

# TLAMELO MAKATI

*Researcher & Engineer — AI Systems • Evaluation • Inclusive Technology*

Dublin, Ireland • [tmakati04@gmail.com](mailto:tmakati04@gmail.com) • +353 83 088 8527 • [LinkedIn](#) • [Google Scholar](#)

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## PROFILE

Interdisciplinary researcher and engineer working at the intersection of AI systems, human behaviour, and real-world evaluation. My work focuses on building and assessing AI-enabled tools in high-stakes contexts, especially digital accessibility and inclusive technology, and translating evidence into practical systems and policy recommendations. I combine hypothesis-driven research, mixed-methods studies, and technical prototyping (Python-based pipelines) with an engineering mindset for reproducible workflows and robust deployment.

## CORE COMPETENCIES

- Hypothesis-driven research: research question formulation, experimental planning, evaluation design, and iterative refinement
- Quantitative & qualitative validation: surveys, interviews (29+), focus groups, evidence synthesis, and limitations/assumptions documentation
- AI evaluation & reliability: defining measurable success criteria, identifying failure modes, and assessing real-world system impacts
- Inclusive technology & accessibility: standards-informed auditing (WCAG, EN 301 549), assistive technology evaluation, and participatory design
- Engineering practice: Python prototyping, reproducible pipelines, data processing and reporting workflows
- Communication & leadership: technical writing, stakeholder engagement, teaching/mentoring, and cross-functional collaboration

## TECHNICAL SKILLS

- Programming: Python, R; scripting/automation; Jupyter notebook
- ML/data: scikit-learn workflows (classification, validation), feature processing/selection, reporting; experiment organisation
- Web & accessibility tooling: Deque Axe Auditor / Axe DevTools Pro, WAVE, VoiceOver, keyboard-only testing; WCAG 2.1/2.2, EN 301 549
- Reproducibility & systems: Linux, Git, Docker; documentation for repeatable research and deployments
- Research methods: study design, survey instruments, interview/focus group protocols, thematic analysis and triangulation

## EXPERIENCE

### **PhD Researcher (Computer Science) — Technological University Dublin | 2021–Present**

- Research focus: ML/AI for digital accessibility and inclusive technology, with emphasis on evidence quality, real-world evaluation, and socio-technical impacts.
- Designed and conducted mixed-method studies including 29 stakeholder interviews, focus groups, and a survey across accessibility, assistive tech, and AI research communities.
- Evaluated AI-driven accessibility tools and practices through fairness, transparency, and reliability lenses; documented limitations and actionable improvement opportunities.
- Produced research outputs and stakeholder-facing documentation, translating findings into practical recommendations for design, evaluation, and governance.

### **Visiting Researcher — Rochester Institute of Technology (CAIR Lab) | 2023–2024**

- Co-researched the promise and pitfalls of web accessibility overlays with blind and low-vision participants; contributed to study design, evaluation, and synthesis.
- Collaborated with cross-disciplinary partners to translate findings into concrete recommendations for teams building or procuring AI-enabled accessibility tools.

### **Accessibility Evaluation Intern — National Disability Authority (Ireland) | 2024 (short internship)**

- Evaluated websites using Deque accessibility tooling and standards-informed methods; documented issues, severity, and remediation implications.
- Developed an assistive-tech grounded evaluation capability through VoiceOver use to strengthen the validity and interpretation of findings.
- Produced structured outputs to support auditing workflows and decision-making.

### **Assistant Lecturer (Research Methods) — Technological University Dublin | 2025**

- Taught and supported postgraduate research methods: study design, analysis planning, and ethical, inclusive research practice.
- Mentored students in producing clear, defensible research artefacts and communicating evidence to mixed audiences.

### **Engineering Intern — United Nations Environment Programme (UNEP) | 2021**

- Supported research and synthesis work on technology use in environmental/disaster-response contexts, focusing on socio-technical constraints and responsible deployment considerations.

### **SURF Research Intern — Stanford School of Engineering | 2018**

- Supported experimentation and analysis in ML/computer vision research; contributed to reproducible documentation and research communication.

## SELECTED TECHNICAL PROJECTS

### **ARIA Landmarks Identification (PhD Project) — Python, scikit-learn, Selenium, Docker**

- Built an end-to-end pipeline to automatically identify ARIA landmark regions in web applications using DOM element classification and clustering.
- Trained and compared SVM, KNN, Decision Tree, and Random Forest models; ran 10-split group-based cross-validation (grouped by URL) and generated consolidated precision/recall/F1 reports.
- Implemented feature processing/selection and tracked feature usage frequency to support interpretability and iteration.
- Applied the classifier to unseen web apps and clustered predicted regions by class and spatial layout to select the highest-probability landmark candidates.
- Generated visual image reports overlaying predicted landmarks on screenshots to support qualitative validation and error analysis.
- Packaged the workflow with Docker for reproducible execution across environments.

### **Accessibility Evaluation & Audit Workflows (Research & Practice)**

- Designed and executed accessibility evaluations combining automated tooling and manual/assistive-technology testing to identify high-impact barriers.
- Produced structured findings and recommendations aligned to WCAG/EN 301 549 requirements for remediation and governance purposes.

### **PUBLICATIONS (SELECTED)**

- Makati, T. (2025). Assessing AI's Role in Digital Accessibility. In *Beyond Tech Fixes* (Springer).
- Makati, T., Tigwell, G., & Shinohara, K. (2024). The Promise and Pitfalls of Web Accessibility Overlays for Blind and Low-Vision Users ACM ASSETS.
- Makati, T. (2022). Machine Learning for Accessible Web Navigation. ACM W4A.

### **TALKS, TEACHING & OUTREACH (SELECTED)**

- ACM FAccT (2025): Stakeholders' perceptions of active inclusion for AI tools supporting accessibility (presentation).
- Women Techmakers Southern Africa: Introduction to AI Design & Development (talk).
- IndabaX Botswana: Introduction to Machine Learning (talk/workshop).

### **FELLOWSHIPS & AWARDS**

- Humboldt Residency Programme (2024)
- SFI-NSF Dublin-Rochester Mobility Fellowship (2023)
- African Drone and Data Academy (ADDA) Scholarship (2020)
- Stanford SURF Fellowship (2018)

### **LEADERSHIP & SERVICE**

- Women in STEM — Expertise & Mentorship Director
- Women in Machine Learning & Data Science (WiMLDS) Gaborone — Co-organiser
- BIUST Alumni — Director of Research & Innovation

## **EDUCATION**

- PhD, Computer Science (in progress) — Technological University Dublin (Expected 2026)
- BEng, Mechatronics Engineering

## **ADDITIONAL**

- Professional development: Certificate in AI policy/governance training (CAIDP course; Research Group Member).
- Tools & environment: Linux-first workflow since 2018; comfortable working in ambiguity and cross-disciplinary teams.
- Language: English (professional proficiency).