Yunkyung Kim, PhD

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LinkedIn | Google Scholar | Portfolio

PROFESSIONAL SUMMARY

UX Designer & HRI Specialist with 13+ years of experience leading foundational research for autonomous systems and complex hardware-software ecosystems. Proven track record of translating ambiguous user needs into high-impact product strategies at NASA and Amazon Robotics. Specialized in developing mixed-methods frameworks that align technical system capabilities with human mental models to drive global-scale product adoption and operational efficiency.

TECHNICAL EXPERTISE

- **Robotics:** Human-Robot Interaction Design, User-Centered Autonomous Systems, Human-in-the-Loop Testing.
- **Strategy:** UX-Business Value Chain, System Architecture Blueprints, Stakeholder Alignment for R&D.
- **Engineering:** Human-System Instrumentation, Product Requirement Authoring, Experimental Design.

PROFESSIONAL EXPERIENCE

Amazon Robotics   8/2022 – Present
Senior UX Designer   *North Reading, MA*

- **Quantitative Interaction Modeling & ROI:** Developed and validated a high-fidelity framework to quantify the "Business Value of HRI" by correlating behavioral interaction metrics with algorithmic efficiency. Established the first direct statistical link between human intervention quality and fleet-wide OpEx reduction, enabling data-driven prioritization of R&D investments.

- **Autonomous Exception Management Policy:** Architected a "North Star" research strategy for robotic failure recovery. Transitioned global operations from reactive troubleshooting to a proactive, state-aware framework, utilizing probability density functions to reduce robotic downtime and cognitive load for users.

- **Scalable HMI Data Foundations:** Engineered a standardized Human-Machine Interface (HMI) platform designed as a telemetry engine for large-scale data ingestion. This architecture enables the consistent collection of high-dimensional Human-in-the-loop (HITL) data, serving as the foundational training set for reinforcement learning models and behavioral prediction.

iRobot   9/2020 – 7/2022
Principal UX Designer   *Bedford, MA*

- **Cross-Functional Requirements:** Translated qualitative human behavior insights into technical specifications for the motion-planning and SLAM teams to reduce "collision anxiety" in residential settings.

- **Behavioral Specification:** Defined the interaction logic and navigational "personality" for autonomous mobile agents, ensuring robot trajectories were legible and predictable to users in unstructured home environments.

- **Mental Model Alignment:** Designed the end-to-end synchronization between robotic hardware states (LEDs, motion, sound) and digital applications to manage user expectations of autonomous capabilities.

NASA Johnson Space Center | KBR Inc.   7/2019 – 9/2020
Senior Human Factors Engineer   *Houston, TX*

- **Mission-Critical HRI:** Authored the Concept of Operations (ConOps) and technical requirements for AR-based visual informatics; served as Robotics SME for habitat-vehicle integration and autonomous docking.

- **XR & Habitability Metrics:** Established quantitative evaluation frameworks and human factors metrics for extended reality (XR) systems, defining the standards for human-system performance in extreme environments.

NASA Ames Research Center | SGT Inc.   4/2016 – 7/2019
Computer Scientist   *Moffett Field, CA*

- **Free-Flying Robotics:** Led the HRI design for the Astrobee project, developing the interaction systems for intra-vehicular autonomous robots; focused on robotic state-awareness and "intent" communication.

- **Exploration Ground Data System :** Engineered the user interface architecture for planetary rover telemetry.

- **Telepresence & Robotic Task Allocation :** Conducted human-factors research for the Human-Exploration Telepresence project, optimizing task allocation and control-loop latencies for earth-to-orbit robotic manipulation.

Samsung Electronics   3/2013 – 3/2016
Senior UX Designer   *Seoul, South Korea*

- **Emerging Form Factors:** Spearheaded R&D for "Next Mobile UX," defining the interaction logic for foldable and transparent displays through iterative hardware-software co-design.

- **IP & Patent Strategy:** Directed UX Patent Strategy development for mobile and home appliance verticals, securing intellectual property for novel "Small Screen" and "Flexible/Transparent" interaction models.

SELECTED PUBLICATIONS

- **Kim, Y.** and Mutlu, B. "How social distance shapes human–robot interaction." *International Journal of Human-Computer Studies*, 72(12), 783-795, 2014.

- Cha, E., Fitter, N. T., **Kim, Y.**, Fong, T., and Matarić, M. J. "Effects of robot sound on auditory localization in human-robot collaboration." *Proc. of the ACM/IEEE International Conference on Human-Robot Interaction*, 434-442, 2018.

- Ma, L. M., Fong, T., Micire, M. J., **Kim, Y. K.**, and Feigh, K. "Human-robot teaming: Concepts and components for design." *Field and Service Robotics: Results of the 11th International Conference*, 649-663, 2017.

- **Kim, Y.** and Fong, T. "Signaling robot state with light attributes." *Companion Proc. of the ACM/IEEE International Conference on Human-Robot Interaction*, 163-164, 2017.

PROFESSIONAL SERVICE

- **Founder** / **President:** Korean New England Robotics and AI, 2025–Present.
  - Leading a Korea community of Robotics and AI professionals to orchestrate seminars and networking initiatives with 100+ members.
- **Associate Reviewer:** ACM/IEEE International Conference on Human-Robot Interaction (HRI), 2021–Present.
- **Associate Reviewer:** IEEE International Conference on Robot and Human Interactive Communication (RO-MAN), 2017–Present.

EDUCATION

Ph.D. in Industrial Design   Korea Advanced Institute of Science and Technolocy (KAIST), 2013

- Dissertation Title: Human-Robot Social Distance in Interaction Design for Robot Acceptance

B.S. in Business Administration   Korea National Open University, 2013

B.S. in Industrial Design   KAIST, 2008