Charles Delahunt CV

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Employment

Global Health Labs, Bellevue, WA (2012 – present)
- Senior Research Engineer, machine learning for medical diagnostics
- Role: Research and develop ML algorithms for impact, tailored to global health use cases
- Projects: automated malaria detection; grain moisture prediction; pregnancy risk stratification; fetal monitoring; vitamin A deficiency detection from pupillary response; lung ultrasound; Neglected Tropical Disease (schistosomiasis, *Loa loa*) diagnosis; cervical cancer diagnosis; ML methods for tailoring algorithms to medical use cases.

U. Washington Applied Math Postdoc (2018 – 2021, J. Nathan Kutz P.I.)
- Data-driven discovery of governing equations in high-noise regimes
- Application of biological learning mechanisms to ML architectures

Key skills
- Tailor machine learning to concrete use cases
- Analyze, interrogate, and understand data sets
- Research and develop end-to-end ML systems
- Honor use-case demands, biophysical priors, and domain knowledge in algorithm design
- Assess algorithm performance and results
- Work with field experts and collaborators
- Take initiative
- Write papers and present to audiences – story telling

Education
- Ph.D. Electrical Engineering, University of Washington. Advisors J. Nathan Kutz (Applied Math) and Eve Riskin (Electrical Engineering). 2018
- B.S. Math and Music, MIT

Languages
Python, Matlab, SQL. Some Java, C, Linux, Powershell, Git, Tensorflow.
English, French, Spanish.

Conference events
- Invited speaker on ML for global health:
    ML4H 2023; SPaM 2024; MICCAI 2024; SIPAIM (Guatemala) 2024; Phaw-AI (Peru) 2025.
- Tutorials and sessions on ML for global health:
    MICCAI 2022, 2023; IEEE GHTC 2020, 2022, 2024; IEEE New Era 2024; SIPAIM 2024.
- Area chair (area: ML for social good): ML4H 2024
- Chair, Roundtable on multi-disciplinary research: ML4H 2024

Selected ML for global health papers   **(*)** indicates lead author

- **(*)** *Reducing Poisson error can offset classification error: a technique to meet clinical performance requirements.* ML4H, 2024. link
- **(*)** *Metrics to guide development of machine learning algorithms for malaria diagnosis* Frontiers Malaria 2024. link
- **(*)** *Algorithms to predict moisture content of grain using relative humidity time-series.* IEEE GHTC 2020. link
- **(*)** *Fully automated patient-level malaria assessment on field-prepared thin blood film microscopy images.* IEEE GHTC 2019. link
- *Evaluation of an automated microscope using machine learning for the detection of malaria in travelers returned to the UK.* Front Mal, 2023. link
- *Performance of a fully-automated system on a WHO malaria microscopy evaluation slide set.* Malaria J 2021. link
- *For several more papers on ML for global health, please visit* https://charlesdelahunt.github.io

In the press:
- Technology Review: *AI offers a better way to diagnose malaria.* link

Selected ML papers   **(*)** indicates lead author

- **(*)** *A toolkit for data-driven discovery of governing equations in high-noise regimes.* IEEE Access 2022. link
- **(*)** *Predicting United States Policy Outcomes with Random Forests.* INET 2020. link
- **(*)** *Money on the Table: Statistical information ignored by Softmax can improve classifier accuracy.* arXiv 2019. link
- **(*)** *Putting a bug in ML: The moth olfactory network learns to read MNIST.* Neural Networks 2019. link
- **(*)** *Insect cyborgs: Bio-mimetic feature generators improve machine learning accuracy on limited data.* NeurIPS workshop 2019. link
- *For more papers on ML, please visit* https://charlesdelahunt.github.io

In the press:
- Quanta Magazine: *New AI strategy mimics how brains learn to smell.* link
- Technology Review: *Why even a moth's brain is smarter than AI.* link
- The Register: *Moth brain AI.* link

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

Service
- Board member, RISE-MICCAI (Reinforcing inclusiveness & diversity and empowering MICCAI in low-to-middle income countries) link
- Scientific committee member (schistosomiasis subcommittee), ASTMH link
- Advisor, WHO document on digital microscopy for malaria, 2023
- Peer Reviewer: NeurIPS, ICML, MICCAI, PREPSS, ML4H, CHIL, TMLR, Mal J, etc.
- Roosevelt High School Vocational Advisory Committee (for technical education)
- Devoted runner ☺