Courtney Hutton Pospick

Ph.D. Candidate, Computer Science

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Education

Exp. 2024 **Ph.D.**, *University of Minnesota*, Minneapolis, MN.
Computer Science & Engineering, advised by Evan Suma Rosenberg

2016 – 2018 **Ph.D. Student**, *University of Southern California*, Los Angeles, CA.
Computer Science & Engineering, advised by Evan Suma Rosenberg

2013 – 2016 **B.A.**, *Occidental College*, Los Angeles, CA.
Mathematics

Scholarship & Awards

2020 – 2022 **ARCS Foundation 3M Scholar**.
$10,000 merit-based award sponsored by 3M

2019 – 2020 **Graduate Assistance in Areas of National Need (GAANN) Fellow**.
Competitive fellowship covering full tuition, fees, and a need-based stipend

Research Experience

08/2018 – present **Graduate Research Assistant**, *Illusioneering Lab*, University of Minnesota.
- Published 6+ peer-reviewed papers for ACM and IEEE conferences in HCI & 3D Graphics, including a VRST "Best Paper" and over 4 first-author publications.
- Created 6+ end-to-end VR/AR applications as the sole developer, working with C#, Unity, Python, and a broad range of APIs and devices.
- Leveraged compute shaders in HLSL/GLSL to manipulate eye-tracking data and image properties to calculate cognitive workload in real-time at 90+ Hz. This represents a 4400% increase over existing workflows, which ran at 2 Hz.
- Integrated existing LLM APIs to create a proof-of-concept VR demonstration that turned verbal natural language instructions into a sequence of executable commands for a flying robotic agent.
- Designed and implemented three spatial interaction techniques affording natural, intuitive 3D path manipulation in VR and AR. Developed user studies to quantitatively benchmark and compare the interaction techniques through existing biometric metrics and novel performance-based metrics.
- Integrated physiological tracking devices with multiple VR applications, allowing real-time read back of metrics such as heart rate and galvanic skin response. Applied these metrics to monitor cognitive workload and motion sickness.
- Partnered with multi-disciplinary researchers in Kinesiology and Cognitive Science to investigate perceptual illusions to mitigate cybersickness. contributed to three psychophysical and perception studies for the manipulation of optic flow, leading to two publications.

- Extended existing UX metrics for 2D interfaces to 3D environments, including a performance-based measure to assess the learnability of new interactions among novice and expert users.
- Designed and prototyped a low-cost, discreet Arduino wearable to improve emotional awareness using a community-based participatory design process; published the design at CHI 2019.

07/2021 – 09/2021 **Graduate Research Fellow**, *Magic Leap, Inc.*, Plantation, FL.
Product Research and Design. Supervised by Charlotte Vinkers.
- Planned and moderated two vision and perception studies for a new AR headset; calculated detection and discrimination thresholds from psychophysical tasks and analyzed qualitative data from semi-structured interviews.
- Distilled findings to measure progress towards company objectives and key results; identified three areas for improving the product, drafted possible solutions, presented insights to senior management, human factors, and marketing.
- Collaborated on developer guides and SDKs, supplying knowledge of best principles and techniques for interaction in AR.

05/2018 – 08/2018 **Graduate Research Intern**, *Army Research Lab*, Los Angeles, CA.
Supervised by Suya You
- Extended a digital sand table prototype for the HoloLens using Unity and Vuforia to aid military mission planning, collaboration, and data visualization; wrote custom HLSL shaders to manage object and field-of-view culling.
- Added visualization capabilities for up to four co-located users, enabling features such as shared examination and markup of 3D assets.

08/2016 – 08/2018 **Graduate Research Assistant**, *University of Southern California*, Los Angeles, CA.
Institute for Creative Technologies, advised by Evan Suma Rosenberg
- Developed a method to calculate individual psychophysical thresholds for during image-based manipulation of perceptual cues; validated this method with a user study, and analyzed additional data in SPSS to identify early cues of cybersickness.
- Examined novel mixed reality frameworks for non-co-located collaboration, identified existing standards and open research questions within the space.
- Refined a simulator for modeling natural locomotion during redirected walking.

05/2017 – 08/2017 **Magic Lab Intern**, *PlayStation*, San Mateo, CA.
Research and Development, supervised by Richard Marks and Steven Osman
- Designed an experimental VR interface for the PlayStation VR headset backed by a local SQLite database of 200 VR assets during a partnership with Sony Music Group and the Jet Propulsion Laboratory.
- Identified and traced a bug in the Unity PS4 API that caused regular system freezes; the resulting update eliminated 100% of system freezes during garbage collection and enabled testing for gesture recognition interfaces.

Teaching & Mentoring Experience

01/2023 – 05/2024 **Graduate Teaching Assistant**, *University of Minnesota*, CSCI 4611: Interactive Computer Graphics & Games.
- Guided students through web-based graphics projects using Typescript, covering a range of topics including linear algebra, 3D affine transformations, HLSL shaders, rendering pipelines, motion-capture based animation, and physics simulation.
- Helped maintain an open-source graphics library based in TypeScript, GopherGfx. Wrote clean, readable, well-documented code for students and staff to use in classrooms and homework assignments.

08/2020 – 05/2024 **Undergraduate Research Mentor**, *University of Minnesota*.
Illusioneering Lab
- Mentored and supervised two separate undergraduate women in graphics and HCI concepts, as well as general research principles. They went on to engage in directed research within the lab, developing VR applications and perceptual user studies, some of which led to conference publications.

09/2021 – 05/2022 **Graduate Teaching Assistant**, *University of Minnesota*, CSCI 5801: Software Engineering.
- Covered software development models such as Waterfall and Agile (Scrum and Kanban), requirements analysis, and system testing. Emphasized version control (git) and documentation including SRS, UML models, and user stories, and design documentation.

06/2020 – 08/2023 **NSF REU Mentor**, *University of Minnesota*.
Human-Centered Computing for Social Good
- Supervised cohorts of 10+ undergraduate scholars from underrepresented groups during summer research projects; served as a point of contact and intermediary between scholars, the department, and supervising professors.
- Counseled students on individual projects and research concepts in graphics, robotics, and HCI; wrote and taught 8 weekly modules each year covering the research process, scientific ethics, and technical writing.

11/2019 – 03/2021 **Student Volunteer Chair**, *IEEE Virtual Reality 2020, 2021*.
- Collaborated with conference chairs to identify conference needs and allocate volunteers. Evaluated 190+ applications each year to select 40 diverse student volunteers; created documentation and onboarding programs.
- Pivoted from initial volunteer plans to convert the March 2020 conference and operations to an online, VR-capable event in two weeks; recruited and trained 50+ replacement volunteers in a brand-new conference and volunteer pipeline. The conference broke records with over 1000 attendees from around the world.

08/2016 – 05/2017 **Graduate Teaching Assistant**, *University of Southern California*, CSCI 109: Introduction to Computer Science.
- Developed quizzes, exams, and introductory C++ assignments for entering computer science students; held office hours and review sessions to reinforce classroom concepts. Covered the history and fundamentals of computer science, dynamic programming, and fundamental algorithms.

Publications

Refereed Papers

[1] C. Hutton Pospick, V. Cantory, T. Nie, I. Adhanom, and E. Suma Rosenberg. Passive mid-air locomotion techniques: Insights from luminance-corrected pupillary metrics on cognitive workload. In *2025 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*. 2025. *[submitted]*.

[2] T. Nie, C. Hutton Pospick, V. Cantory, D. Zhang, J. J. Deguzman, V. Interrante, I. Adhanom, and E. Suma Rosenberg. Peripheral teleportation: A rest frame design to mitigate cybersickness. In *2025 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*. 2025. *[submitted]*.

[3] C. Hutton Pospick and E. Suma Rosenberg. Creating and Manipulating 3D Paths With Mixed Reality Spatial Interfaces. In *Frontiers in Virtual Reality*, vol. 4(2023). doi:10.3389/frvir.2023.1192757.

[4] J. Thomas, C. Hutton Pospick, and E. Suma Rosenberg. Towards physically interactive virtual environments: Reactive alignment with redirected walking. In *26th ACM Symposium on Virtual Reality Software and Technology*. 2020. doi:10.1145/3385956.3418966. *[Best Paper Award]*.

[5] C. Hutton and S. Saravanan. ReMind: Improving emotional awareness for persons in recovery. In *2019 CHI Conference on Human Factors in Computing Systems*. 2019. doi:10.1145/3290607.3312997.

[6] C. Hutton, S. Ziccardi, J. Medina, and E. Suma Rosenberg. Individualized calibration of rotation gain thresholds for redirected walking. In *ICAT-EGVE 2018 - International Conference on Artificial Reality and Telexistence and Eurographics Symposium on Virtual Environments*, pp. 61–64. 2018. doi:10.2312/egve.20181315.

Conference Posters

[1] C. Hutton, S. Ziccardi, J. Medina, and E. Suma Rosenberg. Please don't puke: Early detection of severe motion sickness in VR. In *2018 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, pp. 579–580. 2018. doi:10.1109/VR.2018.8446382.

[2] C. Hutton and E. Suma. A realistic walking model for enhancing redirection in virtual reality. In *2016 IEEE Virtual Reality (VR)*, pp. 183–184. 2016. doi:10.1109/VR.2016.7504714.

Doctoral Consortiums

[1] C. Hutton. Augmented reality interfaces for semi-autonomous drones. In *2019 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, pp. 1361–1362. 2019. doi:10.1109/VR.2019.8797893.

Research Demonstrations

[1] J. J. DeGuzman, E. DeVries Smith, S. Nepal, K. Miller, C. Hutton Pospick, T. Nie, and E. Suma Rosenberg. Walk me through it: Using impossible spaces to embody graph traversal algorithms. In *2024 IEEE Virtual Reality (VR) 3D User Interfaces (3DUI)*. 2024.

[2] C. Hutton, N. Sohre, B. Davis, S. J. Guy, and E. Suma Rosenberg. An augmented reality motion planning interface for robotics. In *2019 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, pp. 1313–1314. 2019. doi: 10.1109/VR.2019.8798010.

[3] C. Hutton and E. Suma Rosenberg. Augmented reality motion planning for drones. In *Driven to Discover (D2D) at the Minnesota State Fair*. University of Minnesota, Minneapolis, MN. 2019.

Service & Professional Activities

Peer-Review Experience

ACM   Symposium on User Interface Software and Technology (UIST)

ACM   Symposium on Virtual Reality Software and Technology (VRST)

ACM   Symposium on User Interaction (SUI)

IEEE   Transactions on Visualization and Computer Graphics (TVCG)

IEEE   International Symposium on Mixed and Augmented Reality (ISMAR)

IEEE   Virtual Reality and 3-D User Interaction (VR)

IEEE   Visualization and Visual Analytics (Vis)

Professional Organizations

Student Member, Association for Computing Machinery (ACM)

Student Member, Institute of Electrical and Electronics Engineers (IEEE)

Media

"Redirected Walking and Physical Interaction," *Journey's Edge*, NotionTheory. Podcast, 2021. notiontheory.com/podcast