

Exponent®
Engineering & Scientific Consulting

Sarah Eom, Ph.D.

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Professional Profile

Dr. Sarah Eom's expertise is in the design, evaluation, and translational assessment of augmented and virtual reality (AR/VR) systems for medical and surgical applications. She has developed AR/VR technologies that support surgical guidance, medical training, and patient-facing interventions across neurosurgery, ophthalmology, mental health, and physical rehabilitation. Her work spans spatial computing, multimodal sensing, medical visualization, and human–computer interaction, with a focus on quantifying how immersive technologies influence user performance, situational awareness, and clinical workflow. Dr. Eom has extensive experience designing user studies and experimental protocols, both in simulation and clinical-adjacent environments to evaluate usability, accuracy, ergonomic burden, and workflow integration of emerging healthcare technologies.

Prior to joining Exponent, Dr. Eom completed her Ph.D. in Electrical and Computer Engineering at Duke University. Her doctoral research focused on developing AR/VR systems that provide real-time guidance and contextual information to surgeons, medical trainees, and patients. She collaborated with clinicians across multiple specialties to investigate how virtual overlays, 3D anatomical visualizations, and novel interaction techniques can enhance task performance and decision-making in both training and procedural environments. Her work also incorporated evaluation of sensor-fusion systems (camera, IMU, depth sensing), eye tracking, motion capture, and biometric sensors, to assess user behavior, system robustness, and the reliability of immersive guidance.

Dr. Eom was also an ORISE Fellow in the Medical Extended Reality Program at the U.S. Food and Drug Administration, where she contributed to regulatory research and guidance development for AR/VR-based medical devices, including head-mounted displays intended for clinical use. In this role, she evaluated device safety, human factors considerations, and technical performance criteria to inform future regulatory pathways for immersive medical technologies.

Academic Credentials & Professional Honors

Ph.D., Electrical and Computer Engineering, Duke University, 2025

M.S., Engineering Technology, Purdue University, 2020

B.S., Electrical & Computer Engineering, Purdue University, 2017

VitreoRetinal Surgery Foundation Research Award, 2025

Research to Prevent Blindness Grant, 2023

CRA-WP Grad Cohort for Women, 2022

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NSF Innovation Corp Program, 2020

Prior Experience

Graduate Research Assistant, Duke University, 2021-2025

ORISE Fellow, U.S. Food and Drug Administration, 2024

IoT Edge and Cloud Intern, Bosch Research, 2023

Graduate Research Assistant, Purdue University, 2017-2020

Undergraduate Research Assistant, Purdue University, 2016-2017

Professional Affiliations

Association for Computing Machinery (ACM) (2022-Present)

Institute of Electrical and Electronics Engineers (IEEE) (2021-Present)

Publications

Duan L, Rotondo E, Xiu Y, Eom S, Chen R, Li C, Hu Y, Gorlatova M. Probing the augmented reality scene analysis capabilities of large multimodal models: toward reliable real-time assessment solutions. IEEE Internet Computing 2025; Oct 1(01):1–9.

Eom S, Xu W, Zou L, Frith A, Escobar E, Streisfeld G, Mall A, Granger B, Gorlatova M. Legato: virtual reality for physical rehabilitation of patients in the intensive care unit. IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW) 2025; 1027–1032.

Eom S, Kim S, Jackson J, Sykes D, Rahimpour S, Gorlatova M. Augmented reality-based contextual guidance through surgical tool tracking in neurosurgery. IEEE Transactions on Visualization & Computer Graphics 2025; 31(07):3913–28.

Scargill T, Janamsetty R, Fronk C, Eom S, Gorlatova M. Environment texture optimization for augmented reality. Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies 2024; Sep 9;8(3):1-26.

Eom S, Ma T, Hu T, Vutakuri N, Jackson J, Gorlatova M. Did I do well? Personalized assessment of trainees' performance in augmented reality-assisted neurosurgical training. IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW) 2024; 117–124.

Eom S, Ma TS, Vutakuri N, Hu T, Haskell-Mendoza AP, Sykes DA, Gorlatova M, Jackson J. Accuracy of routine external ventricular drain placement following a mixed reality–guided twist-drill craniostomy. Neurosurgical Focus 2024; 56(1):E11.

Eom S, Kim S, Jiang Y, Chen RJ, Roghanizad AR, Rosenthal MZ, Dunn J, Gorlatova M. Investigation of thermal perception and emotional response in augmented reality using digital biomarkers: a pilot study. IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW) 2023; 170–173.

Eom S, Sykes D, Rahimpour S, Gorlatova M. NeuroLens: augmented reality-based contextual guidance through surgical tool tracking in neurosurgery. IEEE International Symposium on Mixed and Augmented Reality (ISMAR) 2022; 355–364.

Eom S, Kim S, Rahimpour S, Gorlatova M. AR-assisted surgical guidance system for ventriculostomy. IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW) 2022; 402–405.

Scargill T, Chen Y, Eom S, Dunn J, Gorlatova M. Environmental, user, and social context-aware augmented reality for supporting personal development and change. IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW) 2022; 155–162.

Eom S, Zhou H, Kaur U, Voyles RM, Kusuma D. TupperwareEarth: bringing intelligent user assistance to the “internet of kitchen things”. IEEE Internet of Things Journal 2022; 9(15):13233–49.

Eom S, Abbaraju P, Xu Y, Nair BR, Voyles RM. Embedded neuromorphic architecture for form+ function 4-D printing of robotic materials: emulation of optimized neurons. IEEE International Conference on Robotics and Automation (ICRA) 2021; 12185–12191.

Presentations

Eom S, Pajic M, Gorlatova M, Hadziahmetovic M. Improving laser targeting accuracy with augmented reality guidance in retinal laser therapy. Investigative Ophthalmology & Visual Science 2024; 65(7):793–793.

Eom S, Ma T, Vutakuri N, Du A, Qu Z, Jackson J, Gorlatova M. Did you do well? Real-time personalized feedback on catheter placement in augmented reality-assisted neurosurgical training. IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW) 2024; 1208–1209.

Byrne R, Qu Z, Fronk C, Eom S, Scargill T, Gorlatova M. AR simulations in VR: the case for environmental awareness. IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW) 2024; 985–986.

Eom S, Pajic M, Gorlatova M, Hadziahmetovic M. Augmented reality for retinal laser therapy. Investigative Ophthalmology & Visual Science 2023; 64(8):216–216.

Eom S, Janamsetty R, Hadziahmetovic M, Pajic M, Gorlatova M. Demo abstract: edge-based augmented reality guidance system for retinal laser therapy via feature matching. Proceedings of the 22nd International Conference on Information Processing in Sensor Networks 2023; 366–367.

Eom S, Hadziahmetovic M, Pajic M, Gorlatova M. Through an AR lens: augmented reality magnification through feature detection and matching. Proceedings of the 20th ACM Conference on Embedded Networked Sensor Systems 2022; 784–785.

Peer Reviews

ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)

IEEE International Symposium on Mixed and Augmented Reality (ISMAR)

ACM Virtual Reality Software Technology (VRST)

ACM Transactions on Sensor Networks