Trenton Wirth

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Computational Perceptual-Motor Scientist & UX Researcher

I am an experimentalist with expertise in human perception and action. I have 8 years of experience designing psychophysics-based experiments using AR/VR systems to examine the complex relationship between visual perception and movement. Over the past 2 years I have been leading UX research for FreeMoCap (freemocap.org), a non-profit I co-founded dedicated to providing easy to use free and open source motion capture for everyone.

Experience

Co-Founder & UX Research Scientist **2020 - Present**
The FreeMoCap Foundation

Free and Open Source Motion Capture

Performed the first wave of mixed-methods research in collaboration with engineers, software developers, marketing, and designers, resulting in our successful pre-alpha release

Project managed 3 inter-laboratory end-to-end collaborative validation studies resulting in initial benchmarking internally and against competitors

Conducted surveys and interviews of the FreeMoCap community, resulting in the development of a GUI for our Alpha release

Post-Doctoral Researcher **2020 - Present**
Northeastern University

Visual Control of Foot Placement

Designed a ground-projected Augmented Reality psychophysics-inspired terrain combining Unity with a marker-based motion capture system, resulting in a new experimental paradigm

Synchronized and analyzed eye tracking data (Pupil Core) alongside full-body kinematics & navigation across the AR terrain, resulting in 2 conference presentations and 1 in-preparation manuscript

Graduate Student Researcher **2014 - 2021**
Brown University

Walking in Virtual Crowds

Conducted VR realism surveys & interviews that influenced over 6 years of experimental design

Studied how individuals coordinate their locomotion and navigate through/with crowds of avatars in virtual reality, resulting in 8 conference presentations and 4 written publications

Built data-driven agent-based models that successfully predicted participant behavior when walking in real and virtual crowds

Education

Brown University, Providence RI • February 2021
PhD, Cognitive Science

University of Cincinnati, Cincinnati OH • April 2014
B.S. in Psychology, (*Cum Laude*)
B.A. in Philosophy, (*Summa Cum Laude*)

Research Skills

General

Experimental design, psychophysics & threshold testing, project management, subject recruitment, professional scientific writing and verbal communication, agile method

Research Methods

General statistics, hypothesis testing, computational modeling, time series analysis, regression analyses (linear, logistic), expert reviews, remote field studies, interviews, surveys (including Likert-scale analyses), user segmentation, usability studies, logs analysis

Hardware

Eye tracking (Pupil Core, Pupil Invisible), motion capture (Qualisys, FreeMoCap), Virtual Reality (Oculus, Samsung, Vive), Augmented Reality (Unity + Qualisys)

Software

Unity, Python, SQL, HMTL, CSS, R, Matlab, Vizard, GitHub, Microsoft Suite

Grants

Epic MegaGrant, The FreeMoCap Foundation, 2022

Link Foundation Fellowship:
Modeling Simulation & Training, 2019

Hyundai Visionary Challenge Award Recipient
Brown University, 2018

Selected Publications

Wirth, T.D., Dachner G.C., Rio K.W., & Warren W.H. (In Review) The neighborhood of interaction in human crowds is neither metric nor topological, but visual. bioRxiv 2022.08.18.504451; doi: https://doi.org/10.1101/2022.08.18.504451

Wirth T.D. & Warren W.H. (2021). Robust weighted averaging accounts for recruitment into collective motion in human crowds. *Frontiers Applied Math & Statistics:* 73. doi: https://doi.org/10.3389/fams.2021.761445

Dachner, G.C., **Wirth T.D.**, Richmond, E., & Warren W.H. (2022). The visual coupling between neighbors explains 'flocking' in human crowds. *Proceedings of the Royal Society, B.* doi: https://doi.org/10.1098/rspb.2021.2089

Kinateder, M., **Wirth, T. D.**, & Warren, W. H. (2018). Crowd dynamics in virtual reality. In *Crowd Dynamics, Volume 1* (pp. 15-36). Birkhäuser, Cham. (Book Chapter)