & expressive play, we bring accessibility to the classroom so that all types of learners can excel in their thinking, practice, and well-being.

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NEWMT is a suite of tools for collaborative, portable, mixed reality learning, which was developed by community stakeholders and experts in higher education. These hand-held, wearable devices free students and teachers from uninterrupted screen use and reintroduces spatial awareness and interaction wherever hybrid teaching methods are needed.

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Our project has progressed across three main stages. In our first stage, our experts worked with experienced teachers of neurodivergent middle school students (or Teacher Fellows) to co-design and pilot our wearable music sensors in the classroom to see how students would respond. In stage two, we refined our devices while also developing four lesson kits that centered computational thinking concepts and neurodiverse workplace skills. We also introduced our lessons to teachers and middle students at our interactive showcase, the Neurodiversity STEAM Fest. In the final stage, our Teacher Fellows will introduce our curriculum during workshops to new teachers for implementing into their classrooms, with the help of our research team. Additionally, we are working with employers to cultivate more neurodiversity-affirming workplace environments.

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Our culminating showcase, the Neurodiversity STEAM Fest, along with our workshops, are designed to introduce middle school students in our local communities to creative STEAM experiences through interactive, embodied technologies. During this event, students played with different music and sounds on our wearable sensors while also learning about the science behind the music, such as decomposition, pattern recognition, and abstraction. The STEAM Fest and the workshops help us learn about the students, their needs, and the kinds of technologies that can advance neurodiverse curriculum into mainstream science education.

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Our research team includes ten individuals from the ASU Herberger Institute for Design and the Arts, the Mary Lou Fulton Teachers College, the Neurodiversity Education Research Center, and the Science Prep Academy. In that sense, our interdisciplinary expertise ranges across education, communication, computer science, media studies, and the arts.

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Lastly, our Teacher Fellows include Jessica Strouth of Science Prep Academy, Jasmine Cano of Cholla Middle School, Kristin Kennedy of Sacaton Schools,

and Jonathan Perrone of the Arizona Educational Foundation. They will be your facilitators for our four STEAM workshops in this project. The next several videos will be introducing you to neurodiversity, computational thinking, wearable music tech, our lesson kits, and so much more. Thank you for listening and we hope you enjoy.