Abhishek Karwankar

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SUMMARY

Ph.D. student in Computer and Information Sciences with a research focus on Human-Computer Interaction (HCI), Information Retrieval, Accessible Technology Design, Tangible Media Systems, and Data-Driven Interfaces. I conduct mixed-methods research, integrating quantitative analysis with qualitative inquiry to study how interactive and intelligent systems support learning, creativity, and accessibility. My work involves designing and evaluating tangible and immersive interfaces, as well as developing machine learning systems for affective analysis, music interaction, and therapeutic applications. I have experience building end-to-end pipelines, from data collection and modeling to user-centered evaluation, and a strong record of cross-disciplinary publications and deployed prototypes.

EDUCATION

University of Delaware — Newark, DE
Ph.D. in Computer and Information Sciences — 2024 – Present
Advisor: Dr. Matthew Louis Mauriello

University of Delaware — Newark, DE
M.S. in Computer and Information Sciences — 2022 - 2024
Advisor: Dr. Matthew Louis Mauriello

Pune Institute of Computer Technology — Pune, India
B.Eng. in Electronics and Telecommunication — 2017-2021
Thesis: Bone Fracture Detection using RADTorch
Advisor: Dr. Rajendra Yelalwar

PEER REVIEWED PUBLICATIONS

1 paper in review at CHI, 1 at IJHCS

C4. **Abhishek Karwankar**, Elise Ruggiero, Daniel Stevens, and Matthew Louis Mauriello. 2026." ResonaVis: Visualizing Interactive Music Data to Support Reflective Music Composition for Therapeutic Contexts." *Transactions of Visualization and Graphics (Proc. VIS 2026)* https://doi.org/10.48550/arXiv.2608.10338 (To Appear).

C3. **Abhishek Karwankar**, Liam Stapley, Daniel Stevens, and Matthew Louis Mauriello. 2026. "CalmSet: A Domain-Specific Test Collection for Affective Music Retrieval for Children with ASD." In *Proceedings of the 49th International ACM SIGIR Conference on Research and Development in Information Retrieval* (SIGIR '26), July 20–24, 2026, Melbourne, VIC, Australia. ACM, New York, NY, USA, 8 pages. https://doi.org/10.1145/3805712.3808586.

C2. **Abhishek Karwankar**, Elise Ruggiero, Zoe Lipkin, Malika Karthik Iyer, Simon Brugel, Prerana Khatiwada, Daniel Stevens, and Matthew Louis Mauriello. 2025. "uCue: An Interactive Musical Interface to Enhance Formative Listening Experiences for Children with ASD." *Proceedings of the 24th Interaction Design and Children*. Association for Computing Machinery, New York, NY, USA, 340–357. https://doi.org/10.1145/3713043.3727053

C1. Wang, Qile*, Moath Erqsous*, Prerana Khatiwada, **Abhishek Karwankar**, Fatimah Mohammad Alhassan, Aishwarya Chandrasekaran, Benita Abraham, Faith Lovell, Andrew Anh Ngo, and Matthew Louis Mauriello. 2025. "Leveraging Large Language Models for Review Classification and Rating Estimation of Mental Health Applications". *Proceedings of the International AAAI Conference on Web and Social Media* 19 (1):2017-29. https://doi.org/10.1609/icwsm.v19i1.35916.

PATENTS

P1. Matthew Louis Mauriello, Daniel Stevens, Elise Ruggiero, & **Abhishek Karwankar.** (2025). *U.S. Patent Application No. 19/201,395 (Pending).*

LIGHTLY REVIEWED PUBLICATIONS

W1. **Abhishek Karwankar**, Evina Shingavi, Aayush Singh, Liam Stapley, Aastha Desai, Elise Ruggiero, Daniel Stevens, and Matthew Louis Mauriello. 2026. " Designing With an Ecosystem: Reflections on Co-Designing Sensory-Informed Music Technology with Children with ASD, Families, and Music Therapists". In *Designing With, Not For Workshop @ ASSETS'26* https://doi.org/10.5281/zenodo.22901011

AWARDS

- Open Data Impact Award for MHARD **[C1]** 2026
- ACM SIGACCESS Travel Award. 2026
- Finalist for the Google PhD Fellowship from the University of Delaware (1 among the top 4 selected). 2026
- Department Travel Award for Outstanding Conference Publications (VIS, SIGIR) 2026
- Outstanding Graduate Student Award for Recognition of Exceptional Promise in the Ph.D. Program with an Expectation of Continued Excellence in Research 2025
- Nomination for the Associate Membership in Sigma Xi, The Scientific Research Honor Society 2025
- Special Recognition for Outstanding Review DIS 2025
- UD CIS Distinguished Student Award 2024
- Special Recognition for Outstanding Review for CHI 2024
- Class Topper for Academic Year 2021

GRANTS AND FUNDING

G1. Music for Listeners with Autism: An Online Platform for Collecting Music Interaction Data from Children with Autism

University of Delaware, Institute of Engineering Drive Health – Seed Translational Research Project Award: $177,725
Role: Contributing Writer
PIs: Dr. Matthew Louis Mauriello (PI) and Dr. Daniel Stevens (Co-PI)

RESEARCH EXPERIENCE

Sensify Lab, University of Delaware Newark, DE
Graduate Research Assistant February 2023 – Present

- Led multi-phase user studies, visualization development, and technical implementations, providing empirical insights that shape HCI, accessibility, and therapeutic music research. **[C2-C5]**
- Designed and implemented a large-scale therapeutic music dataset for children with autism, integrating machine learning–based annotations (CLAP, GPT) with human-in-the-loop validation pipelines. **[C3]**
- Conducted formative studies in classroom environments to evaluate how interactive music technologies scaffold educational activities for children with ASD. **[C5]**
- Developed a visual-interactive dashboard for composers to analyze therapy session data through visualizations, supporting data-driven music composition. **[C4, P1]**
- Co-designed and evaluated a tangible modular musical interface enabling children with ASD to compose and modify songs, enhancing formative listening experiences. **[C2, P1]**
- Collaborated on applying LLMs for review classification and rating estimation of digital mental health applications. **[C1]**

INDUSTRY EXPERIENCE

_VOIS Pune, India
Graduate Engineer Trainee August 2021 – July 2022

- Designed and deployed **3 enterprise microservice modules** using RESTful APIs on AWS EKS Kubernetes.
- Optimized CI/CD pipelines in Jenkins, reducing deployment time by **30%** through containerized Docker workflows.
- Migrated **2 microservices** to the latest Spring Boot version, boosting system scalability and performance.

eGlobalDoctors LLC San Francisco, USA (Remote)
Software Engineer Intern June 2020 – July 2021

- Developed **15+ backend RESTful APIs** and database models with PostgreSQL.
- Built and deployed a full-stack health counseling platform that served **2,500+ users during COVID-19**.
- Collaborated with a **10+ Software Engineers and Doctors in a cross-functional team**, to build up the application ensuring system reliability with **95% uptime**.

Upcloud Technology Pvt Ltd Mumbai, India
Deep Learning Intern June 2020 – August 2020

- Developed predictive models for a Menstrual Cycle Tracker, with an estimation accuracy around **90%**.
- Designed adaptive alert systems that supported **real-time predictions for 20+ users** in pilot testing.
- Reduced training time using model optimization techniques.

TEACHING EXPERIENCE

University of Delaware Newark, DE

Teaching Assistant, CISC482/682 Fall 2026

- Instructor: Dr. Matthew Louis Mauriello.

Guest Lecturer, CISC655 April 2026

- Instructor: Dr. Kathleen McCoy.
  Topic: **"Addressing Paper Reviews and Writing Rebuttals"**

Guest Lecturer, CISC655 April 2025

- Instructor: Dr. Kathleen McCoy.
  Topic: **"Addressing Paper Reviews and Writing Rebuttals"**

SERVICE

Program Committee

- ACM Conference on Research and Development in Information Retrieval (SIGIR) 2026

Reviewer

- ACM Conference on Human Factors in Computing Systems (CHI) 2024 - Present
- ACM Interaction Design and Children (IDC) 2024 - Present
- IEEE Transactions on Visualization and Computer Graphics 2026
- Transactions of the International Society for Music Information Retrieval 2026
- ACM Conference on Research and Development in Information Retrieval (SIGIR) 2026
- International Journal of Human-Computer Studies (IJHCS) 2026
- ACM Conference on Mobile Human-Computer Interaction (MobileHCI) 2026
- ACM Conference on Computer-Supported Cooperative Work & Social Computing (CSCW) 2025
  ACM Designing Interactive Systems (DIS) 2025

Community Newark, DE

Brennen Elementary School 2024-Present

- Participated in the Brennen School's Artapalooza event where we hosted a hands-on booth featuring our interactive music prototype uCue for children with ASD. Activities included guided play sessions and opportunities to engage with a live musical choir and other sensory-rich experiences.

Mentorship

- **Undergraduate Students:**
  - **Current:** Elise Ruggiero, Liam Stapley, Aastha Desai, Edwin Kodiji, Angelina Xu
  - **Past:** Simon Brugel, Malika Iyer, Trung Nguyen, Christopher Bennet, Zoe Lipkin, Connor Penhale, Ryan Schaffer, Guru Nayak, Katelyn Attieh, JR Chaplin
- **High School Students:**
  - **Current:** Aayush Singh, Evina Shingavi

CONFERENCE PRESENTATIONS

CP5. " ResonaVis: Visualizing Interactive Music Data to Support Reflective Music Composition for Therapeutic Contexts " at the International IEEE Visualization Conference (VIS) 2026 in Boston, USA, November 8-13, 2026.

CP4. "Designing Sensory-Informed Generative AI Systems for Music Composition and Neurodiverse Listening" at the International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS) 2026 in Porto, Portugal, October 25-28, 2026.

CP3. "Consensus-Anchored Expansion for Noise-Resilient Re-ranking" at the ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR) 2026 conference in Melbourne, VIC, Australia July 20-24 2026. On behalf of Nischal Subedi *et al.*

CP2. "CalmSet: A Domain-Specific Test Collection for Affective Music Retrieval for Children with ASD" at the ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR) 2026 conference in Melbourne, VIC, Australia July 20-24 2026.

CP1. "uCue: An Interactive Musical Interface to Enhance Formative Listening Experiences for Children with ASD" at the ACM Interaction Design and Children (IDC) 2025 conference in Reykjavik, Iceland, June 23-26 2025.

POSTER PRESENTATIONS

PP2. "uCue: An Interactive Musical Interface to Enhance Formative Listening Experiences for Children with ASD" at the UD AI4Health Day, University of Delaware, Jan 31, 2025.

PP1. "Music for Autistic Listeners: A Music Theory Community Engagement Project." at the CIS 60th Anniversary Celebration, University of Delaware, May 4-5, 2024.

PROTOTYPE DEMONSTRATIONS

PD7. "Music for Autistic Listeners: A Music Theory Community Engagement Project." University of Delaware, Newark, DE, Avon Grove High School. April 1, 2026.

PD6. "Music for Autistic Listeners: A Music Theory Community Engagement Project." University of Delaware, Newark, DE, Visiting Professor: Dr. Stephen MacNeil. November 21, 2025.

PD5. "Music for Autistic Listeners: A Music Theory Community Engagement Project." Artapalooza. Brennen School, Newark, DE, April 16, 2025.

PD4. "Music for Autistic Listeners: A Music Theory Community Engagement Project." University of Delaware, Newark, DE, Visiting Professor: Dr. Adam Perer. March 21, 2025.

PD3. "Music for Autistic Listeners: A Music Theory Community Engagement Project." University of Delaware, Newark, DE, Visiting Professor: Dr. Parastoo Abtahi. November 15, 2024.

PD2. "Music for Autistic Listeners: A Music Theory Community Engagement Project." UD Inventors Recognition. University of Delaware, October 22, 2024.

PD1. "Music for Autistic Listeners: A Music Theory Community Engagement Project." Artapalooza. Brennen School, Newark, DE, April 19, 2024.

SKILLS

Programming: C, C++, Java, Python, JavaScript, MATLAB, C#, .Net, HTML/CSS
Frameworks: Keras, TensorFlow, PyTorch, Flask, Docker, Unity3D, Angular, NodeJS, GIT, REST, Qualtrics
Databases: MySQL, PostgreSQL, Oracle, Firebase
Cloud: AWS, Azure, Kubernetes, Heroku
UX Research: Mixed-Methods Research, Usability Testing, Survey & Interview Design, Thematic Analysis, Visualization Evaluation, Accessibility Heuristics, IRB & Ethical Research Practices

MEDIA

- Invention and community engagement help children with autism enjoy music: https://www.udel.edu/udaily/2026/october/innovation-ambassador-daniel-stevens-matthew-mauriello/
- CalmSet: A Dataset for Finding Calming Music for Children with Autism: https://www.growkudos.com/publications/10.1145%25252F3805712.3808586/reader
- ResonaVis turns music therapy into data-driven art: https://audionerds.org/resonavis-turns-music-therapy-into-data-driven-art/