

# YOONSANG KIM (Academic advisor: Dr. Arie E. Kaufman)

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## RESEARCH INTERESTS

Multimodal interaction in XR | Cross-reality | Personalized Context-aware systems | Ubiquitous XR | Prototyping |

XR Security and privacy

**Keywords:** AR | MR | XR | Visuospatial | Personal Context-aware | Human-centered AI | Ubiquitous Computing | User Interface | Security/Privacy

## EDUCATION

### Stony Brook University

Ph.D. Candidate., Computer Science (GPA: 3.83/4)

Stony Brook, NY

(Aug. 2020 – Present)

### Stony Brook University

M.S., Computer Science (GPA: 3.68/4)

Stony Brook, NY

(Aug. 2018 – May. 2020)

### Darmstadt University of Applied Sciences

Exchange Student (via Soongsil University Program)

Darmstadt, Germany

(Mar. 2015 – Jul. 2015)

### Soongsil University

B.S., Computer Science and Engineering

Seoul, Korea

(Mar. 2010 – Feb. 2017)

## RESEARCH AND TECHNICAL EXPERIENCE

### Stony Brook University

Research Assistant

Stony Brook, NY

May. 2022 – Present

- Researched object-centric **spatial** relationships (**scene graph**) to disambiguate referents with LLM **agents**
- Researched the 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
- Conducted 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 applications 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 the local & remote **rendering of mapping** gigapixel/high dimensional data to **Tiled displays**
- Studied open-vocabulary **world mapping** and **synchronization** of XR **digital twin** coordinate systems

Graduate Student Researcher

Stony Brook, NY

– May. 2020

- Studied platform/**device-agnostic** properties for scientific (volume rendering) /information **visualization**
- Explored the applications of **gesture-based input** in Virtual Reality using Leap motion
- Designed Shark<sup>2</sup> algorithm (shape/location channel) for Unity C# to utilize across **multi-platforms**

### Soongsil University

Undergraduate Student Researcher

Seoul, Korea

– 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

- **Yoonsang Kim**, Divyansh Pradhan, Devshree Jadeja, Arie Kaufman.  
From Speech-to-Spatial: Grounding Utterances on Live Shared View with Augmented Reality. (**Under review**).
- **Yoonsang Kim**, Devshree Jadeja, Divyansh Pradhan, Yalong Yang, Arie Kaufman.  
Memento: Spatial Remembrance of Routine Memories with Conversational Personal Assistant in XR. (**Under review**).
- Doris Gutierrez, **Yoonsang Kim**, Amir Rahmati, Arie Kaufman.  
Mixed Reality vs. 2D PC Interface for Network Security Tasks: A Comparative Study. (**Under review**)
- Matthew Castellana, Chahat Kalsi, **Yoonsang Kim**, Saeed Boorboor, Arie Kaufman.  
[AuxiScope: Handheld Augmented Reality Tablet as an Auxiliary Display for Large-Scale Display Systems](#). IEEE ISMAR. 2025.
- **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 TVCG. 2025.
- 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 TVCG. 2023.
- 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 TVCG. 2023.
- **Yoonsang Kim**, Sanket Goutham, Amir Rahmati, Arie Kaufman.  
[Erebus: Access Control for Augmented Reality Systems](#). USENIX Security. 2023.

- **Yoonsang Kim**, Saeed Boorboor, Amir Rahmati, Arie Kaufman.  
[Design of Privacy Preservation System in Augmented Reality](#). IEEE VizSec Poster. 2021.
- Yu-Jung Ko, Hang Zhao, **Yoonsang Kim**, IV Ramakrishnan, Shumin Zhai, Xiaojun Bi.  
[Modeling Two-Dimensional Touch Pointing](#). ACM UIST. 2020.
- 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](#). ACM CHI. 2020.
- **Yoonsang Kim**, Geunyeop Ha, Sangjun Lee.  
[Flexible Remote-Control Application for Virtual Reality using Virtual Graphics Driver and OpenCV](#). IJAER. 2017.

## ACADEMIC SERVICES

- |  |                          |
|--|--------------------------|
| • Reviewer of IEEE ISMAR ( <i>Recognized for Outstanding Reviews</i> ) | 2025 (Currently Serving) |
| • Reviewer of IEEE VR  | 2025 (Currently Serving) |
| • Reviewer of IEEE PacificVIS  | 2025 (Currently Serving) |
| • Reviewer of ACM CHI  | 2025 (Currently Serving) |
| • Reviewer of ACM ISS  | 2025 (Currently Serving) |
| • Reviewer of ACM UIST   | 2025 (Currently Serving) |
| • Reviewer of ACM IMWUT  | 2025 (Currently Serving) |
| • Reviewer of ACM SUI  | 2025 (Currently Serving) |
| • Reviewer of ACM VRST   | 2025 (Currently Serving) |

## HONORS AND AWARDS

- |   |           |
|---|-----------|
| • Best Data Science/AI Award. SBU Hackathon. Stony Brook University                   | Sep. 2019 |
| • Dean's Award. Software Competition. Soongsil University                             | Oct. 2016 |
| • National Semi-Finalist. Microsoft Imagine Cup. Microsoft Korea                      | Mar. 2016 |
| • Gold Award. IT·BT Software Convergence Engineering Competition. Soongsil University | Dec. 2015 |

## TEACHING AND LEADERSHIP EXPERIENCE

- |   |                 |
|---|-----------------|
| <b>Stony Brook University</b>   | Stony Brook, NY |
| <i>Research Mentor</i>  |                 |
| • Mentored 2 high school, 4 undergraduate, and 15 graduate students on the domains of Mobile AR, Personalized XR, User interface, and Context-aware visualization | – Present       |
| <i>Graduate Mentor: K-12 Energy Tech</i>  |                 |
| • Engaged with over 1400 high school students around the state (New York) on immersive technologies   | – Nov. 2025     |
| <i>Teaching Assistant</i>   |                 |
| • Assisted lecture/assignment preparation for professors of courses (VR, HCI, Visualization, OS)  | – May. 2022     |
| <b>Soongsil University</b>  |                 |
| <i>Exchange Student Program Mentor</i>  | Seoul, Korea    |
| • Helped the incoming students of exchange student program & shared experience  | – Dec. 2016     |
| <b>Republic of Korea Army</b> (The 31 <sup>st</sup> Infantry Division Engineering Battalion)  |                 |
| <i>Financial &amp; Personnel Administrator in Human Resources</i>   | Gwangju, Korea  |
| • Served military duty at the HQ in the Engineering battalion as Financial & Personnel administrator  | – Jan. 2013     |

## 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),<br>Cursor AI, OpenAI/Gemini API, Vuforia SDK, OpenGL, D3.js, WINAPI, MFC, WPF, MySQL, DB2,<br>HTML, CSS |

## LANGUAGES

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