Elshaddai Muchuwa

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RESEARCH INTERESTS

I am interested in the representational and inferential assumptions that govern how AI clusters, ranks and assesses people and in designing relational, participatory methods that mitigate their impacts on marginalized communities.

EDUCATION

B.A Cognitive Science and Government, *Franklin & Marshall College*
Study Abroad, *DIS Copenhagen, Denmark*

RESEARCH EXPERIENCE

2024-Present **Research Assistant**, Dr. Wilson, Computer, Affective, Robotic, & Ethical Sciences Lab, F&M College. Studied how students' ethical reasoning, inclusion perceptions and engagement changed over 4 month period. Built survey instruments; coded 2000+ qualitative artifacts; implemented PCA and mixed effected models(nested, AIC) to track shifts in affective-participatory and cogniotve indicators. Authored two papers accepted at ACM SIGSCE (2025, 2026); led faculty training workshops on ethics and Gen AI.

2025-Present **Undergraduate Honors Research**, (Research Advisor: Dr. S. Dicklitch-Nelson). *Developing context-senstive audit framework Composite Vulnerability Persona (CVP); building qualitative risk mapping protocols and quantitative methods to model relational harm across intersecting vulnerability.*

2025 **Research Project**, Human-Robot Interaction. Programmed interactive robot to study user affect and engagement; implemented touch-events, detection, poses, LED states using Python. Designed interactive dashboard and sentiment log board using Javascript, Flask and Supabase.

2025 **Research Assistant**, Prof. Scott Engen, Cognitive Neurosceince of Consciousness Lab, DIS. Researched the impact of immersive VR on episodic memory recall. Designed structured recall tasks; programmed data-capture scripts; implemented Azure sentiment analysis in Python to extract affective cues from verbal responses; cleaned and analyzed data in R; produced final report and poster *(won Best Poster and Interactive Presentation Award at DIS Festival)*

2025 **Research Project**, DIS. Built search-based autonomous agents for hospital environment in Python (Jupyter); formalized navigation tasks; modeled state space constraints and designed admissable heuristics.

2024 **Research Course**, Social Psychology. F&M College. Designed between-subjects study testing the influence of AI-generated admissions recommendations (suitability scores) on admission decisions and whether cognitive-affective traits predicted susceptibility to that influence. Built Qualtrics instruments, ran tests (independent-samples, multiple regression, correlational analysis and assumption tests); produced final proposal report.

2023 **Research Assistant**, Dr. McNulty, F&M College. Built and cleaned participatory governance dataset; constructed coding scheme for institutional powers and decision rules; performed archival extraction across data sources; proofread and authored analytic summariesfor upcoming book, "The Power and Perils of Participatory Democary"

PUBLICATIONS

1. **Elshaddai Muchuwa*** and Jason R. Wilson (2025). "Student/Faculty Partnerships to Teach Computing Ethics Beyond the Computer Science Classroom". In: *SIGCSE Technical Symposium 2026*

2. **Elshaddai Muchuwa*,** Jason R. Wilson, and Lee Franklin. 2025. Co-Creation and Inclusive Design: Developing a Machine Ethics Curriculum through Collaborative Pedagogy. *In Proceedings of the 56th ACM Technical Symposium on Computer Science Education V. 2 (SIGCSETS 2025). Association for Computing Machinery, New York, NY, USA, 1757.* https://doi.org/10.1145/3641555.3705022

FELLOWSHIPS & AWARDS

2024 **Pi Sigma Alpha**, F&M College, Lancaster, PA
2023-24-25 **Hackman Research Fellowship**, F&M College, Lancaster, PA - $14.4k
2023 **Harwood Leadership Fellowship**, F&M College, Lancaster, PA

TECHNICAL SKILLS

- **Programming:** Python; Java; R; Matlab; Stata; JavaScript; HTML/CSS
- **AI + Big Data:** NumPy; Pandas; Scikit-learn; Heuristic Design; State-space modeling; Agent-based navigation; Adversarial Search; Reinforcement-learning Basics; Baseline Classifier Construction; Counterfactual Harm Estimation
- **Statistical Modeling:** Principal Component Analysis; mixed-effects regression (hierarchical/nested); variance decomposition; AIC comparison; residual/model-fit diagnostics; repeated-measures/longitudinal modeling; logistic and linear regression; likert-scale modeling
- **Research:** Survey Design (Qualtrics); Crowdsourcing (M-Turk); UI/UX Research and Design (User-interviews, Journey Mapping, Story-boarding, Wireframing, Prototyping, A/B Testing);

Participatory Risk Mapping, HCI Research; Qualitative Thematic Coding (Azure; Nvivo); Simulation Design and Execution; Behavioral Study Desig