YOONSANG KIM

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RESEARCH INTERESTS

I aim to design intelligent XR interfaces for adaptive data representation and visualization across realities. I leverage multimodal AI agents to support personalized, cross-entity (Human/AI), and multi-sensory communication, and privacy-aware ubiquitous XR.
Keywords: AR | MR | XR | Personal Context-aware | Human-centered AI | Ubiquitous Computing | User Interface | User Privacy

EDUCATION

Stony Brook University — Stony Brook, NY, USA
Ph.D. Candidate., Computer Science — *Aug. 2020 – Present*
Advisor: Arie E. Kaufman

Stony Brook University — Stony Brook, NY, USA
M.S., Computer Science — *Aug. 2018 – May. 2020*
Advisor: Xiaojun Bi, Arie E. Kaufman

Darmstadt University of Applied Sciences — Darmstadt, Germany
Exchange Student in B.S., Computer Science — *Mar. 2015 – Jul. 2015*
(via Soongsil University Program)

Soongsil University — Seoul, Korea
B.S., Computer Science and Engineering — *Mar. 2010 – Feb. 2017*

RESEARCH EXPERIENCE & DETAILS

Stony Brook University — Stony Brook, NY, USA
Research Assistant — *May. 2022 – Present*

- Designed object-centric **spatial graphs** (**scene graph**) to disambiguate referents with LLM **agents**
- Researched mapping of embodied interactions **(speech and gesture)** to **spatial** representations in AR
- Designed **socially unobtrusive** conversational AI **assistant** for glassed-form factor **wearable XR**
- Designed personalized **ubiquitous**, **spatial prior-aware** XR system with multimodal LLM
- Prototyped interactive recommender system using **RAG LLM** for **personalized** AR experience
- Conduced research on **personal context-aware** system for cross-virtuality (cross-device, remote)
- Researched **conversational, cross-reality** (AR-to-VR) interface for remote **collaboration**
- Investigated **spatial computing** (PC-2D vs MR) for network security apps with Apple Vision Pro
- Conducted **controlled** and "**in-the-wild**" (N=150+) evaluations deriving patterns across subjects
- Designed end-to-end **analytics** framework for user behaviors in XR environments (AR, VR, MR) using **multimodal (visual, audio, interaction) cues**
- Implemented hand-held system (tablet, mobile) for **collaborative** multi-user AR experience
- Developed a novel design of OS-level **access control** system in AR for **privacy-protection**
- Explored local & remote **rendering** of **mapping** gigapixel/high dimensional data to **Tiled displays**
- Studied open-vocabulary **world mapping** & **synchronization** of XR **digital twin** coordinate systems

Graduate Student Researcher — Stony Brook, NY, USA — *– May. 2020*

- Studied platform/**device-agnosticism** for scientific (volume rendering) /information **visualization**
- Explored the applications of **gesture-based input** in Virtual Reality using Leap motion
- Designed Shark² algorithm (shape/location channel) for Unity C# to utilize across **multi-platforms**

Soongsil University — Seoul, Korea
Undergraduate Student Researcher — *– Jul. 2018*

- Developed **hand gesture recognizer** for MR **remote desktop** settings
- Developed an **immersive remote** desktop screen **network streaming** system in C and Unity C# utilizing virtualized graphics card and WINAPI hooking

PUBLICATIONS

Peer-Reviewed Conference Papers

C6. **Yoonsang Kim**, Devshree Jadeja, Divyansh Pradhan, Yalong Yang, Arie Kaufman.
SpeechLess: Micro-utterance with Personalized Spatial Memory-aware Assistant in Everyday Augmented Reality.
In *Proceedings of the IEEE Conference on Virtual Reality and 3D User Interfaces.* **(IEEE VR 2026)**

C5. **Yoonsang Kim**, Divyansh Pradhan, Devshree Jadeja, Arie Kaufman.
From Speech-to-Spatial: Grounding Utterances on Live Shared View with Augmented Reality.
In *Proceedings of the IEEE Conference on Virtual Reality and 3D User Interfaces.* **(IEEE VR 2026)**

C4. Matthew Castellana, Chahat Kalsi, **Yoonsang Kim**, Saeed Boorboor, Arie Kaufman.
AuxiScope: Handheld Augmented Reality Tablet as an Auxiliary Display for Large-Scale Display Systems.
In *Proceedings of the IEEE International Symposium on Mixed and Augmented Reality.* **(IEEE ISMAR 2025)**

C3. **Yoonsang Kim,** Sanket Goutham, Amir Rahmati, Arie Kaufman.
Erebus: Access Control for Augmented Reality Systems.
In *Proceedings of the USENIX Conference on Security Symposium.* **(USENIX Security 2023)**

C2. Yu-Jung Ko, Hang Zhao, **Yoonsang Kim**, IV Ramakrishnan, Shumin Zhai, Xiaojun Bi. **Honorable Mention Award** 🏆
Modeling Two-Dimensional Touch Pointing.
In *Proceedings of the ACM Symposium on User Interface Software and Technology.* **(ACM UIST 2020)**

C1. Suwen Zhu, **Yoonsang Kim**, Jingjie Zheng, Jennifer Yi Luo, Liuping Wang, Xiangmin Fan, Feng Tian, Xiaojun Bi.
Using Bayes' Theorem for Command Input: Principle, Models, and Applications.
In *Proceedings of the ACM Conference on Human Factors in Computing Systems.* **(ACM CHI 2020)**

Peer-Reviewed Journal Articles

J4. **Yoonsang Kim**, Zainab Aamir, Mithilesh Singh, Saeed Boorboor, Klaus Mueller, Arie Kaufman.
Explainable XR: Understanding User Behaviors of XR Environments using LLM-assisted Analytics Framework.
IEEE Transactions on Visualization and Computer Graphics. **(IEEE TVCG 2025)**

J3. Saeed Boorboor, **Yoonsang Kim**, Ping Hu, Josef M Moses, Brian A Colle, Arie Kaufman.
Submerse: Visualizing Storm Surge Flooding Simulations in Immersive Display Ecologies.
IEEE Transactions on Visualization and Computer Graphics. **(IEEE TVCG 2023)**

J2. Saeed Boorboor, Matthew Castellana, **Yoonsang Kim**, Zhutian Chen, Johanna Beyer, Hanspeter Pfister, Arie Kaufman.
VoxAR: Adaptive Visualization of Volume Rendered Objects in Optical See-Through Augmented Reality.
IEEE Transactions on Visualization and Computer Graphics. **(IEEE TVCG 2023)**

J1. **Yoonsang Kim**, Geunyeop Ha, Sangjun Lee.
Flexible Remote-Control Application for Virtual Reality using Virtual Graphics Driver and OpenCV.
International Journal of Applied Engineering Research. **(IJAER 2017)**

Peer-Reviewed Workshop & Posters

W4. **Yoonsang Kim**, Yalong Yang, Arie Kaufman.
Memento: Towards Proactive Visualization of Everyday Memories with Personal Wearable AR Assistant.
In *Proceedings of the IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops.* **(IEEE VRW 2026)**

W3. **Yoonsang Kim**, Swapnil Dey, Arie Kaufman.
Evaluating Spatialized Auditory Cues for Rapid Attention Capture in XR.
In *Proceedings of the IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops.* **(IEEE VRW 2026)**

W2. **Yoonsang Kim,** Saeed Boorboor, Amir Rahmati, Arie Kaufman.
Design of Privacy Preservation System in Augmented Reality.
IEEE Symposium on Visualization for Cyber Security. **(IEEE VizSec 2021)**

W1. Geunyeop Ha, **Yoonsang Kim**, Dongyeon Lee, Sangjun Lee.
Design and Implementation of Remote-Control Application in Virtual Reality Environment using Virtual Graphic Driver and OpenCV.
Korean Institute of Information Scientists and Engineers. **(KIISE 2016)**

SERVICES

Reviewer

IEEE International Symposium on Mixed and Augmented Reality **(ISMAR)**	2025
IEEE Conference on Virtual Reality and 3D User Interfaces **(VR)**	2025
IEEE Pacific Visualization Conference **(PacificVis)**	2025
ACM Conference on Human Factors in Computing Systems **(CHI)**	2025
ACM Symposium on User Interface Software and Technology **(UIST)**	2025
ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies **(IMWUT)**	2025
ACM Symposium on Virtual Reality Software and Technology **(VRST)**	2025
ACM Interactive Surfaces and Spaces **(ISS)**	2025
ACM Symposium on Spatial User Interaction **(SUI)**	2025
ACM Designing Interactive Systems **(DIS)**	2026

Leadership

Mentoring Graduate Students for Independent Study Research @ Stony Brook University — 2020 - Present
Supervised and collaborated with 4 undergraduates and 17 graduate students on: Wearable/Hand-held AR, Multi-sensory Perception, Context-aware Interface, AR Security, Cross-reality Collaboration, SLAM.

Graduate Mentor of K-12 Energy Tech @ Center of Excellence in Wireless and Information Technology — 2024 - 2025
Engaged with over 1,400 New York state high school students introducing immersive technologies.

KidOYO Summer Mentoring Program @ Stony Brook University — 2022
Mentored 2 high school students on designing a remote visualization tool with hand-held AR and tiled display.

Exchange Student Program Mentor @ Soongsil University — 2016
Assisted incoming students of exchange student program to settle into local community and academic life.

HONORS & AWARDS

Recognized for Outstanding Review @ IEEE ISMAR 2025	2025
Honorable Mention Award @ ACM UIST 2020	2020
Best Data Science/AI Award. SBU Hackathon @ Stony Brook University	2019
Dean's Award. Software Competition @ Soongsil University	2016
National Semi-Finalist. Microsoft Imagine Cup @ Microsoft Korea	2016
Gold Award. IT·BT Software Convergence Engineering Competition @ Soongsil University	2015

MEDIA & EXPOSURE

Weathering the Storm: How SBU's Climate Research Is Shaping Long Island's Future @ Stony Brook University News	2025
Naval Science and Technology: Growing Energy Resiliency Through Research @ Future Force Magazine (Vol. 9, No. 1)	2023
Reality Deck Helps Researchers Visualize and Predict Storm Surge Emergencies @ Stony Brook University News	2022

TEACHING EXPERIENCE

Instructor (CSE566: Virtual Reality) @ Stony Brook University	2026
Graduate Course Teaching Assistant (CSE566: Virtual Reality) @ Stony Brook University	2020 - 2023
Graduate Course Teaching Assistant (CSE564: Visualization) @ Stony Brook University	2021
Graduate Course Teaching Assistant (CSE518: Human Computer Interaction) @ Stony Brook University	2021
Undergraduate Teaching Assistant (CSE320: Systems Fundamental II – Operating System) @ Stony Brook University	2020

PROFESSIONAL EXPERIENCE

[Will-be-disclosed-in-the-near-future] (Expected) — Summer 2026
Research Intern.

31st Infantry Division Human Resources (Financial & Personnel Administrator) — 2011 - 2013
Served military duty at the HQ in the Engineering battalion at Republic of Korea Army.

TECHNICAL SKILLS

Language	C#, Python, C, C++, HLSL, Compute Shader, JavaScript, Java, Go
Tool/Framework/API	Unity, AR Foundation (ARCore/ARKit; Android/iOS/Meta Horizon OS/Vision OS), Cursor AI, OpenAI/Gemini API, Vuforia SDK, OpenGL, D3.js, WINAPI, MFC, WPF, MySQL, DB2, HTML, CSS

LANGUAGES

Korean	Native
English	Full professional working proficiency: TOEFL 110 (27/27/28/28)