Idunnuoluwa A. Adeniji

Chicago, IL | Email | LinkedIn | Website

SUMMARY

CS PhD student at the University of Illinois Chicago, conducting research at the Argonne Leadership Computing Facility (ALCF & Electronic Visualization Laboratory. Specializes in GPU-accelerated scientific visualization and HCI for large-scale HPC data. Designer & Developer of OVA (OpenCosmo Visualization Application), a WebGPU-accelerated particle viewer sustaining 120 FPS through 82.6M cosmological particles.

TECHNICAL SKILLS

Languages & Tools: Python, Java, C++, C#, R, JavaScript, HTML, Unity, Babylon.js, ParaView, Maya, Adobe Photoshop

Web & GPU Technologies: WebGPU, WebGL, WGSL, WebAssembly, WebXR, Apache Parquet, Apache Arrow

Specializations: Scientific visualization, VR/AR/MR, 3D rendering, High-Performance Computing, GPU compute shaders, Human-Computer Interactions, Data analysis

Core Strengths: Critical thinking, Problem solving, Creativity, Team collaboration, Communication, Time management, Project Management

PROFESSIONAL EXPERIENCE

Research Aide – ALCF Visualization Team, Argonne National Laboratory & Electronic Visualization Laboratory | 2025 – Present

- Migrated OVA's rendering pipeline from WebGL2 to WebGPU, sustaining 120 FPS through 82.6M cosmological particles at roughly half the heap usage of the WebGL implementation
- Implemented GPU compute shaders (WGSL) for per-particle color mapping, LOD decimation, and GPU histogram generation
- Leads architectural decisions and maintenance of the dual-canvas WebGPU/Babylon.js rendering pipeline
- Conducts performance-focused research on WebGPU-based rendering, interface redesign, and browser-side HPC visualization

Research Aide – ALCF Visualization Team, Argonne National Laboratory & Electronic Visualization Laboratory | 2025

- Designed and developed OVA — a fully client-side, zero processing, GPU-accelerated 3D browser-based viewer — achieving 4.3× less heap and 52.9M particle capacity
- Collaborated with the cosmology team to integrate domain-specific visualization features
- Presented results at the CELS Division poster session and the eScience conference

Research Aide – ALCF Visualization Team, Argonne National Laboratory | 2023 – 2024

- Created VR interactions for halo datasets and built immersive virtual environments for efficient data analysis
- Applied ParaView and Unity for visualization of high-performance cosmology simulations
- Presented research at the Sandia XR Conference and CELS Division poster session

Teaching Assistant – University of Illinois at Chicago | 2025

- Led two lab sections for CS 107 (Intro to Computing and Programming)
- Guided students in debugging, problem-solving, and project development
- Held office hours, graded assignments, and proctored exams

Student Assistant – Visualization and Immersive Studio for Education and Research (VISER), Kean University | 2022–2024

- Designed and managed visualization projects using Zignage and Adobe Photoshop
- Supported troubleshooting and daily operations of the VISER lab
- Assisted in public demonstrations and outreach activities

EDUCATION

University of Illinois at Chicago | 2025 – Present
Ph.D. in Computer Science

Kean University | 2021 – 2024
B.Sc. in Computational Science and Engineering · Summa Cum Laude · Honors Distinction in Research
Dean's List (SP 2022 – FA 2024)

PUBLICATIONS

[1] Adeniji, I.A., Insley, J., Papka, M.E.. *"OpenCosmo Visualization Application: Migrating a Client-Side Cosmological Particle Viewer from WebGL to WebGPU."* IEEE CLUSTER 2026. **(under review)**

[2] Adeniji, I.A., Insley, J., Han, M., et al.. *"Interactive Exploration of HACC Cosmology Data using WebXR."* IEEE eScience 2025. (Paper)

[3] Adeniji, I.A., Insley, J., Joiner, D., et al.. *"Exploring Large-Scale Scientific Data in Virtual Reality."* IEEE LDAV 2024. (Paper)

[4] Adeniji, I.A., et al.. *"Using Unity for Scientific Visualization as a Course-based Undergraduate Research Experience."* Journal of Computational Science Education, 2024. (Paper)

[5] Adeniji, I.A., Insley, J., Papka, M.E.. *"A Client-Side Architecture for Scalable Ingestion and Interactive Visualization of Cosmological Particle Data."* GCASR 2026. (Poster)

[6] Wells, P. R., et al. (incl. **Adeniji, I. A.**). "OpenCosmo: Community Portal and Analysis Framework for Flagship Cosmological Simulations." arXiv:2607.16059, 2026. (Paper)

LEADERSHIP & ACTIVITIES

Membership: IEEE, IEEE Computer Society, IEEE Women in Engineering, IEEE VGTC, National Society of Collegiate Scholars

Presenter: IEEE eScience 2025, GCASR 2026, Sandia XR Conference, Argonne CELS Division Poster Session, Argonne Learning on the Lawn, CAAV, KEAN Research Days

Recognition: Argonne National Laboratory Core Values Shout-Out (awarded by Joseph Insley and Victor Mateevitsi, 2026)

Scholarships: Kean STEM Scholarship, Bodzioch Advancement of Science Scholarship

Programs: Sustainable Research Pathways participant

Outreach: Argonne Family Preview Day & Open House volunteer, Argonne coding camp volunteer, Tutoring Chicago math tutor, Kean Cougar Volunteer