

# 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 interaction, and privacy-aware ubiquitous XR.

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

## EDUCATION

<b>Stony Brook University</b> <i>Ph.D. Candidate., Computer Science</i> <i>Advisor: Arie E. Kaufman</i>	Stony Brook, NY, USA <i>Aug. 2020 – Present</i>
<b>Stony Brook University</b> <i>M.S., Computer Science</i> <i>Advisor: Xiaojun Bi, Arie E. Kaufman</i>	Stony Brook, NY, USA <i>Aug. 2018 – May. 2020</i>
<b>Darmstadt University of Applied Sciences</b> <i>Exchange Student in B.S., Computer Science</i> <i>(via Soongsil University Program)</i>	Darmstadt, Germany <i>Mar. 2015 – Jul. 2015</i>
<b>Soongsil University</b> <i>B.S., Computer Science and Engineering</i>	Seoul, Korea <i>Mar. 2010 – Feb. 2017</i>

## RESEARCH EXPERIENCE & BACKGROUND

<b>Stony Brook University</b> <i>Research Assistant</i>	Stony Brook, NY, USA <i>May. 2022 – Present</i>
<ul style="list-style-type: none"> <li>Designed object-centric <b>spatial graphs (scene graph)</b> to disambiguate referents with <b>LLM agents</b></li> <li>Researched mapping of embodied interactions (<b>speech and gesture</b>) to <b>spatial</b> representations in AR</li> <li>Designed <b>socially unobtrusive</b> conversational AI <b>assistant</b> for glassed-form factor <b>wearable XR</b></li> <li>Designed personalized <b>ubiquitous, spatial prior-aware</b> XR system with multimodal LLM</li> <li>Prototyped interactive recommender system using <b>RAG LLM</b> for <b>personalized</b> AR experience</li> <li>Conduced research on <b>personal context-aware</b> system for cross-virtuality (cross-device, remote)</li> <li>Researched <b>conversational, cross-reality</b> (AR-to-VR) interface for remote <b>collaboration</b></li> <li>Investigated <b>spatial computing</b> (PC-2D vs MR) for network security apps with Apple Vision Pro</li> <li>Conducted <b>controlled</b> and “<b>in-the-wild</b>” (N=150+) evaluations deriving patterns across subjects</li> <li>Designed end-to-end <b>analytics</b> framework for user behaviors in XR environments (AR, VR, MR) using <b>multimodal (visual, audio, interaction) cues</b></li> <li>Implemented hand-held system (tablet, mobile) for <b>collaborative</b> multi-user AR experience</li> <li>Developed a novel design of OS-level <b>access control</b> system in AR for <b>privacy-protection</b></li> <li>Explored local &amp; remote <b>rendering</b> of <b>mapping</b> gigapixel/high dimensional data to <b>Tiled displays</b></li> <li>Studied open-vocabulary <b>world mapping &amp; synchronization</b> of XR <b>digital twin</b> coordinate systems</li> </ul>	
<i>Graduate Student Researcher</i>	Stony Brook, NY, USA <i>– May. 2020</i>
<ul style="list-style-type: none"> <li>Studied platform/<b>device-agnosticism</b> for scientific (volume rendering) /information <b>visualization</b></li> <li>Explored the applications of <b>gesture-based input</b> in Virtual Reality using Leap motion</li> <li>Designed Shark<sup>2</sup> algorithm (shape/location channel) for Unity C# to utilize across <b>multi-platforms</b></li> </ul>	<i>– Jul. 2018</i>
<b>Soongsil University</b> <i>Undergraduate Student Researcher</i>	Seoul, Korea <i>– Jul. 2018</i>
<ul style="list-style-type: none"> <li>Developed <b>hand gesture recognizer</b> for MR <b>remote desktop</b> settings</li> <li>Developed an <b>immersive remote</b> desktop screen <b>network streaming</b> system in C and Unity C# utilizing virtualized graphics card and WINAPI hooking</li> </ul>	

## 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 Symposium on Spatial User Interaction (SUI)	2025
ACM Designing Interactive Systems (DIS)	2026
ACM Interactive Surfaces and Spaces (ISS)	2025, 2026

### Leadership

<b>Mentoring Graduate Students for Independent Study Research @ Stony Brook University</b>	2020
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.	- Present
<b>Graduate Mentor of K-12 Energy Tech @ Center of Excellence in Wireless and Information Technology</b>	2024
Engaged with over 1,400 New York state high school students introducing immersive technologies.	- 2025
<b>KidOYO Summer Mentoring Program @ Stony Brook University</b>	2022
Mentored 2 high school students on designing a remote visualization tool with hand-held AR and tiled display.	
<b>Exchange Student Program Mentor @ Soongsil University</b>	2016
Assisted incoming students of exchange student program to settle into local community and academic life.	

## **HONORS & AWARDS**

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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**

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

## **TEACHING EXPERIENCE**

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Instructor (CSE566: Virtual Reality) @ Stony Brook University	2026
	2020
Graduate Course Teaching Assistant (CSE566: Virtual Reality) @ Stony Brook University	- 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**

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<b>Dolby Laboratories Inc.</b> PhD Research Intern.	<b>(Expected)</b> Summer 2026
<b>31<sup>st</sup> Infantry Division Human Resources (Financial &amp; Personnel Administrator)</b> Served military duty at the HQ in the Engineering battalion at Republic of Korea Army.	2011 - 2013

## **TECHNICAL SKILLS**

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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**

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