

HANG YUAN

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EDUCATION

DPhil in Machine Learning for Health, **University of Oxford** 2019-2024

- Advisors: Prof. Aiden Doherty and Prof. Simon Kyle
- Thesis: “Using Machine Learning for Wearables to Understand the Association of Sleep with Future Morbidity”
- EPSRC Centre for Doctoral Training in Health Data Science
- Fully funded by Novo Nordisk

MPhil in Computational Neuroscience, **École Polytechnique Fédérale de Lausanne (EPFL)** 2017-2019

- Advisors: Dr. Mathieu Salzmann and Prof. François Fleuret
- Thesis: “A Primer on the Delayed Adversarial Attack in Using Recurrent Neural Networks for Reinforcement Learning”

B.S. in Computer Science, **Jacobs University Bremen** 2014-2017

- Advisors: Prof. Herbert Jaeger and Prof. Ben Godde
- Thesis: “Resting State EEG Classification for Motor Learning Skills Using Echo State Networks”

Exchange Semester, School of Computer Science, **Carnegie Mellon University** Fall, 2016

RESEARCH EXPERIENCE

OxWearables Group, University of Oxford 2024 - present

Advisor: Prof. Aiden Doherty
- NPDH Early Career Research Fellow

Visual Geometry Group, University of Oxford Summer 2020

Advisors: Prof. Andrew Zisserman and Dr. Timor Kadir
- Challenges of information extraction from clinical reports for machine learning

G lab, EPFL 2017-2018

Advisor: Prof. Grégoire Courtine
- Biologically plausible multilayer perceptron

Empirical Inference Group, Max Planck Institute for Intelligent Systems, Tübingen Summer 2017

Advisor: Prof. Moritz Grosse-Wentrup
- Transfer learning in brain computer interfaces

Data Science Institute, Imperial College London Summer 2016

Advisors: Dr. David Birch and Prof. Yike Guo
- Data visualisation using distributed data observatory

KWARC Research Group, Jacobs University Bremen 2015-2016

Advisor: Prof. Michael Kohlhase
- Mathematical knowledge management systems

INDUSTRY EXPERIENCE

Advisor, **Lume Health**, San Francisco, USA 2023 - present

- Building next generation wearable sensors using body fluids to improve human health

Machine learning intern, **Meta (Facebook)**, London, UK
- AI Creative for image segmentation using Segment Anything

Summer 2022

Software engineering intern, **Bloomberg L.P.**, London, UK
- Trading simulation for fixed-income transactions

Summer 2018

- Selected as one of the high performance interns (3/40+) featured in a public relations campaign

AWARDS & FUNDING

Funding

- 2025 GSK, industrial fund: **Co-I, £681K**
Leveraging Large Scale Biobanks to Investigate Digital Biomarkers for the Early Identification of Chronic Obstructive Pulmonary Disease
- 2025 Schmidt Science Fellowship Finalist
Wearable Representation Learning for Genomic Discovery
- 2023 NDPH Early Career Research Fellowship: **PI, £89K**
Improving the Measurement of Sleep in Large Prospective Cohorts

Awards

- 2021 Best poster award, EPSRC Centre for Doctoral Training in Health Data Science symposium | University of Oxford
- 2017 Finalist top 6/300+ (2%) and Artificial Intelligence Track Winner | Hack Junction, the largest Hackathon in Europe, Helsinki, Finland
- 2017 Prix Du Public Hackathon by Vaudoise | Lausanne, Switzerland
- 2016 Second Place 2/20+ (10%) @ OpenBank Hackathon | Google London Campus
- 2016 Wiki Data Prize @ HPI Machine Learning and Data Analytics Hackathon | Berlin, Germany
- 2016 Promos Scholar, 1,900 euros awarded to study at Carnegie Mellon University | Bremen, Germany
- 2015 Top 10/130+ (8%) @ Global Jacobs Startup Competition | Bremen, Germany
- 2014 Jacobs University Entrance Scholarship 15k Euros | Bremen, Germany
- 2014 STEM Scholar, top 2/20+ for FRC Robotics Team 4415 | California, USA

PUBLICATIONS

Journal articles

- 2025 Tse K.*, **Yuan H***, Zisou C*, et al. "Sleep and circadian health in UK Biobank: Report on the 2023 sleep questionnaire enhancement " *medRxiv*
- 2025 Portas, L., **Yuan, H.**, Cai, L., Smith-Byrne, K., van Duijvenboden, S., Kyle, S.D., Ray, D., Howson, J.M. and Doherty, A., 2025. Discovering the genetic architecture of sleep regulation: genome-wide association study of device-measured sleep traits. *medRxiv*
- 2025 Amador, Sarah, et al. "Process evaluation in a randomised controlled trial of DREAMS-START (dementia related manual for sleep; strategies for relatives) for sleep disturbance in people with dementia and their carers." *Age and Ageing*
- 2025 McGagh, D., Song, K., **Yuan, H.**, Creagh, A., Fenton, S., Small, S., Ng, W., Goldsack, J., Dixon, W., Doherty, A., Coates, L. "Digital health technologies to strengthen patient-centred outcome assessment in clinical trials in inflammatory arthritis." *Lancet Rheumatology*

- 2025 Brocklebank, L., Steptoe, A., Zhao, Y., Bloomberg, M., Acquah, A., **Yuan, H.**, Chan, S., Wang, Y., Maylor, B., Plekhanova, T. and Doherty, A., 2025. Comparing two wrist-worn accelerometers (Axivity AX3 and Matrix 003) for measuring movement behaviors in British and Chinese older adults. *Journal for the Measurement of Physical Behaviour*
- 2024 **Yuan, H.***, Chan, S.*, Creagh, A. P., Tong, C., Acquah, A., Clifton, D. A., and Doherty, A. “Self-supervised Learning for Human Activity Recognition Using 700,000 Person-days of Wearable Data”. *npj Digital Medicine*. | GitHub 137 stars | 37 forks
- **The first open source large-scale foundation model for wearable devices**
- 2024 **Yuan, H.**, Plekhanova, T., Walmsley, R., Reynold, A., Maddison, K., Bucanc, M., Gehrman, P., Rowlands, A., Ray, D., Bennett, D., McVeigh, J., Straker, L., Eastwood, P., Kyle, S., Doherty, A. “Self-supervised learning of accelerometer data provides new insights for sleep and its association with mortality”. *npj Digital Medicine*. | GitHub 39 stars | 12 forks
- 2024 **Yuan, H.**, Hill, L., Kypreos, D. S., and Doherty, A. “How accurate is wrist-worn accelerometry in measuring sleep stages? - a systematic review”. *Journal of Sleep Research*.
- 2024 Rapaport, P., Amador, S., Adeleke, M. O., Barber, J. A., Banerjee, S., Charlesworth, G., Clarke, C., Espie, C. A., Gonzalez, L., Horsley, R., Hunter, R., Kyle, S. D., Manela, M., Raczek, M., Walker, Z., Webster, L., **Yuan, H.**, Livingston, G. “Clinical-effectiveness of DREAMS START (Dementia RElATED Manual for Sleep; STrAtegies for RelaTives) versus usual care for people with dementia and their carers: A single masked, phase 3, parallel arm, superiority randomised controlled trial.” *Lancet Healthy Longevity*
- 2024 Creagh, A.P., Hamy, V., **Yuan, H.**, Mertes, G., Tomlinson, R., Chen, W.H., Williams, R., Llop, C., Yee, C., Duh, M.S. and Doherty, A., Garcia-Gancedo L., and Clifton, D. A. “Digital health technologies and machine learning augment patient reported outcomes to remotely characterise rheumatoid arthritis”. *npj Digital Medicine*.
- 2024 Chan, S., **Yuan, H.**, Tong, C., Acquah, A., Schonfeldt, S., Gershuny, J., Doherty, A. “CAPTURE-24: A large dataset of wrist-worn activity tracker data collected in the wild for human activity recognition”. *Scientific Data*.
- 2024 Wei, J., Uppal, A., Nganjimi, C., Warr, H., Ibrahim, Y., Gu, Q., **Yuan, H.**, Jones, N., Walker, A. S., & Eyre, D. W. “No evidence of difference in mortality with amoxicillin versus co-amoxiclav for hospital treatment of community-acquired pneumonia”. *Journal of Infection*

Conference proceedings

- 2025 Gu, Xiao, et al. “Foundation Models for Biosignals: A Survey.” Authorea Preprints (2025).
- 2023 Ovalle, A., Subramonian, A., Singh, A., Voelcker, C., Sutherland, D.J., Locatelli, D., Breznik, E., Klubička, F., **Yuan, H.**, Zhang, H. and Shriram, J., et al. 2023. “Queer In AI: A Case Study in Community-Led Participatory AI.” **Best paper award** at the *ACM Conference on Fairness, Accountability, and Transparency (ACM FAccT)*.
- 2021 **Yuan, H.***, Chan, S.*, and Doherty, A. “Learning the Arrow of Time For Human Activity Recognition.” *ICML Workshop: Self-Supervised Learning for Reasoning and Perception*.
- 2020 **Yuan H*.**, Vanea C*, Lucivero F. and Hallowell N. “Training Ethically Responsible AI Researchers: a Case Study”. *Navigating the Broader Impacts of AI Research Workshop at NeurIPS*.

Work in progress

- 2026 **Yuan, H.** et al. “From dawn to dawn: self-supervised neural networks can capture health state and disease risks with 24-hours of human movement.”
- 2026 Burns, A. et al. “Genome-wide association analysis of sleep questionnaire data provides new insights into the genetic architecture of sleep.”

Book chapters

- 2020 Ding, Z., Huang, Y., **Yuan, H.**, and Dong, H. "Introduction to reinforcement learning". In Deep reinforcement learning (pp. 47-123). Springer, Singapore.
 - **Top 1 best-selling AI textbook** on JD.com, February, 2021.
 - Sold over **28,000** copies in mainland China.
- 2018 Dong, H., Zhang, J., **Yuan, H.** "Introduction to deep learning". In Deep Learning using TensorLayer. Publishing House of Electronics Industry, Beijing.

TALKS

Invited talks

Foundation models for wearables

- 2025 Basel, Switzerland, ActiGraph Digital Data Summit: The Era of Foundation Models for Human Sensing
- 2024 Great Orchard Street Hospital, London: *Wearable based longitudinal monitoring in routine care.*
- 2024 Novo Nordisk: *Foundation Models for Wearables.*
- 2024 Understanding Human Skill in Healthcare Settings by AI-based Analysis, Worcester College, University of Oxford: *Wearables, the window into high-performance healthcare systems.*
- 2023 Oxford Centre for Human Brain Activity Analysis Group, Wellcome Centre for Integrative Neuroimaging, University of Oxford: *Machine learning for time series using mobile sensing data.*
- 2022 Colby College, Virtual: *Self-supervised learning for wearables.*

Representation learning

- 2025 CHI Lab, University of Oxford: Contrastive Language Accelerometer Pre-training
- 2024 CDT-HDS Seminar: *Representation learning for genomic discovery.*

Measurement of sleep

- 2025 UK Biobank Webinar: Exploring UK Biobank's Sleep Data
- 2023 Third Richard Doll Prospective Cohort Studies Symposium, University of Oxford: *Device measured sleep and all-cause mortality.*
- 2023 Oxford Sleep and Light Initiative, St. Hilda College, University of Oxford: *Towards population inference for light and sleep in large health datasets: a wearable perspective.*
- 2023 Phenome Seminar, Big Data Institute, University of Oxford: *Time-series machine learning of wearable sleep datasets.*

Contributed talks

- 2023 World Sleep Congress, Rio de Janeiro, Brazil: *Self-supervised learning yields insights into sleep and all-cause mortality.*
- 2023 5th MobiUK Research Symposium, Lancaster University: *Self-supervised learning for human activity recognition using 700,000 person-days of wearable data.*
- 2021 OXSTATS: *Machine learning for population health - a wearable perspective.*
- 2021 CDT Symposium, Trinity College, University of Oxford: *Understanding sleep's association with cardiovascular diseases using machine learning for wearables.*
- 2021 European Insomnia Network, Virtual: *Predicting polysomnography from accelerometry using machine learning.*

TEACHING & SUPERVISION

University of Oxford

Supervision

2025 Firas Darwish (CDT Stats-ML, Rhodes scholar): Doctoral rotation student, label-free human activity recognition

2025 Kyra Delray (CDT Health Data Science): Doctoral rotation student, learning the language of motion

2024 Xinyi Cai: Undergraduate intern, efficient pre-training of wearable foundation model

Teaching

2020-2023 Lecturer & Tutor, CDT for Health Data Science: Wearables, Self-supervised Learning, and Data Challenge

2023 Lecturer & Tutor, Reproducible Machine Learning of Wearables in Health Data Science Short Course: Machine Learning and Sleep Measurement

2021 Tutor, Department of Computer Science, Machine Learning

2020 Tutor, Department of Computer Science, Artificial Intelligence

Jacobs University Bremen

2017 Teaching assistant, Formal Language and Logic

2016 Teaching assistant, Statistical Inference and Data Analysis

Miscellaneous

2019 Tutor, Robotics Camp, TechX Academy, Shanghai, China

2019 Tutor, Cybersecurity Weekend, Google Zurich

2018-2019 Lecturer, Cybersecurity Camp, International School of Geneva

PROFESSIONAL SERVICES

Academic services

Academic leadership

2021-2024 Committee member for Oxford Network for Medical Statisticians

2022 Committee member for Queer in AI Workshop at NeurIPS

2021 Junior chair for ML4Health Workshop at NeurIPS

Conference reviewer

Conference NeurIPS 2024-2025, ICLR 2024, ICML 2025

Workshop NeurIPS, Machine Learning for Health Workshop 2020-2022, NeurIPS, Machine Learning Time Series for Health Workshop 2023, AAIL Human-centric Representation Learning Workshop 2024, ICLR Learning Time-series for Health 2024.

Journal reviewer

- Nature Communications: 1
- BMJ Digital Health & AI: 2
- Communications Medicine: 1
- Journal of Open Source Software: 1

- Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT):
2

Grant reviewer

- UKRI, EPSRC New Investigator Award: 1

Diversity, equity, and inclusion (DE & I)

2020-2023 Mentor for Queer in AI, Women in AI, and Jacobs University Bremen Alumni Mentorship Program

2021-2022 Program committee member: DE & I CDT for Health Data Science