Akshay Paruchuri

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Summary

My research interests are at the intersection of computer graphics, computer vision, and machine learning. I work on research that typically involves applications in healthcare and/or augmented reality. Currently, I'm working toward a future where wearable, spatial computing devices, such as augmented reality eyeglasses capable of all-day use, are contextually aware and personalized to the benefit of users and their goals (e.g., human memory enhancement, becoming healthier). Prior to my current interests, I've worked on synthetic data generation pipelines for health sensing, 3D reconstruction from endoscopy videos, and health insights agents that leverage large language models. I generally like working on things that are as effective and accessible as possible in both academia and industry.

Education

University of North Carolina at Chapel Hill — *Chapel Hill, NC, USA*

Ph.D. in Computer Science — *Aug 2021 - May 2026 (Expected)*

- Research Areas: Computer Graphics, Computer Vision, and Machine Learning
- Advisor: Henry Fuchs

North Carolina State University — *Raleigh, NC, USA*

B.S. in Electrical and Computer Engineering — *Aug 2014 - Dec 2019*

- Graduated with Honors
- Research Areas: Embedded Systems, Wearable Sensors

Experience

Istituto Dalle Molle di Studi sull'Intelligenza Artificiale (IDSIA) — *Lugano, CH*

Visiting Researcher (Advisor: Piotr Didyk) — *Jun 2025 - Present*

- Research involving computer graphics and human perception, with a focus on realizing AR smart glasses for all-day use.

Google — *Seattle, WA*

Student Researcher (Advisors: Ishan Chatterjee) — *Feb 2025 - Present*

- Research involving adaptive sensor capture and context-aware systems, with a focus on realizing AR smart glasses for all-day use.

Google — *Seattle, WA*

Student Researcher (Advisors: Xin Liu and Daniel McDuff) — *Mar 2024 - Aug 2024*

- Research at the intersection of healthcare and language models.

Kitware — *Carrboro, NC*

Research and Development Intern (Advisor: Brian Clipp) — *Apr 2023 - Jul 2023*

- Various research projects involving person re-identification, object detection, segmentation, and tracking.

University of North Carolina at Chapel Hill — *Chapel Hill, NC*

Graduate Research Assistant (Advisor: Henry Fuchs) — *Aug 2021 - Present*

- Research at the intersection of machine learning, healthcare, and augmented reality.

Nike — *Beaverton, OR*

Embedded Systems Engineer (Manager: Vikram Malhotra) — *Jan 2020 - Jul 2021*

- Developed hardware, algorithms, and software toward novel, wearable consumer devices for experiences involving physical fitness.

Nike — *Beaverton, OR*

Embedded Systems Engineering Intern (Manager: Vikram Malhotra) — *May 2019 - Aug 2019*

- Prototyped a feature-rich, non-form factor PCB to characterize power consumption in unique contexts and developed software toward meaningful gesture recognition using adaptive, self-lacing shoes

Publications

11 **Akshay Paruchuri**, Maryam Aziz, Rohit Vartak, Ayman Ali, Best Uchehara, Xin Liu, Ishan Chatterjee, Monica Agrawal. "What's Up, Doc?": Analyzing How Users Seek Health Information in Large-Scale Conversational AI Datasets. In submission.

10 Ken Gu, Zhihan Zhang, Kate Lin, Yuwei Zhang, **Akshay Paruchuri**, Hong Yu, Mehran Kazemi, Kumar Ayush, A. Ali Heydari, Maxwell A. Xu, Yun Liu, Ming-Zher Poh, Yuzhe Yang, Mark Malhotra, Shwetak Patel, Hamid Palangi, Xuhai Xu, Daniel McDuff, Tim Althoff, Xin Liu. RADAR: Benchmarking Language Models on Imperfect Tabular Data. In submission.

9 **Akshay Paruchuri**, Sinan Hersek, Lavisha Aggarwal, Qiao Yang, Xin Liu, Achin Kulshrestha, Andrea Colaço, Henry Fuchs, and Ishan Chatterjee. EgoTrigger: Toward Audio-Driven Image Capture for Human Memory Enhancement in All-Day Energy-Efficient Smart Glasses. In submission.

8 **Akshay Paruchuri**, Jake Garrison, Shun Liao, John Hernandez, Jacob Sunshine, Tim Althoff, Xin Liu, and Daniel McDuff. What Are the Odds? Language Models Are Capable of Probabilistic Reasoning. In *Proceedings of the 2024 Conference on Empirical Methods in Natural Language Processing* (pp. 11712-11733), November 2024.

7 Mike A. Merrill, **Akshay Paruchuri**, Naghmeh Rezaei, Geza Kovacs, Javier Perez, Yun Liu, Erik Schenck, Nova Hammerquist, Jake Sunshine, Shyam Tailor, Kumar Ayush, Hao-Wei Su, Qian He, Cory McLean, Mark Malhotra, Shwetak Patel, Jiening Zhan, Tim Althoff, Daniel McDuff, and Xin Liu. Transforming Wearable Data into Health Insights using Large Language Model Agents. *arXiv preprint arXiv:2406.06464*, 2024. In submission.

6 Shuxian Wang, **Akshay Paruchuri**, Zhaoxi Zhang, Sarah McGill, Roni Sengupta. Structure-Preserving Image Translation for Depth Estimation in Colonoscopy. In *International Conference on Medical Image Computing and Computer-Assisted Intervention* (pp. 667-677). Cham: Springer Nature Switzerland, October 2024. **[Oral]**.

5 **Akshay Paruchuri**, Samuel Ehrenstein, Shuxian Wang, Inbar Fried, Stephen M. Pizer, Marc Niethammer, and Roni Sengupta. (2024). Leveraging Near-Field Lighting for Monocular Depth Estimation from Endoscopy Videos. In *European Conference on Computer Vision* (pp. 473-491). Springer, Cham.

4 Xin Liu, **Akshay Paruchuri***, Girish Narayanswamy*, Xiaoyu Zhang, Jiankai Tang, Yuzhe Zhang, Roni Sengupta, Shwetak Patel, Yuntao Wang, and Daniel McDuff. rPPG-Toolbox: Deep Remote PPG Toolbox. *Advances in Neural Information Processing Systems*, vol. 36, 2024. **[650 stars on GitHub as of May, 2025]**.

3 **Akshay Paruchuri**, Xin Liu, Yulu Pan, Shwetak Patel, Daniel McDuff, and Soumyadip Sengupta. Motion Matters: Neural Motion Transfer for Better Camera Physiological Measurement. *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, January 2024, pp. 5933-5942. **[Oral, Top 2.6%, 53 of 2042 submissions]**.

2 Qian Zhang, **Akshay Paruchuri**, Young-Woon Cha, Jia-Bin Huang, Jade Kandel, Howard Jiang, Adrian Ilie, Andrei State, Danielle Szafir, Daniel Szafir, and Henry Fuchs. Reconstruction of Human Body Pose and Appearance Using Body-Worn IMUs and a Nearby Camera View for Collaborative Egocentric Telepresence. *2023 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW)*, Shanghai, China, 2023, pp. 96-97, doi: 10.1109/VRW58643.2023.00025.

1 Angelos Angelopoulos, Austin Hale, Husam Shaik, **Akshay Paruchuri**, Ken Liu, Randal Tuggle, and Daniel Szafir. Drone Brush: Mixed Reality Drone Path Planning. *Late-Breaking Reports at the IEEE/ACM International Conference on Human-Robot Interaction (HRI 2022)*.

Skills

Design	Research Experiments, User interface design, Hardware prototypes (PCB layout, circuit modeling)
Programming	C++, C, Python (NumPy, OpenCV, PyTorch, and PyTorch3D)
Hardware	Displays, MCUs, FPGAs, Soldering, Oscilloscope, Logic analyzer, 3D printing

Courses

Taken

First Principles of Computer Vision (Coursera), Mathematics for Machine Learning and Data Science (Coursera), Computer Vision in our 3D World (UNC), Machine Learning (UNC), Deep Learning (UNC), Neural Rendering (UNC), Visual Recognition with Transformers (UNC), Topics in Parallel Computing (UNC), Mobile Health Systems (UNC), Human-Robot Interaction (UNC), Information Visualization (UNC), and Introduction to Mathematical Thinking (Coursera)

Taught

2D Computer Graphics (Fall 2024, TA)

Awards

ASSIST Center Undergraduate REU (Summer 2018, sponsored by RTNN)
ASSIST Center Undergraduate Research Fellowship (Fall 2018)
NC State ECE Department Undergraduate REU (Fall 2018)
NC State Dean's List (4.0 GPA in Spring 2019 and Fall 2019)

Presentations

Motion Matters: Neural Motion Transfer for Better Camera Physiological Sensing
Poster Presentation, International Conference on Computational Photography (Summer 2023)
Poster Presentation, UNC Data Science Day (Fall 2023)
Oral + Poster Presentation, IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) (Winter 2024)
FORABOT: An Autonomous and Accessible System for Sorting Foraminifera
Poster Presentation, NC State Undergraduate Research and Creativity Symposium (Spring 2019)
Thermoelectric Properties of $CuBi_xSb_{1-x}Te_2$ Bulk Alloys
Technical Talk and Poster Presentation, National Nanotechnology Coordinated Infrastructure (NNCI) REU Convocation (Summer 2018)
Poster Presentation, NC State Undergraduate Research and Creativity Symposium (Summer 2018)
Poster Presentation, ASSIST Center Research Symposium (Summer 2018)

Proposals

NIH SCH: An Augmented Reality Neurorehabilitation System for Monitoring and Management of Motor Symptoms of Parkinson's Disease. Project Number: 1R01HD111074 ($1,186,393 across 4 years). Role: Student lead. I wrote significant portions of the proposal under the supervision of Professor Henry Fuchs and I helped in literally every aspect of the proposal submission process.

Mentoring

Mingxuan Li (UNC CS BS, Spring 2022, now at CMU CS BS)
Yulu Pan (UNC CS BS, Fall 2022-Spring 2023, now at UNC CS MS)
Ray Shealy (UNC CS BS, Fall 2024-Present)
Ashley Neall (UNC CS BS, Spring 2024-Present)

Outreach & Academic Service

Outreach
UNC-CH Computer Science Student Association Officer, Summer 2023 - Spring 2024
UNC-CH Computer Science Student Association President, Fall 2022 - Summer 2023
UNC CS Fellowship Panel Organizer, Fall 2022
Decoding Graduate Programs in CS Panel Member, Fall 2022
UNC CS Middle School/High School Open House Volunteer, Spring 2023
UNC CS Vision Seminar Organizer, Spring 2023
Summer Geometry Initiative (SGI) Mentor, Summer 2024
Academic Service
IEEE VR 2023, Reviewer
Information Systems Frontiers, Reviewer
NeurIPS 2024 Datasets and Benchmarks, Reviewer
CSCW 2025, Reviewer
CHI 2025, Reviewer
CVPR 2025 - Workshop on Computer Vision for Mixed Reality, Reviewer
ISMAR 2025, Reviewer
UIST 2025, Reviewer

Authorizations

U.S. Citizenship
Amateur Radio License (Granted by the FCC, Call-sign: KN4IOS)

Hobbies

Reading, running, and hiking