Charles Delahunt

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https://charlesdelahunt.github.io

Expert in AI for healthcare

Understand the specific needs of the clinical use-case, then tailor AI solutions to fit these needs and hit performance requirements. That is, shape AI to deploy successfully to the clinic.

- Collaborate with field experts and clinical partners
- Translate use case constraints into an AI context to guide algorithm development
- Interrogate / curate datasets for optimal training
- Define / derive clinically relevant metrics for AI dev and evaluation

Examples:

Automated malaria microscopy:

A famously hard task due to small targets, noisy blood films and demanding performance reqs. I led our algorithm dev team, plus had ownership of: understand use case (via literature and experts), curate data, shape architecture to fit specifics of the task, derive evaluation metrics. *Results:* SOTA algorithms, validated in 5 trials in 14 countries. 10 publications. Handed off to a commercial partner. Currently preparing a 12 TB dataset for public release.

Biosensor data during labor:

A Gates Foundation (GF) MNCNH grantee had a vast dataset on 12,000 women in labor: clinical data (events, labs, outcomes) and time-series sensor data (maternal, fetal). But they lacked bandwidth to address the sensor data.
I took full ownership and initiative for all aspects of sensor data: explored, assessed, cleaned, processed, prepared for outside users. Operational lead on 4 analysis sprints for GF priorities.
Results: Actionable findings for GF, and a clean and usable sensor dataset. Now helping to prepare this dataset for public release.

LLMs for text classification:

ASTMH (premier tropical medicine conference in the U.S.) receives '000s of abstracts in 54 categories for their annual conference. But abstracts submitted to an incorrect category get sent to the wrong review committees, a huge headache to fix *post-hoc*.
I volunteered and led our AI team to build an LLM-based model to vet submitted abstracts.
Results: The model identifies potentially misclassified abstracts, enabling correction before distribution to review committees – effective, appreciated, now in 3rd year of use.

Key skills

- Analyze, interrogate, understand complex data sets
- Research and develop end-to-end AI systems for healthcare
- Define / derive / apply clinically relevant evaluation metrics
- Effective story telling: Papers and presentations
- Ask questions, in all contexts
- Take initiative
- Cheerleader – *go team!*

Affiliate Professor Dept of Electrical and Computer Engineering
University of Washington, Seattle, WA Jan 2026 – present

- MRI safety (Nigerian team); Malaria diagnostics (Rwandan team); LLMs (Ghanaian team); Maternal / fetal sensor data; Dataset releases (labor, malaria, *Loa loa*, pupillary response).

Senior AI Research Engineer for medical diagnostics
Global Health Labs, Bellevue, WA: a Gates-funded healthcare research lab developing solutions for high-impact healthcare use cases (ceased operations in late 2025). 2012 – Oct 2025

Intern > Contractor > AI Research Engineer (2012 – 2020), Senior AI Research Engineer (2020 – 2025)

All aspects of AI development for healthcare use cases, mainly as team lead or self-directed:

- Developed AI algorithms for 12 global health use cases, always focused on tailoring AI development to the specific needs of the clinical use case.
- Led AI projects for: Maternal and fetal sensor data; Pregnancy risk stratification; Malaria diagnosis; Neglected Tropical Disease diagnosis (schistosomiasis, loiasis); vitamin A deficiency detection from pupillary response; LLMs to triage conference abstracts.
- Team member, AI projects for obstetric ultrasound, cervical cancer.
- Leadership for communications training in-lab, driving full AI team and intern training.
- 16+ invited talks and workshops (lead organizer) at AI for health conferences (MICCAI, ML4H, ASTMH, IEEE GHTC) on how to design AI to effectively deploy in healthcare use cases.

Education

- Post-doc, Applied Math, U. of Washington, Seattle. 2018 - 2020
- Ph.D. Electrical and Computer Engineering, U. of Washington, Seattle. 2018
- B.S. Math and Music, MIT, Cambridge, MA

Languages

- English, French, Spanish, Python, PyTorch, SQL, Matlab, Linux, Powershell.

Patents

- Image analysis systems and related methods. Patent # 10061972
- Devices and methods for staining and microscopy. Patent # 9453996

Selected papers on AI for healthcare ∗ indicates lead (co-) author

∗ *Beyond validation loss: Improving a model's clinical performance using clinically relevant optimization metrics.* MICCAI MIRASOL, 2026. link
- *SGMCE: Segment-Grounded Morphological Concept Explanation for malaria parasite species identification.* MIUA, 2026. link
∗ *Automated detection of Loa loa: A field trial in Cameroon.* In review, 2026. link
∗ *Designing AI algorithms to suit local context.* MICCAI MIRASOL, 2025. link
∗ *Reducing Poisson error can offset classification error: a technique to meet clinical performance requirements.* ML4H, 2024. link
∗ *Metrics to guide development of ML algorithms for malaria diagnosis.* Frontiers Malaria, 2024. link
- *Algorithms for AI-enabled obstetric ultrasound.* Gates Open Research, 2025. link, repo
- *Performance of a fully-automated system on a WHO malaria slide set.* Malaria J, 2021. link
∗ ~30 papers on AI for healthcare and basic AI research: https://charlesdelahunt.github.io

Service work in AI for global health

- Scientific committee member (schistosomiasis) for American Society of Tropical Medicine and Hygiene.
- Advisor, WHO document on digital microscopy for malaria, 2023.
- Peer review: Conference Area Chair (ML4H, MICCAI); Senior Editor (PLOS Digital Health).
- Board member, RISE-MICCAI (Reinforcing inclusiveness & diversity and empowering MICCAI in low-to-middle income countries), 2022 – present. link
- Chair, MICCAI Travel Grants Committee, 2025, 2026 (grants for LMIC-based researchers).

☺ devoted runner