

Sandeep Kollannur

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PROFESSIONAL SUMMARY

Ph.D. in Computer Science with 9 years of industrial experience designing and developing world-class products at Adobe and leading cross-functional engineering teams. Deep expertise in haptics, robotics, AR/VR, and human-computer interaction. Accomplished research mentor with multiple mentees advancing to graduate programs including PhD studies. International speaker at major industry events including CES, IoTWorld, and Adobe Summits. Published researcher with peer-reviewed publications in top-tier HCI venues and four USPTO patents spanning advanced manufacturing, social media analytics, and data visualization.

EDUCATION

Ph.D. in Computer Science 2019 - 2025
University of Southern California, Los Angeles, CA

- Dissertation: “[From User Insights to Standards: Developing Open-Source Tools for Haptic Research and Design](#)”, advised by [Dr. Heather Culbertson](#)
- Awards:
 - Annenberg Fellowship (\$86,000, 2019-2023)
 - Innovation in Haptics Fund from IEEE Technical Committee on Haptics supported by Meta Inc (2022)
 - Center on Science, Technology, and Public Life (STPL) Research Funding (2023)
 - Annenberg Graduate Fellowship Research and Creative Project Symposium Award (2023 and 2025)

M.S. in Computer Science 2017 - 2019
University of Calgary, Alberta, Canada

- Thesis: “[Leveraging Neuroscience to Improve Haptic Rendering](#)”, advised by [Dr. Sonny Chan](#) and [Dr. Lora Oehlberg](#)

M.S. in Human Computer Interaction with Ergonomics 2014 - 2015
University College London, London, United Kingdom

- Thesis: “[Design of High-Resolution, Low-Cost Tactile Shape Display](#)”, advised by [Dr. Nicolai Marquardt](#)

B.Tech in Computer Science and Engineering 2003 - 2007
Cochin University of Science and Technology, Kochi, India

MENTORSHIP AND LEADERSHIP EXPERIENCE

- **Dedicated Mentorship:** Mentored 48 students across 10 semesters, providing individualized guidance on academic development, research methodologies, and professional growth, with multiple mentees advancing to graduate programs including PhD studies. Detailed mentorship activities available at: [Academic Mentoring Details](#)
- **Adaptable and Goal-Oriented Educator:** Demonstrated versatility across diverse teaching contexts and program structures, aligning mentoring strategies with individual student objectives to maximize engagement and facilitate achievement of academic milestones and research goals
- **Research Mentorship:** Guided students to successful research outcomes, including co-authored publications and poster presentations at competitive conferences such as Southern California Robotics Symposium and World Haptics Conference
- **Engineering Leadership:** Led cross-functional engineering team of 9 members at WebCardio (2016-2017), managing product development lifecycle and coordinating mobile, cloud, and web development initiatives

PROFESSIONAL EXPERIENCE

Research Scientist, Intern

May 2024 - Aug 2024

Adobe Research Labs, Adobe Systems, San Jose, CA

- Pioneered scalable manufacturing innovations for Adobe Primrose wearable displays, achieving 10,000x production scalability through systematic materials research and automation
- Patent for novel PDLC manufacturing technique enabling minimal post-processing with laser cutting
- Engineered precision laser cutting automation by reverse-engineering laser cutter drivers and conducting 75+ experimental configurations over 150+ hours, establishing reproducible PDLC processing parameters
- Developed and tested 64 material stitching configurations across adhesives, edge-gluing, and laser-welding methods for optimal multi-layer PDLC assembly
- Key Technologies: PDLC Materials, Laser Cutting Automation, Python, Arduino, Manufacturing Processes, 3D Printing, Computer Vision

Principal Software Architect

Mar 2016 - Sep 2017

WebCardio, Kochi, India

- Architected and deployed end-to-end cloud infrastructure, web interface, and mobile application for real-time and historical ECG data storage, processing, and algorithmic analysis, enabling scalable healthcare diagnostics
- Led cross-functional team of 9 engineers across mobile, cloud, and web development, orchestrating product delivery from conception through production deployment
- Drove user-centered product innovation through design thinking methodologies, creating accessible and intuitive healthcare solutions tailored for resource-constrained environments in developing countries
- Key Technologies: JavaScript, NodeJS, Amazon Web Services (Lambda, DynamoDB, S3)

Researcher

Oct 2012 - Jul 2014

Adobe Research Labs, Adobe Systems, Bangalore, India

- Developed strategic patented technologies for Adobe Digital Marketing Cloud, contributing to 3 patents that advanced the platform's analytics and predictive capabilities
- Created sophisticated data visualizations showcasing cutting-edge Adobe Lab technologies
- Engineered and integrated visualization technologies into Adobe Social, enhancing the platform's social media marketing intelligence and analytics capabilities
- Key Technologies: R, D3, Python, JavaScript, Apache Storm, Redis, HBase

Product Solution Developer

Apr 2011 - Oct 2012

Adobe@Adobe, Adobe Systems, Bangalore, India & Ottawa, Canada

- Contributed to R&D initiatives leveraging Adobe technologies to identify emerging product opportunities and advance platform capabilities beyond existing boundaries
- Developed UNICOM project integrating voice, instant messaging, and unified communication features, attracting strategic interest from Defense Information Systems Agency (DISA), USA
- Collaborated with cross-functional teams across multiple Adobe international offices (India, Canada) to deliver high-impact technology solutions and prototypes
- Key Technologies: Flash, HTML, CSS, JavaScript, C#

Web Engineer

Sep 2007 - Apr 2011

Web Technology Group, Adobe Systems, Bangalore, India

- Contributed to Adobe's enterprise digital commerce platform (adobe.com), supporting over \$1 billion in annual transactions through technical infrastructure and feature development
- Developed core platform technologies integrated into Acrobat X and subsequent product releases, enhancing document processing and user experience capabilities
- Recognized in official Acrobat X documentation for significant technical contributions to platform architecture
- Built foundational features enabling Adobe's strategic cloud migration across Creative Cloud, Document Cloud, and Digital Marketing Cloud platforms
- Key Technologies: HTML, CSS, JavaScript, ColdFusion, Flex, Flash

MANUSCRIPTS UNDER REVIEW

- **Kollannur, S.**, Lee, S.H., & Culbertson, H. TouchTact: An Open Source, Performance-Centric Audio-Haptic Research Toolkit for Task-Oriented Mobile Interactions. *IEEE Transactions on Haptics*
- **Kollannur, S.**, Zhao, F., Chen, Y., & Culbertson, H. Open-Source Stochastic Resonance for Enhanced Sensory Integration: Democratizing Balance Control and Texture Perception Research in Virtual Environments. *ACM Transactions on Applied Perception*
- **Kollannur, S.**, Jang, K., Zhu, X., & Culbertson, H. When Touch Becomes Data: A Technology Probe Study of User Expectations for Privacy, Safety, and Control in Mediated Social Touch. *ACM Transactions on Computer-Human Interaction*
- **Kollannur, S.**, Robertson, K., & Culbertson, H. Design and Evaluation of a Cost-Effective Toolkit for Modular Haptic Harnesses in Wearable Devices. *IEEE Haptics Symposium 2026*

JOURNAL ARTICLES

- (2025) [Adding Touch to Immersive Media: An Overview of the MPEG Haptics Coding Standard](#). Guillotel, P., Muthusamy, Y., Galvane, Q., Vezzoli, E., Nockenberger, L., Sodagar, I., Da Costa, H., Hulsken, A., Lecuyer, G., Da Silva, M. P., Bouffard, F., Culbertson, H., **Kollannur, S.**, & Gueorguiev, D. *IEEE Transactions on Haptics*

CONFERENCE PAPERS

- (2026) Community-Based Online Information Literacy Training to Combat Misinformation Among South Korean Older Adults: Effectiveness, Implementation, and Lessons Learned. Jang, K., & **Kollannur, S.** Korean American Communication Association (KACA) Conference, University of Hawaii at Manoa, Honolulu, HI
- (2024) [Beyond Sight: The Role of Kinesthetic Feedback in Redirected Walking within Virtual Reality](#). Lee, S.H., **Kollannur, S.**, & Culbertson, H. 2024 IEEE Haptics Symposium (HAPTICS), Long Beach, CA
- (2021) [I/O Bits: User-Driven, Situated, and Dedicated Self-Tracking](#). Wannamaker, K.A., **Kollannur, S.**, Dörk, M., & Willett, W. Designing Interactive Systems Conference 2021 (DIS '21), Virtual Event
- (2014) [Real-time Visualization and Targeting of Online Visitors](#). Pai, D., & **Kollannur, S.** Proceedings of the 37th International ACM SIGIR Conference on Research and Development in Information Retrieval

WORKSHOP PAPERS & EXTENDED ABSTRACTS

- (2024) [Haptic Playground: Empowering Inclusive Haptic Design for Everyone](#). Joshi, B.R., **Kollannur, S.**, Mishra, A., Nguyen, T., & Schneider, O. Extended Abstracts of the 2024 CHI Conference on Human Factors in Computing Systems (CHI EA '24), Honolulu, HI
- (2023) [When Virtual Hugs Become Sexual Harassment: Conceptualizing Acceptable Forms of Mediated Touch in Extended Reality Platforms](#). Jang, K., **Kollannur, S.**, Zhu, X., & Culbertson, H. IEEE World Haptics Conference 2023 Work-in-Progress (WHC '23), Delft, Netherlands
- (2019) [Improving Texture Discrimination in Virtual Tasks by Using Stochastic Resonance](#). **Kollannur, S.**, Khosravi, H., Peters, R., Oehlberg, L., & Chan, S. CHI Extended Abstracts 2019, Glasgow, UK
- (2018) [Improving Edge and Texture Rendering in Mid-Air Haptic Systems](#). **Kollannur, S.**, Peters, R., Chan, S., & Oehlberg, L. Position paper for CHI 2018 Workshop on Mid-Air Haptics for Control Interfaces, Montreal, Canada

PREPRINTS & TECHNICAL REPORTS

- (2024) [Developing a Modular Toolkit for Rapid Prototyping of Wearable Vibrotactile Haptic Harness](#). **Kollannur, S.**, Robertson, K. & Culbertson, H. arXiv preprint arXiv:2409.04579

CONFERENCE PRESENTATIONS

- (2025) Empowering South Korea's Older Adults to Combat Online Misinformation through Information Literacy. Jang, K., & **Kollannur, S.** IPSA World Congress of Political Science, Seoul, South Korea
- (2025) Analog Realities, Digital Dilemmas: Effects and Challenges in Empowering Older Adults in South Korea through Community-Engaged Information Literacy Training to Combat Online Misinformation. Jang, K., & **Kollannur, S.** International Communication Association (ICA) Annual Conference, Denver, CO
- (2023) How Human-like and How Humane? Ethical Conundrums of Mediated Interpersonal Touch in Social XR Platforms. Jang, K., **Kollannur, S.**, & Zhu, X. 4S (Society for Social Studies of Science), Honolulu, HI
- (2023) Drawing Virtual Lines Between Intimacy and Harassment: Conceptualizing Acceptable Forms of Touch in eXtended Reality. Jang, K., **Kollannur, S.**, & Zhu, X. USC Science and Technology Studies Graduate Student Symposium, Los Angeles, CA

PATENTS

- USPTO 24/Pending: Rapid and Parallelized Manufacturing of Modular Light-Diffuser Devices
- USPTO 14/280393: Normalizing User Responses to an Event by Removing Behavioral Bias
- USPTO 14/031256: Predicting Spread of Content Across Social Networks
- USPTO 13/916775: Seed Group Selection in a Probabilistic Network to Increase Content Dissemination

KEY TECHNICAL SKILLS

- **Human-Computer Interaction:** Haptic feedback systems (vibrotactile, kinesthetic), usability engineering, user research, wearable systems, UI/UX design, ergonomics, perception measurement
- **Machine Learning & AI:** PyTorch, reinforcement learning (skrl), computer vision, prompt engineering (PromptWizard, UniPrompt), LLM operations (vLLM, llamacpp), AI workflows (n8n, ComfyUI), NVIDIA Isaac Gym, CoppeliaSim
- **Programming:** Python (NumPy, SciPy, signal processing), JavaScript (D3.js, Node.js), C/C++, R (statistical analysis), HTML/CSS, Git
- **Cloud & Architecture:** AWS (Lambda, DynamoDB, S3), RESTful APIs, microservices, NoSQL databases, ETL/data pipelines
- **Hardware & Prototyping:** PCB design, embedded systems (Arduino), 3D printing, laser cutting, sensor integration, actuator control, real-time data acquisition
- **Research & Analytics:** Statistical analysis, data visualization (D3.js), A/B testing, experimental design, qualitative/quantitative methods, usability testing, signal processing

SELECT TALKS & PRESENTATIONS

- **CES 2017** - Las Vegas, NV - Product Showcase: WebCardio (STMicroelectronics booth)
- **Adobe MAX** - Los Angeles, CA - Technology Showcases (2013: Data Visualizations; 2011: Adobe@Adobe)
- **IoTWorld** - Santa Clara, CA - Product Presentations: WebCardio (2016-17)
- **Adobe Tech/Marketing Summits** - Predictive Technologies, Emotion Visualization, Rapid Prototyping (2011-2013)
- **International Conferences:** Fab(lab) Asia Network 2017 (Panelist: Art/Design/Fabrication), UX India 2013 (Data Visualization), Cardiology Society India 2016 (WebCardio)
- **Awards:** Hack the Visual 2015 (London) - Hackathon Winner