



Aryabrata Basu

Curriculum Vitae

*"Science is built up of facts, as a house is built of stones;
but an accumulation of facts is no more a science than a
heap of stones is a house." – Henri Poincaré, Science and
Hypothesis, 1905*

Current Positions

- 2022–present **Assistant Professor (Tenure Track)**, *Department of Computer Science, University of Arkansas at Little Rock, Little Rock, AR, United States*
- 2022–present **Research Fellow**, *Donaghey Emerging Analytics Center, University of Arkansas at Little Rock, Little Rock, AR, United States*

Past Positions

- 2025–2026 **Undergraduate Program Coordinator**, *Department of Computer Science, University of Arkansas at Little Rock, Little Rock, AR, United States*
- 2016–2022 **Visual Information Specialist**, *Emory Center for Digital Scholarship, Emory University, Atlanta, GA, United States*
- 2010–2016 **Graduate Research Assistant**, *University of Georgia, Athens, GA, United States*
- 2009–2010 **Graduate Teaching Assistant**, *University of Georgia, Athens, GA, United States*

Education

- 2009–2018 **Ph.D. - Computer Science**, *University of Georgia, Athens, GA, United States*
- 2003–2007 **Bachelor of Technology - Information Technology**, *West Bengal University of Technology, Kolkata, West Bengal, India*

PhD Dissertation

- Dissertation [Designing and evaluating ubiquitous wearable virtual reality](#)
- Advisor(s) Johnsen K, Potter D, Rasheed K, and Liu T

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Research Interests

Topics Human-Computer Interaction, Virtual Reality + Augmented Reality = Extended Reality, Virtual Worlds, Virtual Avatars, Animation, Natural User Interfaces (2D/3D), Usability Analytics, Study Design, Computer Graphics, Artificial Intelligence, Machine Learning, Distributed Computing, Robotics, Prototyping wearable hardware and its design, and Haptics.

Honors and Recognition

- 2025 **Best Paper Award ('Honorable Mention')** - 'From Novelty to Knowledge: A Longitudinal Investigation of the Novelty Effect on Learning Outcomes in Virtual Reality', IEEE Virtual Reality.
- 2014 **Best Paper Award** - 'Mixed Reality Virtual Pets to Reduce Childhood Obesity', IEEE Virtual Reality.
- 2013 **Best Poster Award** - 'Evolution and Usability of Ubiquitous Immersive 3D Interfaces', IEEE Symposium on 3D User Interfaces.
- 2010 **Best Poster Award ('Honorable Mention')** - 'Field Valid Probability Assessment in Uncertain and Multi-agent Settings', Research Day 2010, Department of Computer Science, University of Georgia.

Media and Public Engagement

- 2025 **America250 – [Our American Story](#)**, Featured Interviewee (sole researcher profile from the State of Arkansas). Library of Congress archival project; filmed at Old State House, Little Rock, AR. Oct 2025.
- 2025 **KUAR 89.1 (NPR member station), Morning Edition** — Guest interview on [Mapping cardiac blood vessels in 3D](#). Air date: Sep 11, 2025.

Grants and Sponsored Research Activity

Funded Awards

- 2024–2025 **Cybersecurity Consortium for Innovation** - U.S. Department of Energy, National Energy Technology Laboratory, \$5.0 million total funding. Role: Co-Investigator. Focus: immersive industrial control systems cybersecurity training, workforce development, and cyber-physical simulation.
- 2023–2024 **Robust 2D to 3D Cardiac Arterial Mapping and Visualization for Surgical Preplanning** - NSF/EPSCoR-DART, \$100,000 total funding. Role: Principal Investigator. Focus: digital cardiology, conformal arterial mapping, 3D visualization, and surgical preplanning.
- 2025–2026 **Project Aria Research Kit Grant** - Meta, In-kind hardware award (\$6,000–\$10,000 estimated market value). Role: Principal Investigator. Focus: spatial AI, human-computer interaction (HCI), virtual reality, and secure telemetry data collection.

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Active Proposal Portfolio

Advanced Air Mobility and Digital Twins	NASA EPSCoR FY 2026 Basic Research: Human-in-the-Loop Digital Twin for Noise-Aware Regional AAM Fleet Planning (pending). Role: Principal Investigator. Focus: human-in-the-loop digital twins, Advanced Air Mobility/UAS corridor planning, noise-aware fleet scenario comparison, acoustic exposure and human-response modeling, telemetry replay, 3D geospatial visualization, and NASA-aligned regional aviation decision support.
Quantum and Nanotechnology Infrastructure	NSF NQNI: Arkansas Open-Access Quantum and Nanotechnology User Facility for Secure User Enablement, Digital Twin Workflows, and Workforce Development (pending). Role: Co-Principal Investigator. Focus: open-access nanotechnology and QISE user infrastructure, secure immersive user enablement, digital-twin onboarding, AI-enabled discovery workflows, workforce training, external-user support, and Mid-South regional research capacity.
Immersive AI and Human-Centered Computing	NSF CAREER: Persistent Virtual Reality Spaces; Secure Analytics for Immersive Environments (in preparation). Focus: persistent immersive environments, embodied interaction, privacy-preserving behavioral telemetry, responsible immersive analytics, human-centered AI, and AI-mediated learning.
Secure XR Training and Evidence-Based Assessment	ORETTC / Y-12: SPECTRA - Secure Platform for Encrypted Content Transmission, Replay, and Analytics (pending). Role: Principal Investigator. Focus: secure real-time 3D mesh distribution, encrypted XR content streaming, distributed digital twin training, Unity-based immersive simulation, ELK telemetry ingestion, behavioral replay, usability analytics, after-action review, and evidence-based training assessment for national security, nuclear operations, cybersecurity, and emergency preparedness contexts.
Scientific and Medical Visualization	Digital Cardiology; Open Carbon Atlas; Remote Sensing-Assist Crop Phenology Detection and Immersive Visualization (in preparation). Focus: AI-assisted scientific infrastructure, 3D medical visualization, carbon science, agricultural decision support, remote sensing, and immersive data interaction.
AI Assurance, Sensing, and Cyber-Physical Awareness	DARPA Young Faculty Award; AFOSR/ARO Conformal Augmented Reality for Passive Wireless Signal Decoding (in preparation). Focus: formal assurance, loss-of-control containment of AI, passive RF sensing, electromagnetic awareness, conformal mapping, and augmented reality visualization.
Society, Law, and Scientific Communication	NSF Science of Science: Discovery, Communication, and Impact; NSF Law and Science: Spatially Queryable Crime Scene Simulation Platform (in preparation). Focus: computational analysis of scientific discourse, scientific correspondence, communication media, forensic simulation, spatial querying, and law-science research infrastructure.
Edge Intelligence and Immersive Infrastructure Digital Twins	NSF VINES Track 1: Augmented Reality and Edge-Aware Digital Twins for Multi-Utility Infrastructure Management (in preparation). Role: Co-Principal Investigator / Senior Personnel. Focus: edge-resident digital twins, multi-utility infrastructure modeling, Bayesian filtering, distributed and federated learning, resource-aware 3D visualization, augmented reality field interfaces, privacy-preserving telemetry, and human-centered evaluation for utility maintenance.

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Teaching

- 2026 **Professor**, *Capstone Projects (CPSI 49203), Adv Game Programming (CPSI 37703), Seminar in Computer Architecture (CPSI 73103)*, UA Little Rock, Arkansas
Academic Year
- 2025 **Professor**, *Capstone Projects (CPSI 49203), Adv Game Programming (CPSI 37703), Seminar in Computer Architecture (CPSI 73103)*, UA Little Rock, Arkansas
Academic Year
- 2024 **Professor**, *Computer Networks (CPSC 3384), Database Concepts (CPSC 3375), Computer Architecture (CPSC 7331), Distributed Computing (CPSC 43/5387)*, UA Little Rock, Arkansas
Academic Year
- 2023 **Professor**, *Computer Networks (CPSC 3384), Database Concepts (CPSC 3375), Computer Architecture (CPSC 7331), Distributed Computing (CPSC 43/5387)*, UA Little Rock, Arkansas
Academic Year
- Fall 2022 **Professor**, *Distributed Computing (CPSC 4387/5387)*, UA Little Rock, Arkansas
- 2019 – 2022 **Lead Instructor**, *Introduction to 3D Visualization and Interactive Media Design (ARTHIST 393R)*, Emory University, Atlanta

Service

- 2026 **Co-Organizer and Deployment Lead**: *Introduction to Quantum Computing and Quantum Machine Learning Workshop*, University of Arkansas at Little Rock, June 25–26, 2026. Co-organized and deployed a two-day hands-on quantum computing and quantum machine learning workshop hosted in the EIT Auditorium, with support from the George W. Donaghey Emerging Analytics Center and NSF-DART. The workshop engaged **150+ participants** across in-person and online formats, including students, faculty, researchers, industry professionals, national-lab experts, and online attendees. The event emphasized practical quantum learning, quantum machine learning, lab-based instruction, and regional community-building for emerging quantum workforce development.
- 2025-26 **Program Committee Member**: IEEE International Conference on Artificial Intelligence & eXtended and Virtual Reality (AIxVR 2026)
- 2025 **Editorial Board Member**: [Nature Portfolio](#)
- 2025 **Track Chair(Main+Posters)**: The ACM Symposium on Applied Perception (SAP)
- 2025 **Program Committee Member**: TRUST-XR 2025 @IEEE International Symposium on Mixed and Augmented Reality (ISMAR)
- 2024-25 **Program Committee Member**: IEEE International Conference on Artificial Intelligence & eXtended and Virtual Reality (AIxVR 2025)
- 2024 **Panel Reviewer**: [NEH](#)
- 2021 **University Senate Committee Member**: [COE](#)
- 2020 **Panel Reviewer**: [NSF](#)
- 2020 **Associate Editor**: [Presence](#)
- 2020 **Review Editor**: [Frontiers in Virtual Reality](#)

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- 2020 **Review Editor:** [Springer Nature Virtual Reality](#)
- 2020-21 **Program Committee Member:** International Symposium on Visual Computing
- 2020 **Session Chair:** Immersive Learning Research Network
- 2020 **Local Arrangements Chair, Usability Study Researcher:** IEEE Virtual Reality
- 2012-2013 **Student Volunteer:** IEEE Virtual Reality
- 2012 **Student Volunteer:** IEEE International Symposium on Mixed and Augmented Reality

Membership

- IEEE Senior Member
- ACM Lifetime Member

Publications

Kharel, A., Sunny, M. J. M., and Basu, A. Dataecho: Reflective telemetry replay for studying navigation strategy refinement in xr. In *IEEE Conference on Virtual Reality and 3D User Interfaces, VR 2026 – Abstracts and Workshops, Daegu, Republic of Korea, March 21–25, 2026*, pages 272–279. IEEE, 2026.

Karim, M. A. B., Sunny, M. J. M., and Basu, A. Vibrotactile mass cues for planetary interaction in vr. In *IEEE Conference on Virtual Reality and 3D User Interfaces, VR 2026 – Abstracts and Workshops, Daegu, Republic of Korea, March 21–25, 2026*, pages 356–361. IEEE, 2026.

Karim, M. A. B., Shrestha, K., Kharel, A., Sunny, M. J. M., and Basu, A. Cared-vr: Context-aware reinforcement and enforcement for drill training in vr. In *IEEE Conference on Virtual Reality and 3D User Interfaces, VR 2026 – Abstracts and Workshops, Daegu, Republic of Korea, March 21–25, 2026*, pages 830–837. IEEE, 2026.

Sunny, M. J. M., Springer, J. P., and Basu, A. Evaluating adjustment and proficiency disparities in virtual reality. In *2025 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops*, pages 1282–1283. IEEE, 2025.

Sunny, M. J. M., Springer, J. P., and Basu, A. Combined effects of vr and gaming expertise on precision performance. In *Human Factors in Design, Engineering, and Computing*, volume 199 of *AHFE Open Access*, pages 946–958. AHFE International, 2025.

Sunny, M. J. M., Guthula, J. S. N., Kharel, A., Shraboni, M. N., Rashid, H., Bhandari, P., Springer, J. P., and Basu, A. Gaze insights in xr: Real-time eye-tracking analytics with elasticsearch. In *2025 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops*, pages 97–103. IEEE, 2025.

Lee, J., Chen, C. C., and Basu, A. From novelty to knowledge: A longitudinal investigation of the novelty effect on learning outcomes in virtual reality. *IEEE Transactions on Visualization and Computer Graphics*, 31(5):3204–3212, 2025.

Guthula, J. S. N., Rashid, H., Springer, J. P., and Basu, A. Preserving privacy in vr telemetry data. In *2025 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops*, pages 1270–1271. IEEE, 2025.

Bhandari, P., Young, C. Z., Springer, J. P., and Basu, A. Scientific crosstalk: Analyzing sentiment-topic alignment in personal and scientific discourse. In *International Conference on Machine Learning and Applications*, pages 99–106. IEEE, 2025.

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Tullis, J. A., Lanter, D. P., Basu, A., Cothren, J. D., Shi, X., Limp, W. F., Linck, R. F., Young, S. G., Davis, J., and Alsumaiti, T. S. Geoprocessing, workflows, and provenance. In *Remote Sensing Handbook, Volume II*, volume 2, pages 303–337. CRC Press, 2024.

Sunny, M. J. M. and Basu, A. Non-linear parameterization of spatial decision making in immersive virtual environment. In *2024 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops*, pages 389–395. IEEE, 2024.

Guthula, J. S. N. and Basu, A. Navigating gender biases in xr: Towards equitable technological future. In *2024 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops*, pages 326–329. IEEE, 2024.

Page, M., Kang, Y., Varner, S., Lee, K., Cors, A., Basu, A., Durante, K., and Burr, I. Methods and evaluation in the historical mapping of cities. *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, XLVIII-4/W7-2023:155–160, 2023.

Basu, A., Sunny, M. J. M., and Guthula, J. S. N. Privacy concerns from variances in spatial navigability in vr. *arXiv preprint arXiv:2302.02525*, 2023.

Basu, A. Stag: A tool for realtime replay and analysis of spatial trajectory and gaze information captured in immersive environments. In *2022 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops*, pages 43–45. IEEE, 2022.

Martin, A. J., Stearns, D., Whitten, M. J., Hage, M. M., Page, M., and Basu, A. First known trace fossil of a nesting iguana (pleistocene), the bahamas. *PLOS ONE*, 15(12):e0242935, 2020.

Basu, A. Work-in-progress—augmented reality at scale: Using physical dimensionality of spaces to our advantage! In *6th International Conference of the Immersive Learning Research Network*, pages 373–376. IEEE, 2020.

Basu, A. Work-in-progress—tracking the untracked. *arXiv preprint arXiv:1909.05327*, 2019.

Basu, A. Work-in-progress—a brief chronology of virtual reality. *arXiv preprint arXiv:1911.09605*, 2019.

Basu, A. and Johnsen, K. Work-in-progress—navigating a maze differently: A user study. *arXiv preprint arXiv:1805.09454*, 2018.

Basu, A., Ball, C., Manning, B., and Johnsen, K. Effects of user physical fitness on performance in virtual reality. In *IEEE Symposium on 3D User Interfaces*, pages 233–234. IEEE, 2016.

Ahn, S. J. G., Johnsen, K., Robertson, T., Moore, J., Brown, S., Marable, A., and Basu, A. Using virtual pets to promote physical activity in children: An application of the youth physical activity promotion model. *Journal of Health Communication*, 20(7):807–815, 2015.

Johnsen, K., Ahn, S. J., Moore, J., Brown, S., Robertson, T. P., Marable, A., and Basu, A. Mixed reality virtual pets to reduce childhood obesity. *IEEE Transactions on Visualization and Computer Graphics*, 20(4):523–530, 2014.

Basu, A. and Johnsen, K. Ubiquitous virtual reality 'to-go'. In *IEEE Virtual Reality*, pages 161–162. IEEE, 2014.

Basu, A., Johnsen, K., Bogert, K., and Wins, P. Immersive virtual reality on-the-go. In *IEEE Virtual Reality*, pages 193–194. IEEE, 2013.

Basu, A., Johnsen, K., and Bogert, K. Poster: Evolution and usability of ubiquitous immersive 3d interfaces. In *IEEE Symposium on 3D User Interfaces*, pages 131–132. IEEE, 2013.

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- Wins, P., Basu, A., and Johnsen, K. Off-the-shelf electronics prototyping for virtual reality. In *IEEE VR Workshop on Off-the-Shelf Virtual Reality*, 2012.
- Wins, P., Basu, A., and Johnsen, K. Do-it-yourself interface device prototyping for virtual reality. *International Journal of Virtual Reality*, 11(3):43–48, 2012.
- Basu, A., Saupe, C., Refour, E., Rajj, A., and Johnsen, K. Immersive 3d ui on one dollar a day. In *IEEE Symposium on 3D User Interfaces*, pages 97–100. IEEE, 2012.
- Basu, A., Rajj, A., and Johnsen, K. Ubiquitous collaborative activity virtual environments. In *Proceedings of the ACM 2012 Conference on Computer Supported Cooperative Work*, pages 647–650. ACM, 2012.
- Mrázek, J., Chaudhari, T., and Basu, A. Perplot & perscan: Tools for analysis of dna curvature-related periodicity in genomic nucleotide sequences. *Microbial Informatics and Experimentation*, 1(1):13, 2011.
- Basu, A. and Nachtgael, M. Owa filters: A robust filtering method and its application to color images. In *IEEE Symposium on Computational Intelligence for Image Processing*, pages 8–13. IEEE, 2009.
- Basu, A. and Funk, S. An optimal scheme for multiprocessor task scheduling: A machine learning approach. In *Work-In-Progress Proceedings, The 30th IEEE Real-Time Systems Symposium*, page 29. Citeseer, 2009.