Hal Brynteson

halbrynteson@gmail.com | 815-751-6725 | linkedin.com/in/hal-brynteson | github.com/halBRY

Education

Northern Illinois University, BS in Computer Science, GPA: 3.7 Aug 2018 – Dec 2022

- **Coursework:** Data Structures, Computer Architecture, Computational Theory, Data Visualization

University of Illinois Chicago, MS in Computer Science, GPA: 4.0 Jan 2023 – May 2025

- **Coursework:** Computer Graphics, Virtual Reality, Computer Vision, Visual Data Science

Experience

Graduate Research Aide, Argonne National Laboratory – Lemont, IL May 2023 – Current

- Developed advanced robotics simulation methods, resulting in a digital twin development methodology that leverages Virtual Reality (VR) on Windows and Linux.
- Developed pipeline to reconstruct the hardware state of a robotic arm using an optical tracking system.
- Lead team of Undergraduate researchers to increase development speed and foster research environment.
- Presented work at 3 academic conferences and research symposiums.

Graduate Assistant, University of Illinois Chicago – Chicago, IL Jan 2023 – Current

- Researched novel methods in scientific visualization and computer graphics at the Electronic Visualization Laboratory.
- Developed immersive applications for virtual reality headsets and CAVEs.
- Communicated research and hardware capabilities to investors, sponsors, and administration.
- Mentored Undergraduate researchers through the Early Research Scholars Program(ERSP) program to develop a WebXR extension for the CAVE2.

Research Aide, Argonne National Laboratory – Lemont, IL May 2020 – July 2022

- Collaborated with multidisciplinary team to develop scientific data visualization pipeline for 500+ GB data sets.
- Generated visualizations rendered using 100+ node High Performance Computing (HPC) resources.
- Developed interactive scientific data visualization in Virtual and Augmented Reality.

Publications

Thomas Marrinan, Ethan Honzik, Hal L. N. Brynteson, and Michael E. Papka. 2024. **Image Synthesis from a Collection of Depth Enhanced Panoramas: Creating Interactive Extended Reality Experiences from Static Images.** doi.org/10.1145/3639701.3656312

Projects

Immersive Stars and Skycultures Project Webpage

- Created an immersive VR application to visualize 300,000+ points of star field data in real-time at 60 FPS.
- Leveraged GPU programming to optimize point cloud rendering in Unity 3D for virtual reality.
- Tested and developed virtual reality applications for a cluster rendering environment of 4 nodes with 22 GPUs.

RPL Job Status Dashboard Project Repository

- Performed a detailed requirements analysis for data visualization dashboard.
- Communicated with clients to develop a functional specification for a data visualization dashboard.
- Conducted user studies and incorporated user feedback into final product.

Skills

Languages: C++, C, C#, Python, R, JavaScript, GLSL, HLSL, PHP, SQL
Graphics Libraries: OpenGL, WebGL, WebXR, Three.js, D3.js, Vulkan, The Visualization Toolkit
Graphics Software: Unity, Unreal Engine, NVIDIA Omniverse, Maya, Blender, Houdini, V-Ray, ParaView, AutoCAD
Robotics: Robot Operating System (ROS/ROS2), NVIDIA Isaac Sim, Gazebo, MoveIt, Arduino
Other: MPI, OpenMP, CUDA, Docker