

Jin Heo

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RESEARCH FOCUS AND OBJECTIVE

My research bridges distributed systems and immersive multimedia to address the increasing computational demands of real-time services, especially in resource-constrained settings. I design and develop efficient system architectures and optimization techniques that enhance resource efficiency, scalability, and user experience for high-load multimedia use cases, including XR and cloud gaming.

PROFESSIONAL EXPERIENCE

DOLBY LABORATORIES	Atlanta, GA
Senior Researcher	Aug 2025 - Present
<ul style="list-style-type: none">Contributing to advanced content adaptation methods driven by user engagement metrics to enhance personalized viewing experiences and retention on streaming platforms.Leading the design and implementation of a scalable, cloud-based data pipeline for collecting and processing multi-source data (QoS, user interaction, ML-derived content insights), enabling personalized content adaptation strategies.	
GEORGIA INSTITUTE OF TECHNOLOGY	Atlanta, GA
Graduate Research Assistant	Aug 2019 - Aug 2025
<ul style="list-style-type: none">Designed an adaptive resource management system to dynamically balance server-side rendering cost against user-perceived quality in demanding cloud gaming workloads [1].Architected and implemented a low-latency, soft real-time inference serving system for XR perception models, serving more users with the same resource footprint on the resource-constrained server [2].Developed a distributed pipeline processing system for flexible distribution of XR workloads, significantly improving throughput and reducing pipeline latency [4, 7].	
DOLBY LABORATORIES	San Francisco, CA
Research Intern	May 2024 - Aug 2024
<ul style="list-style-type: none">Developed a parser for the Universal Scene Description (USD) standard of 3D assets to facilitate real-time content handling.Designed a partial query and retrieval method to enable efficient streaming of interactable 3D assets following the USD standard.	
AT&T LABS	Austin, TX
Research Intern	May 2023 - Aug 2023
<ul style="list-style-type: none">Developed a fast-prototyping framework for a city-scale digital twin in Unity 3D to simulate wireless network performance of AT&T's base stations.Published the resulting research on the digital-twin framework [3].	
ERICSSON RESEARCH	Santa Clara, CA
Research Intern (remote)	Mar 2021 - Dec 2022
<ul style="list-style-type: none">Developed a LiDAR point cloud compression method to enable real-time LiDAR data processing on servers.Developed an interpolation method to recover the lost information by lossy compression, resulting in an international patent application (WO2024073084A1).Published the resulting research findings [5, 6].	
UNIVERSITY OF CALIFORNIA, IRVINE	Irvine, CA
Research Assistant (Undergraduate Research Opportunities Program)	Jul 2017 - Jan 2018
<ul style="list-style-type: none">Contributed to the design and implementation of a framework for FPGA acceleration of computer vision algorithms.Focused on implementing the framework using the OpenVX graph pipeline, resulting in a publication [8].	
COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION (CSIRO)	Brisbane, Australia
Research Assistant (Undergraduate Research Opportunities Program)	Sep 2016 - Feb 2017
<ul style="list-style-type: none">Engineered and implemented an optimized network flooding algorithm for efficient broadcasting in Wireless Sensor Networks (WSNs).Validated performance by deploying the implementation onto battery-constrained sensor devices in an Australian field area.	
MILITARY SERVICE, REPUBLIC OF KOREA ARMY	Busan, South Korea
IT Specialist (System Administration)	Nov 2011 - Aug 2013
<ul style="list-style-type: none">Managed and maintained the hospital's on-premise IT infrastructure and medical data platform, ensuring 24/7 operation and data integrity.Developed and deployed a monitoring tool to track the status and usage of 400+ PC/IT assets across the hospital.	

PUBLICATION

1. **Heo, J.**, Wang, V., Bhardwaj, K. and Gavrilovska, A., 2026, May. *Stimpack: An Adaptive Rendering Optimization System for Scalable Cloud Gaming*. -- To appear in The 23rd USENIX Symposium on Networked Systems Design and Implementation (NSDI '26).
2. **Heo, J.** and Gavrilovska, A., 2024, December. Poster: *Adapting XR Perception Serving for Edge Server Scalability*. In 2024 IEEE/ACM Symposium on Edge Computing (SEC) (pp. 518-520). IEEE.
3. **Heo, J.**, Novlan, T., Akoum, S. and Gavrilovska, A., 2024, December. *GT-Craft: A Framework for Fast Prototyping Geospatial-Based Digital Twins in Unity 3D*. In 2024 IEEE/ACM Symposium on Edge Computing (SEC) (pp. 395-401). IEEE.
4. **Heo, J.**, Bhardwaj, K. and Gavrilovska, A., 2023, June. *FlexXR: A system enabling flexibly distributed extended reality*. In Proceedings of the 14th Conference on ACM Multimedia Systems (pp. 1-13).
5. **Heo, J.**, Phillips, C. and Gavrilovska, A., 2022, December. *FLiCR: A fast and lightweight lidar point cloud compression based on lossy RI*. In 2022 IEEE/ACM 7th Symposium on Edge Computing (SEC) (pp. 54-67). IEEE.
6. **Heo, J.**, Phillips, G., Brodin, P.E. and Gavrilovska, A., 2022, December. Poster: *Making Edge-assisted LiDAR Perceptions Robust to Lossy Point Cloud Compression*. In 2022 IEEE/ACM 7th Symposium on Edge Computing (SEC) (pp. 293-295). IEEE.
7. **Heo, J.**, Bhardwaj, K. and Gavrilovska, A., 2021, December. Poster: *Enabling flexible edge-assisted XR*. In 2021 IEEE/ACM Symposium on Edge Computing (SEC) (pp. 465-467). IEEE.
8. Taheri, S., **Heo, J.**, Behnam, P., Chen, J., Veidenbaum, A. and Nicolau, A., 2018, April. *Acceleration framework for FPGA implementation of OpenVX graph pipelines*. In 2018 IEEE 26th Annual International Symposium on Field-Programmable Custom Computing Machines (FCCM) (pp. 227-227). IEEE.

EDUCATION

GEORGIA INSTITUTE OF TECHNOLOGY <i>Doctor of Philosophy in Computer Science; GPA: 4.0</i>	Atlanta, GA 2019 - 2025
AJOU UNIVERSITY <i>Bachelor of Science in Computer Engineering; Summa Cum Laude</i>	Suwon, South Korea 2016 - 2018

TECHNICAL SKILLS

- Programming Languages & Core Systems: C, C++, Python, Linux, Git
- Distributed Systems & Infrastructure: AWS, GCP, Docker, gRPC, Apache Spark, Apache Kafka, ZMQ, Databricks, CMake, Makefiles
- Multimedia, ML & Scientific Computing: Unity, Unreal Engine, FFmpeg, GStreamer, OpenCV, OpenGL, PyTorch, Scikit-learn, Point Cloud Library

ADDITIONAL ACTIVITIES

- Academic Service & Teaching
 - External Reviewer for IEEE Open Journal of the Communications Society (OJ-COMS), 2024.
 - Head Teaching Assistant for Advanced Operating Systems (CS6210/4210) at Georgia Tech (Spring 2024, Spring 2022).
- Open-Source Contributions
 - RaftLib: Resolved a pipeline scheduler issue to enhance resource efficiency in the streaming library.
 - uvgrtp: Added build system support for Linux installation using pkg-config.
- Selected Presentations/Talks
 - Adaptive XR Serving from the Edge (Principles and Practice of Scalable Systems (PPoSS) Workshop 2023)
 - MEC-based Edge-assisted XR" (Application Driving Architecture (ADA) Symposium 2022)
 - Enabling Flexible Edge-assisted XR" (TECHCON of Application Driving Architecture (ADA) Center 2021)