Subramanian Chidambaram

Amazon, AgentCore Science
201 W. California Avenue,
Sunnyvale, CA, USA 94086

Curriculum Vitae

subbu10123@gmail.com
https://schidamb.github.io/

RESEARCH STATEMENT

I work at the intersection of Agentic AI systems and human-centered design, building the infrastructure that takes autonomous agents from research prototypes to dependable production systems. As part of Amazon Web Services' Bedrock AgentCore organization, I develop foundational primitives for the agent stack — connectivity, evaluation, and simulation — that let agents be deployed at scale with measurable reliability. My most recent work centers on AgentCore Evaluations, where I design evaluation methodologies and tooling for single- and multi-agent systems, shipped as part of AgentCore Evaluation Online and the On-demand managed evaluation service. I previously shipped capabilities for Amazon Bedrock AgentCore Gateway. I also contribute to AWS's open-source agent ecosystem, including Strands Agents (AWS's open-source agent framework) and awslabs (Eval-kit).

My research draws on an interdisciplinary background in Human–Computer Interaction and Artificial Intelligence, with prior work on synthetic data generation, conversational AI, model steerability, automated code generation, and human–AI collaborative architectures. Earlier in my career, I designed human-in-the-loop systems for foundation model providers — building data augmentation and annotation environments and code-generation pipelines that turned model behavior into a controllable, evaluable engineering surface.

I earned my Ph.D. from Purdue University's C Design Lab, where I designed and evaluated novel 3D interfaces and interaction techniques, integrating them with ML models to advance Extended Reality (XR). I am passionate about merging this HCI foundation with my current AI research to make AI systems more useful, transparent, and human-aligned. My work has appeared at premier AI and HCI venues, including EMNLP, ACM CHI, CSCW, UIST, TVCG, Ubicomp, DIS, and others.

EDUCATION

Purdue University, West Lafayette, IN, USA — *Aug 2017 – Dec 2022*
Doctorate of Philosophy (Ph.D), Mechanical Engineering
Thesis: *Exploration Of Codeless In-situ Extended Reality Authoring Environment For Asynchronous Immersive Spatial Instructions*
Advisors: Karthik Ramani

Purdue University, West Lafayette, IN, USA — *Aug 2015 - Aug 2017*
Master's of Science (MS), Aeronautical and Astronautical Engineering
Minor: Computational Science & Engineering

Vellore Institute of Technology, Vellore, India — *Jul 2011 - May 2015*
Bachelor's of Technology with Honors, Mechanical Engineering

RESEARCH EXPERIENCE

Amazon Web Services, Santa Clara, CA, USA — *Nov 2024 - Present*
Applied Scientist II, AI Fundamental Research (AgentCore Science)
Previously with Bedrock Science Team

Amazon Web Services, Santa Clara, CA, USA — *Dec 2022 - Nov 2024*
Postdoctoral Scientist, Human-in-the-Loop Science Team
with: Alex C. Williams and Erran Li

Autodesk Research, Toronto, Canada — *Jul 2022 - Oct 2022*
Research Intern, User Interface Research Group
with: Qian Zhou, Fraser Anderson, and George Fitzmaurice

Vellore Institute of Technology, Vellore, India — *Jul 2012 - Dec 2014*
Undergraduate Research Assistant, Mechanical Engineering
with: Geetha Manivasagam and Satyajit Ghosh

PUBLICATIONS

Peer-Reviewed Conference Proceedings

[C.1] Jain, R., Shi, J., Benton, A., Rasheed, M., **Chidambaram, S.**, and Ramani, K. (2025). Visualizing Causality in Mixed Reality for Manual Task Learning: A Study. IEEE Transactions on Visualization and Computer Graphics.

[C.2] **Chidambaram*, S.**, Li*, E., Bai, M., Li, X., Lin, K., Zhou, X., Williams, A., Socratic human feedback (SoHF): Expert steering strategies for LLM code generation. In Findings of the Association for Computational Linguistics: EMNLP 2024

[C.3] **Chidambaram, S.**, Williams, A., Bai, M., Virk, S., Haffner, P., Lease, M., Li, E., Annorama: Enabling Immersive At-Desk Annotation Experiences in Virtual Reality with 3D Point Cloud Dioramas. In *ACM Symposium on Spatial User Interaction.* Trier, Germany 2024.

[C.4] **Chidambaram, S.**, Reddy, S., Rumple, M., Ipsita, A., Villanueva, A., Redick, T., Stuerzlinger, W., Ramani, K. EditAR: A Digital twin authoring and editing environment to create instructional content for AR/VR and video media. *In 2022 IEEE International Symposium on Mixed and Augmented Reality.* Singapore, 2022.

[C.5] Villanueva, A., Liu, Z., Zhu, Z., **Chidambaram, S.**, Ramani, K., ColabAR: A Toolkit for Remote Collaboration in Tangible Augmented Reality Laboratories. In *ACM Conference On Computer-Supported Cooperative Work And Social Computing.* Virtual, 2022.

[C.6] Paredes, L., Readdy, S.S., **Chidambaram, S.**, Vagholkar, D., Zhang, Y., Benes, B., and Ramani, K. FabHandWear: An End-to-End Pipeline from Design to Fabrication of Customized Functional Hand Wearables. In *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies*, Virtual, 2021.

[C.7] **Chidambaram, S.**, Huang, H., He, F., Qian, X., Villanueva, A. M., Redick, T., Wolfgang, S., and Ramani, K. ProcessAR: An augmented reality-based tool to create in-situ procedural 2d/3d ar instructions. In *Designing Interactive Systems Conference 2021.* Virtual, 2021.

[C.8] **Chidambaram*, S.**, Zhang*, Y., Sundararajan, V., Elmqvist, N., and Ramani, K. Shape Structuralizer: Design, Fabrication, and User-driven Iterative Refinement of 3D Mesh Models. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems* (p. 663). ACM. Glasgow, SCT, May 2019.

[C.9] Yoon, S. H., Huo, K., Zhang, Y., Chen, G., Paredes, L., **Chidambaram, S.**, and Ramani, K. iSoft: a customizable soft sensor with real-time continuous contact and stretching sensing. In *Proceedings of the 30th Annual ACM Symposium on User Interface Software and Technology.* Quebec, CA. 2017.

Peer-Reviewed Journal Publications

[J.1] **Chidambaram*, S.**, Jain†, R., Reddy, S., Unmesh, A., Ramani, and K. AnnotateXR: An Extended Reality Workflow for Automating Data Annotation to Support Computer Vision Applications. In *ASME Journal of Computing and Information Science in Engineering* (August 2024).

[J.2] Unmesh, A., Jain, R., Shi, J., Chaitanya, V., **Chidambaram, S.**, Quinn, A., and Ramani, K. Interacting Objects: A dataset focusing on spatio-temporal object-object relations for richer dynamic scene representation. In *IEEE Robotics and Automation Letters* (January 2024).

[J.3] Ipsita. A., Duan. R., Li. H., **Chidambaram. S.**, Cao. Y., Liu. M., Quinn. A., and Ramani. K. The Design of a Virtual Prototyping System for Authoring Interactive VR Environments from Real World Scans. In *Journal of Computing and Information Science in Engineering* (July 2023).

*- Equal contribution
*- Equal contribution

[J.4] Adam, G., **Chidambaram, S.**, Reddy, S. S., Ramani, K., and Cappelleri, D. J. Towards a Comprehensive and Robust Micromanipulation System with Force-Sensing and VR Capabilities. In *Micromachines* (June 2021).

[J.5] Ritesh, K., Raunak, B., and **Subramanian, C.**. Advanced Suction Device with Continuous Oxygen Supply for Performing Meconium Suction and Identical Procedures. In *Journal of Biomedical Science and Engineering* (2014).

Peer-Reviewed Conference Extended Abstract

[EA.1] Ipsita. A., Duan. R., Li. H., Cao. Y., **Chidambaram. S.**, Liu. M., and Ramani. K. VRFromX: From Scanned Reality to Interactive Virtual Experience with Human-in-the-Loop. In *CHI Conference on Human Factors in Computing Systems Extended Abstracts (CHI '21 EA)* (May 2021).

[EA.2] **Chidambaram, S.**, Verma, A., Goenka, A., Y., and Ghosh, S., A Novel Sounding Protocol for Lower Boundary Layer Characterization. In *31st Conference on Environmental Information Processing Technologies* (January 2015).

Peer-Reviewed internal Conference - Amazon

[IC.1] **Chidambaram, S.**, Williams, A., Bai, M., Virk, S., Haffner, P., Lease, M., Li, E., Annorama: Enabling Immersive At-Desk Annotation Experiences in Virtual Reality with 3D Point Cloud Dioramas (AMLC 2024)

[IC.2] **Chidambaram, S.**, Williams, A., Bai, M., Virk, S., Haffner, P., Lease, M., Li, E., Annorama: Enabling Immersive At-Desk Annotation Experiences in Virtual Reality with 3D Point Cloud Dioramas (AMLC 2023 AR/VR Workshop track)

arXiv - Submission

[IC.1] Cisar, C., Sheffield, E., Drake, J., Harrell, A., **Chidambaram, S.**, Nangia, N., Arannil, V., and Williams, A. (2025). PILOT: Steering Synthetic Data Generation Psychological and Linguistic Output Targeting.

PATENTS

[P.1] Yowbang Wang, **Subramanian Chidambaram**, Abhishek Kumar, Xuan Qi, Smeet Dhakecha, Alex Williams, Jonathan Buck, Vinayak Arannil, Gouriprasad Pandeshwar, Haibo Ding, Muhyun Kim, Jaejin Cho, Lin Cheong. Managed Agentic System Simulation and Test. [Patent Pending]

[P.2] Alex C. Williams, Jonathan Buck, **Subramanian Chidambaram**. Generation, Interactive Refinement, and Deployment of UI Artifacts. [Patent Pending]

[P.3] Jonathan Buck, Alex C. Williams, **Subramanian Chidambaram**. Multi-Modal Interactive Generation of Computational Graphs and Finite State Machines Using Foundation Models. [Patent Pending]

[P.4] Karthik Ramani, **Subramanian Chidambaram**, Sai Swarup Reddy, Mantthew Rumple. A digital twin authoring and editing environment for creation of AR/VR and video instructions from a single demonstration. [Patent Pending]

[P.5] **Subramanian Chidambaram**, Alex C. Williams, Erran Li. System and Apparatus for Enabling High-Quality and Efficient Point-Cloud Frame Labeling with Virtual Reality. US Patent No. 12,423,935. Date of Patent: September 23, 2025.

[P.6] Karthik Ramani, **Subramanian Chidambaram**, Hank Huang, Fengming He. System and method for generating asynchronous augmented reality instructions. US Patent No. 17/085,620. Date of Patent: May 06, 2021.

[P.7] Ritesh Kumar, Raunak Bhavsar, **Subramanian Chidambaram**. Designed a novel 'Laryngoscope' to perform advanced suction device with continuous oxygen supply for preforming Meconium suction on infants. Indian Design Patent No. 262490. Date of Patent: Sept 05, 2014

HONORS AND AWARDS

Graduate School Mentoring Award, *Purdue University* *2020*
Magoon Excellence in Teaching Award, *Purdue University* *2020*
2017 Dassault Systèmes, Additive Manufacturing design hackathon, *Winner* *2017*
CAD Quest, Designing event in Mechnovate, *1st Position* *2013*
India Math Teachers Association National Mathematics Olympiad, *Gold Medalist* *2009*
St.John's Olympiad for Mathematics, *3rd Place* *2009*

MENTORING

Graduate Students Mentored

Rahul Jain (Purdue University, Ph.D.), Asim Unmesh (Purdue University, Ph.D.), Ananya Ipsita (Purdue University, Ph.D.), Sai Swarup Reddy (Purdue University, MS), Hank Huang (Purdue University, MS), Andrew Benton (Purdue University, MS), Devashri Vagholkar (Purdue University, MS), Venkatesh Bharadwaj Srinivasan (Purdue University, MS)

Undergraduate Students Mentored

Matthew Rumple (Purdue University, BS), Anthony Eshleman (Purdue University, BS), Andrew Violette (Purdue University, BS), Avneet Singh Bhinder (Purdue University, BS), Wentao Zhong (Purdue University, BS)

TEACHING

Teaching Assistant

Engineering projects in Community Service, Purdue University, IN *2016 - 2020*
Taught: 35 undergraduate teams comprising over 500 students across 8 semesters

SERVICE

Reviewer

1. *ACM CHI:* 2024; 2023; 2022
2. *ACM CHI EA:* 2023; 2021; 2020
3. *ACM CSCW:* 2022; 2020
4. *ACM UIST:* 2024; 2023; 2020
5. *ACM DIS:* 2024; 2023; 2022
6. *ACM VRST:* 2022; 2024
7. *ACM NordiCHI:* 2022
8. *IEEE ISMAR:* 2022; 2024
9. *IEEE VR:* 2023

Associate Chair

1. *ACM UIST:* 2025
2. *ACM CHI:* 2026

SKILLS

XR Development: Unity3D; OpenXR; Oculus SDK; MRTK; visionOS
Programming Languages: C++; C#; Python; C
AI Frameworks: PyTorch; Strands Agent; AWS Bedrock APIs; OpenAI APIs; Anthropic API
Python Frameworks: NumPy; Pandas; Scikit-Learn; Matplotlib
Computer Graphics/Vision: OpenCV; OpenGL; Three.js
Cloud Compute Services: AWS EC2, S3, Lambda, SageMaker, Ground Truth
3D Asset Design: Blender; Autodesk; Solidworks; 3D Printing; OpenSCAD; MeshLab
Prototyping: Laser Cutting; SolidCAM; CATIA; Abaqus

REFERENCES

Dr. Alex C. Williams, Postdoctoral Mentor
Principal Applied Science Manager, Global Experiences, Microsoft
Email: acwio@microsoft.com

Dr. Erran Li, Manager
Applied Science Manager, AWS Sagemaker Ground Truth, Human-in-the-Loop Science
Email: lilimam@amazon.com

Dr. Karthik Ramani, PhD Advisor
Donald W. Feddersen Distinguished Professor, Mechanical Engineering, Purdue University
Email: ramani@purdue.edu