

YOONSANG KIM

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RESEARCH INTERESTS

I am an interdisciplinary researcher in visualization and applied AI, specializing in context-aware interfaces. My research combines visual computing and embodied interaction to support people across desktop, mobile, and XR environments. I develop LLM agents that use structured representations of user activity and environmental context to interpret user intent and provide context-sensitive agentic assistance. I ground interface design in elicited domain needs and develop functional prototypes, using mixed-method evaluation to examine usability and refine interaction workflows.

**Keywords:** XR/Spatial Computing | Human-centered AI | Context-aware Interfaces | HCI | Visualization | XR Privacy/Trust

EDUCATION

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

RESEARCH EXPERIENCE

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                             |
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| <b>Dolby Laboratories</b><br><i>PhD Research Intern, Advanced Technology Group</i> <ul style="list-style-type: none"><li>Researching on agent-assisted spatial content creation workflow connecting multimodal user intent with 3D content generation, placement, editing, and cross-device delivery. <b>[TMP9, TMP8]</b></li><li>Designing coordinate system-adaptive representations that preserve intent across platform/devices.</li><li>Evaluating with early-stage prototypes to grasp how embodied interactions map with 3D authoring.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Atlanta, GA<br>May. 2026<br>– Present       |
| <b>Stony Brook University</b><br><i>Research Assistant, Visualization Lab</i> <ul style="list-style-type: none"><li>Proposed object-centric scene graphs for verbal instructions disambiguation with LLM agents. <b>[C5]</b></li><li>Designed personalized ubiquitous, spatial prior-aware XR system with multimodal LLM. <b>[C6, W4]</b></li><li>Prototyped interactive recommender system using RAG LLM for personalized AR experience. <b>[W4]</b></li><li>Proposed socially unobtrusive conversational AI assistant for glassed-form factor wearable XR. <b>[C6]</b></li><li>Investigated spatial computing (PC-2D vs MR) for network security apps with Apple Vision Pro. <b>[TMP7]</b></li><li>Designed an AI-assisted user behavior analytics system using multimodal (visual, audio) cues. <b>[J4]</b></li><li>Implemented hand-held system (tablet, mobile) for collaborative multi-user AR experience. <b>[J3, C4]</b></li><li>Developed a novel design of OS-level access control system in AR for privacy-protection. <b>[C3, W2]</b></li><li>Evaluated perception-informed (visual, aural) visualization and information placement. <b>[J2, W3]</b></li><li>Conducted controlled and “in-the-wild” (N=150+) evaluations deriving patterns across subjects.</li><li>Conduced research on personal context-aware system for cross-virtuality (cross-device, remote).</li></ul> | Stony Brook, NY<br>May. 2022<br>– Present   |
| <b>Stony Brook University</b><br><i>Graduate Student Researcher, Human-AI Interaction Lab &amp; Visualization Lab</i> <ul style="list-style-type: none"><li>Conducted user evaluation for mobile wearable interface optimization. <b>[C1, C2]</b></li><li>Studied platform/device-agnosticism for scientific (volume rendering) /information visualization.</li><li>Explored the applications of gesture-based input in Virtual Reality using Leap motion.</li><li>Designed Shark<sup>2</sup> algorithm (shape/location channel) for Unity C# to utilize across multi-platforms.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Stony Brook, NY<br>Aug. 2019<br>– May. 2020 |
| <b>Soongsil University</b><br><i>Undergraduate Student Researcher</i> <ul style="list-style-type: none"><li>Developed hand gesture recognizer for MR remote desktop settings.</li><li>Designed VR remote desktop in C and Unity C# with virtual graphics card and WINAPI. <b>[J1, W1]</b></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Seoul, Korea<br>Mar. 2018<br>– Jul. 2018    |

## PUBLICATIONS

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### Peer-Reviewed Conference Papers

- TMP9.** Beyond the Screen: Designing Spatial Media from 2D Video with an Agent-Assisted Creation Workflow. **(In preparation)**
- TMP8.** EARS: Source-Level Audio Allocation for Movie Viewing Across a Screen and Smart Glasses. **(Under review)**
- TMP7.** Evaluating Mixed Reality for Spatial and Analytical Network Security Tasks. **(Under review)**
- C6.** [SpeechLess: Micro-utterance with Personalized Spatial Memory-aware Assistant in Everyday Augmented Reality.](#)  
**Yoonsang Kim**, Devshree Jadeja, Divyansh Pradhan, Yalong Yang, Arie Kaufman.  
In *Proceedings of the IEEE Conference on Virtual Reality and 3D User Interfaces*. **(IEEE VR 2026)**
- C5.** [From Speech-to-Spatial: Grounding Utterances on A Live Shared View with Augmented Reality.](#)  
**Yoonsang Kim**, Divyansh Pradhan, Devshree Jadeja, Arie Kaufman.  
In *Proceedings of the IEEE Conference on Virtual Reality and 3D User Interfaces*. **(IEEE VR 2026)**
- C4.** [AuxiScope: Handheld Augmented Reality Tablet as an Auxiliary Display for Large-Scale Display Systems.](#)  
Matthew Castellana, Chahat Kalsi, **Yoonsang Kim**, Saeed Boorboor, Arie Kaufman.  
In *Proceedings of the IEEE International Symposium on Mixed and Augmented Reality*. **(IEEE ISMAR 2025)**
- C3.** [Erebus: Access Control for Augmented Reality Systems.](#)  
**Yoonsang Kim**, Sanket Goutam, Amir Rahmati, Arie Kaufman.  
In *Proceedings of the USENIX Conference on Security Symposium*. **(USENIX Security 2023)**
- C2.** [Modeling Two-Dimensional Touch Pointing.](#) **Honorable Mention Award 🏆**  
Yu-Jung Ko, Hang Zhao, **Yoonsang Kim**, IV Ramakrishnan, Shumin Zhai, Xiaojun Bi.  
In *Proceedings of the ACM Symposium on User Interface Software and Technology*. **(ACM UIST 2020)**
- C1.** [Using Bayes' Theorem for Command Input: Principle, Models, and Applications.](#)  
Suwen Zhu, **Yoonsang Kim**, Jingjie Zheng, Jennifer Yi Luo, Liuping Wang, Xiangmin Fan, Feng Tian, Xiaojun Bi.  
In *Proceedings of the ACM Conference on Human Factors in Computing Systems*. **(ACM CHI 2020)**

### Peer-Reviewed Journal Articles

- J4.** [Explainable XR: Understanding User Behaviors of XR Environments using LLM-assisted Analytics Framework.](#)  
**Yoonsang Kim**, Zainab Aamir, Mithilesh Singh, Saeed Boorboor, Klaus Mueller, Arie Kaufman.  
*IEEE Transactions on Visualization and Computer Graphics*. **(IEEE TVCG 2025)**
- J3.** [Submerse: Visualizing Storm Surge Flooding Simulations in Immersive Display Ecologies.](#)  
Saeed Boorboor, **Yoonsang Kim**, Ping Hu, Josef M Moses, Brian A Colle, Arie Kaufman.  
*IEEE Transactions on Visualization and Computer Graphics*. **(IEEE TVCG 2023)**
- J2.** [VoxAR: Adaptive Visualization of Volume Rendered Objects in Optical See-Through Augmented Reality.](#)  
Saeed Boorboor, Matthew Castellana, **Yoonsang Kim**, Zhutian Chen, Johanna Beyer, Hanspeter Pfister, Arie Kaufman.  
*IEEE Transactions on Visualization and Computer Graphics*. **(IEEE TVCG 2023)**
- J1.** [Flexible Remote-Control Application for Virtual Reality using Virtual Graphics Driver and OpenCV.](#)  
**Yoonsang Kim**, Geunyeop Ha, Sangjun Lee.  
*International Journal of Applied Engineering Research*. **(IJAER 2017)**

### Peer-Reviewed Workshop & Posters

- W4.** [Memento: Towards Proactive Visualization of Everyday Memories with Personal Wearable AR Assistant.](#)  
**Yoonsang Kim**, Yalong Yang, Arie Kaufman.  
In *Proceedings of the IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops*. **(IEEE VRW 2026)**
- W3.** [Evaluating Spatialized Auditory Cues for Rapid Attention Capture in XR.](#) **Honorable Mention Award @ XRIOS Workshop 🏆**  
**Yoonsang Kim**, Swapnil Dey, Arie Kaufman.  
In *Proceedings of the IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops*. **(IEEE VRW 2026)**
- W2.** [Design of Privacy Preservation System in Augmented Reality.](#)  
**Yoonsang Kim**, Saeed Boorboor, Amir Rahmati, Arie Kaufman.  
*IEEE Symposium on Visualization for Cyber Security*. **(IEEE VizSec 2021)**
- W1.** [Design of Remote-Control Application in Virtual Reality Environment using Virtual Graphic Driver and OpenCV.](#)  
Geunyeop Ha, **Yoonsang Kim**, Dongyeon Lee, Sangjun Lee.  
*Korean Institute of Information Scientists and Engineers*. **(KIISE 2016)**

## RESEARCH & TECHNICAL SKILLS

|                                    |                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Research Methods                   | Mixed-method Studies, Controlled Experiments, In-the-wild Studies<br>Interviews, Diary Studies, Survey Design, Qualitative/Inductive Coding, Behavioral Analysis                                                                                                                                                                                                                           |
| Programming Language/Tools         | Python, C#, C, C++, HLSL, Compute Shader, JavaScript, Java, Go<br>Unity, AR Foundation, ARCore, ARKit, Vuforia SDK, WebXR<br>OpenGL, D3.js, WINAPI, MFC, WPF, HTML, CSS.                                                                                                                                                                                                                   |
| Deployment Platform/Devices        | AR Glasses – <i>Meta Ray-Ban Gen1/Display</i> .<br>XR Head-Mounted Display – <i>Meta Quest 1/2/3/Pro, Apple Vision Pro, Microsoft HoloLens 1/2, Magic Leap 1/2, HTC Vive Pro/Eyes, Google Cardboard, Samsung Gear VR</i><br>Hand-held AR – <i>Apple iPad Pro, iPhone, Samsung Galaxy S8/9/10/21/22</i><br>Large Wall Display – <i>Tiled-display (Reality Deck, Powerwall, FlexiCAVE)</i> . |
| Applied AI (API, Model, Assistive) | Agentic pipelines, RAG, MCP, agent tooling, multimodal, multi-agent orchestration, evaluation agents<br>LangGraph, Claude Code, Cursor AI, OpenAI/Gemini/Claude APIs, DINO, Qwen3, Gemma 3, Llama3.                                                                                                                                                                                        |

## TEACHING EXPERIENCE

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|------------------------------------------------------------------------------------------------------------|-----------|
| 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 – Operating System) @ Stony Brook University | 2020      |

## HONORS & AWARDS

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|--------------------------------------------------------------------------------------|------|
| Recognized for Outstanding Review @ ACM UIST 2026                                    | 2026 |
| Honorable Mention Award. XRIOS Workshop @ IEEE VR 2026                               | 2026 |
| 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 |

## TALKS & MEDIA

|                                                                                                                  |      |
|------------------------------------------------------------------------------------------------------------------|------|
| Invited Talk: Context-aware User Interfaces Bridging Physical and Mediated Realities @ HKUST VisLab              | 2026 |
| 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 |

## GRANT & PROPOSAL WRITING EXPERIENCE

|                                                                                                                 |      |
|-----------------------------------------------------------------------------------------------------------------|------|
| NSF Grant: Contributed to drafting situated designs for human-centered contextualization – Under review         | 2026 |
| Meta Award: Contributed to drafting visual privacy and access control in AR – Accepted                          | 2022 |
| ONR Grant: Led drafting cross-reality remote collaboration and context-aware industrial applications – Accepted | 2022 |

## PROFESSIONAL EXPERIENCE

|                                                                             |             |
|-----------------------------------------------------------------------------|-------------|
| <b>Dolby Laboratories (Part-time)</b>                                       | Aug. 2026   |
| PhD Research Intern, Advanced Technology Group.                             | – Sep. 2026 |
| <b>Dolby Laboratories</b>                                                   | May. 2026   |
| PhD Research Intern, Advanced Technology Group.                             | – Aug. 2026 |
| <b>The 31st Infantry Division Engineering Battalion</b>                     | 2011        |
| Financial/Personnel Administrator, Human Resources, Republic of Korea Army. | – 2013      |

## LANGUAGES

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

## ACADEMIC SERVICES

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### Reviewer

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|-----------------------------------------------------------------------------------|---------|
| IEEE International Symposium on Mixed and Augmented Reality ( <b>ISMAR</b> )      | 2025/26 |
| IEEE Conference on Virtual Reality and 3D User Interfaces ( <b>VR</b> )           | 2026/27 |
| IEEE Pacific Visualization Conference ( <b>PacificVis</b> )                       | 2025    |
| ACM Conference on Human Factors in Computing Systems ( <b>CHI</b> )               | 2026/27 |
| ACM Symposium on User Interface Software and Technology ( <b>UIST</b> )           | 2025/26 |
| ACM Interactive Surfaces and Spaces ( <b>ISS</b> )                                | 2025/26 |
| ACM Designing Interactive Systems ( <b>DIS</b> )                                  | 2026    |
| ACM Symposium on Virtual Reality Software and Technology ( <b>VRST</b> )          | 2025    |
| ACM Symposium on Spatial User Interaction ( <b>SUI</b> )                          | 2025    |
| ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies ( <b>IMWUT</b> ) | 2025    |

### Mentoring

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| <b>Mentoring Graduate Students for Independent Study Research @ Stony Brook University</b>                                                                                                                                | 2020   |
| <i>Supervised and collaborated with 4 undergraduates and 20 graduate students on: Wearable/Hand-held AR, – Present Multi-sensory Perception, Context-aware Interface, AR Security, Cross-reality Collaboration, SLAM.</i> |        |
| <b>Graduate Mentor of K-12 Energy Tech @ Center of Excellence in Wireless and Information Technology</b>                                                                                                                  | 2024   |
| <i>Engaged with over 1,400 New York state high school students introducing immersive technologies.</i>                                                                                                                    | – 2025 |
| <b>KidOYO Summer Mentoring Program @ Stony Brook University</b>                                                                                                                                                           | 2022   |
| <i>Mentored 2 high school students on designing a remote visualization tool with hand-held AR and tiled display.</i>                                                                                                      |        |
| <b>Exchange Student Program Mentor @ Soongsil University</b>                                                                                                                                                              | 2016   |
| <i>Assisted incoming students of exchange student program to settle into local community and academic life.</i>                                                                                                           |        |