Dr. Ivan Kiskin

CV

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Work Experience

01/2022–present **Tenure track Lecturer (Assistant Professor) in AI for Multimodal Health Monitoring**, *Institute for People-Centred AI, Centre for Vision, Speech, and Signal Processing, University of Surrey*, UK.
- Research, PhD supervision, and teaching in Machine Learning applications to healthcare

02/2021–present **Machine Learning Research Scientist**, *UK Health Security Agency (UKHSA), Joint Biosecurity Centre, Turing Institute*, London, UK, COVID interventions.
- Evaluating and de-biasing ML approaches to COVID-19 detection from acoustic recordings

04/2020–12/2021 **Postdoctoral Researcher, Machine Learning Research Group**, *University of Oxford*, UK.
- Leading research and deployment of an end-to-end pipeline of voice and acoustic event detection
- Full-stack development: ML algorithms (`Python`), database management (`PostgreSQL`, `MongoDB`), web server administrator (`PyDjango`, `Apache`)

05/2018–08/2018 **Research Intern**, *Mind Foundry Ltd*, UK, University of Oxford spin-off specialising in AutoML.
- Research and application of data feature engineering, high-performance GPU computing
- Cellular communications anomaly detection using regression and classification ML methods

Education

2015–04/2020 **PhD in Machine learning for acoustic mosquito detection**, *University of Oxford*, UK.

2010–2015 **Masters in Engineering Science**, *University of Oxford, First-class Honours*, Oxford, UK.

Teaching and Leadership

2022–present **Module co-lead**, *MSc in Artificial Intelligence, University of Surrey Institute for People-Centred AI*, Surrey, UK.
- I am creating course material, lecturing, and assessing *"Introduction to Machine Learning"*

2022–present **Module teacher**, *UNIQ+ DeepMind Internship, University of Oxford*, Oxford, UK.
- I delivered an interactive module for the application of fundamental data science with Python

2022–present **Undergraduate project lead and academic mentor**, *Faculty of Health and Medical Sciences, University of Surrey*, Surrey, UK.
- I lead applied data science projects for healthcare and provide mentorship to faculty students

2019–2022 **Supervision and mentoring**, *University of Oxford*, Oxford, UK.
My supervision led to joint publication output for junior researchers:
- Undergraduate at University of Surrey
- Two undergraduates and two research interns at University of Oxford

2017–2019 **Undergraduate tutor**, *University of Oxford*, Oxford, UK, Department of Engineering Science.
Organise and lead tutorials for third-year undergraduates in Signal Processing and Image Analysis

Professional Activities

07/2022 **"Will progress towards AI be driven mostly by engineering or science?"**, *ICML Debate Chair*, ICML 2022.

04/2022–07/2022 **DCASE Task 5: Few-shot Bioacoustic Event Detection**, *Detection and Classification of Acoustic Scenes and Events (DCASE) Co-organiser*, DCASE 2022.

2022–present **Host University Research Project Supervisor, VecNet team (NVIDIA, Google, etc. employees)**, *Masters in Data Science (MIDS) Capstone Project Research Supervisor*, UC Berkeley 2022.

04/2022–07/2022 **ACM Multimedia 2022 Computational Paralinguistics Challenge (ComParE) Sub-task Organiser**, *ComParE Challenge Sub-task Organiser and Lead Programmer*, ACM 2022.

07/2021 **Challenges in deploying and monitoring machine learning systems**, *ICML Panellist*, ICML 2021.

Grants and Awards

2022 **AI 4 Sleep Quality Assessment: Acquisition and Analysis of Environmental and Physiological Acoustic Signals**, *PI, University of Surrey Faculty for Health and Medical Sciences*.

2022–present **Lead Supervisor, University of Surrey PhD Studentship Award**, *People-Centred AI Institute, University of Surrey*.

2015 **Awarded for outstanding first-class honours MEng performance**, *University of Oxford Postgraduate Award*.

2011–2015 **Elected Scholar for outstanding academic achievements**, *University of Oxford Undergraduate Scholarship*.

Peer-Reviewed Publications

2022 **Dual Bayesian ResNet: A Deep Learning Approach to Heart Murmur Detection**, *BW, FK, I Kiskin, GP, TL, AM*, Computing in Cardiology 2022.
- Competition task to classify murmurs as present, absent or unknown using patients' heart sound recordings and demographic data (3rd of 80)

2022 **Detection and Classification of Acoustic Scenes and Events (DCASE) Task 5**, *IN, SS, VL, AP, LG, HP, EV, HW, IK, FJ, JM, ME, VM, DS*, DCASE 2022.
- Sound event detection in a few-shot learning setting for animal (mammal and bird) vocalisations

2022 **The ACM Multimedia 2022 Computational Paralinguistics Challenge**, *BS, AB, SA, CB, MG, NH, PLM, SPB, KR, AMR, MP, HC, SR, MS, IK*, ACM Multimedia 2022.
- Classification and Detection of Vocalisations, Stuttering, Activity, & Mosquitoes

2021 **HumBugDB: a large-scale acoustic mosquito dataset (full-length presentation)**, *IK, MS, AC, WR, LW, DZ, BG, RD, TM, YL, DM, EK, GK, KW, SR*, NeurIPS 2021.
- A large-scale `PostgreSQL`-maintained database release on Zenodo
- Global collaboration with University of Surrey, Royal Botanic Gardens Kew, Kenya, USA, Tanzania, Thailand, DRC

2021 **Automatic acoustic mosquito tagging with Bayesian neural networks**, *I Kiskin, AC, MS, KW, S Roberts*, ECML PKDD.
- Uncertainty metrics for real-world applied machine learning

2021 **COVID-19 Detection from Audio: Seven Grains of Salt**, *H Coppock, L Jones, I Kiskin, B Schuller*, The Lancet Digital Health.
- A critique of published research on AI for COVID detection from acoustic features

2021 **HumBug – An acoustic mosquito monitoring tool for budget smartphones**, *MS, DZ, YL, IK, DK, WR, LW, HC, BG, EM, HP, SR, KW*, Methods in Ecology and Evolution.
- A Zoological methodological perspective on applied AI

2020 **Bayesian Neural Networks for Acoustic Mosquito Detection**, *I Kiskin, AC, S Roberts*, NeurIPS workshop.
- Bayesian Deep Learning workshop
- Acoustic classification in novel environments with the aid of uncertainty quantification

2019, 2020 **HumBug Zooniverse: a crowdsourced acoustic mosquito dataset**, *I Kiskin, LW, AC, MS, KW, YL, DZ, S Roberts*, Best paper award at NeurIPS workshop, ICASSP.
- Machine Learning for the Developing World workshop. Revision accepted at ICASSP.
- A crowdsourced dataset to aid the battle against malaria with AI

2020 **An Overview of Gaussian Process Regression for Volatility Forecasting**, *B Liu*, I Kiskin*, S Roberts*, (IEEE) ICAIIC.
- Univariate, multivariate, and co-regionalised GPs for foreign exchange returns forecasting

2019 **Semi-separable Hamiltonian Monte Carlo for inference in Bayesian neural networks**, *A Cobb, A Baydin, I Kiskin, A Markham, S Roberts*, NeurIPS workshop.
- Bayesian Deep Learning workshop
- A new method for performing inference in Bayesian neural networks using Hamiltonian Monte Carlo

2019 **Super-resolution of Time-series Labels for Bootstrapped Event Detection**, *I Kiskin, U Meepegama, S Roberts*, ICML workshop.
- Time-series workshop
- A bootstrap framework to extract maximal information from mixed-quality, partially-labelled, datasets

2018 **Bioacoustic detection with wavelet-conditioned convolutional neural networks**, *I Kiskin, D Zilli, Y Li, M Sinka, K Willis, S Roberts*, Neural Computing and Applications.
- Springer journal: Special Issue on Deep Learning for music and audio
- Convolutional neural network detection of signals based on wavelet transformations of audio recordings

2018 **Fast mosquito acoustic detection with field cup recordings: an initial investigation**, *Y Li, I Kiskin, MS, DZ, HC, EH-M, TC, RT, KW, S Roberts*, DCASE workshop.
- Workshop on Detection and Classification of Acoustic Scenes and Events
- A deep convolutional neural network approach to species classification from a challenging field dataset

2017 **Cost-sensitive detection with variational autoencoders for environmental acoustic sensing**, *Y Li, I Kiskin, D Zilli, M Sinka, H Chan, K Willis, S Roberts*, NeurIPS workshop.
- Machine Learning for Audio Signal Processing workshop
- A cost-sensitive classification paradigm for the flexible control of the trade-off between the false positive rate and the false negative rate

2017 **Mosquito detection with low-cost smartphones: data acquisition for malaria research**, *Y Li, D Zilli, H Chan, Ivan Kiskin, M Sinka, S Roberts, K Willis*, NeurIPS workshop.
- Machine Learning for the Developing World workshop
- A portable early warning device and an automatic acoustic data acquisition pipeline to aid the battle against malaria
- *Media*: New Scientist Technology article, Digital Trends Emerging Tech article, Guardian Science article

2017 **Mosquito detection with neural networks: the buzz of deep learning**, *I Kiskin, BP Orozco, T Windebank, D Zilli, M Sinka, K Willis, S Roberts*, Annual CDT conference.
- Convolutional neural networks for detecting mosquitoes from wavelet-transformed audio recordings
- *Media*: nVIDIA Deep Learning blog, MIT technology review: Emerging Technology from the arXiv

* denotes equal contribution

Technical skills

Peer reviewing	NeurIPS 2021–2022, Journal of Real-Time Image Processing (Springer), Ecological Informatics (Elsevier), Computers and Electronics in Agriculture (Elsevier).
Machine Learning	Time-series, Gaussian Processes, Bayesian Deep Learning, Audio Event Detection, Computer Vision, Variational Inference.
ML software	NumPy/SciPy, Pandas, TensorFlow, PyTorch, Keras, Scikit-Learn, VGGNet, VGGish, ResNet-X, GPy, GPML, GPflow.
Programming	Full-stack development: Python, PostgreSQL, docker, MongoDB, Apache, PyDjango, MATLAB, LaTeX.
Operating systems	Scientific and GPU programming on Mac OS, Linux, Windows (proficient).
Languages	English (native), German (fluent), Russian (fluent), Ukrainian (intermediate).
Audio and video	Digital signal processing for audio (Audacity, `ffmpeg`), Guitar recording: emulation and real (Reaper), Video editing.