Trenton Wirth

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Computational Perceptual-Motor Scientist

Assistant Professor Educator of Psychology, specializing in perception-action modeling, VR/AR-based behavioral research. Co-founder of FreeMoCap, an open-source motion capture system. Passionate about advancing AI and human-centered research through interdisciplinary collaboration

Skills

- Research & Analysis: Perception-action modeling, human subjects research, UX research, VR/AR experiment design
- Technical: Python (NumPy, SciPy, Pandas, OpenCV), C# (Unity), SQL, MATLAB, R, Git, Unix environments, computer vision-based motion capture (DeepLabCut, MediaPipe)
- Software & AI Pipelines: End-to-end data processing, timeseries analysis, optimization algorithms, behavior modeling
- Technical Education & Mentorship: Curriculum development, interdisciplinary consultation, research innovation support

Experience

Assistant Professor, Educator – *University of Cincinnati, Department of Psychology (2023 – Present)*

- Designed PSYC 3010: Programming for Behavioral Scientists and PSYC 5063: Cognitive Science & AI, integrating applied coding, AI, and computational modeling into psychology research; introducing **100+** students to programming in python
- Providing technical consultation for PhD students, solving challenges in VR, motion capture, and web-based experiments
- Leading interdisciplinary research projects, applying computational methods to study the visual control of locomotion

Co-Founder – *The FreeMoCap Foundation (2020 – Present)*

- Developed an AI-driven motion capture pipeline to extract and analyze human movement data
- Designed Python-based telemetry tracking for UI interaction analytics, generating insights from more than **10,000 users**
- Managed open-source development, documentation, and interdisciplinary collaborations

Postdoctoral Researcher – *Northeastern University, Human Movement Neuroscience Lab (2020 – 2023)*

- Designed a **Unity-based AR locomotion experiment**, integrating real-time auditory feedback
- Developed a **Python pipeline for synchronizing motion capture and eye-tracking data**, leading to (selected) communications:
    - Wirth, T.D., Matthis, J.S. (2022). Terrain complexity and the relationship between gaze and foot placement. *Dynamic Walking.*
    - Wirth, T.D., Reinhart, S.E., Nguyen, M., & Matthis, J.S. (2022). Terrain complexity and the relationship between gaze and locomotion. *Vision Sciences Society.*
- Created **TimeScriber**, a CLI-based tool for timestamped behavioral data annotation
- Mentored graduate and undergraduate students in **computational modeling and experiment design**

PhD Researcher – *Brown University, Virtual Environment Navigation Lab (2014 – 2021)*

- Conducted **VR-based locomotion experiments** on human **perception-action dynamics**, leading to (selected) publications:
    - Wirth, T.D., Dachner, G.C., Rio, K.W., & Warren, W.H. (2023). Is the neighborhood of interaction in human crowds metric, topological, or visual? *PNAS Nexus.*
    - Dachner, G.C., Wirth, T.D., Richmond, E., & Warren, W.H. (2022). A visual model of collective motion in human crowds. *Proceedings of the Royal Society B.*
    - Wirth, T.D., Warren, W.H. (2019). Collective Decision Making in Human Crowds: Majority Rule Emerges from Local Averaging. *Vision Sciences Society.*
- Developed an **agent-based crowd simulation model** to predict human navigation behavior in virtual environments
- Led experimental design, data analysis, and computational modeling for **multimodal human behavior studies**

Education

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

University of Cincinnati, Cincinnati OH, April 2014
B.S. in Psychology, B.A. in Philosophy