David Watson

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Education

University of Oxford — **October 2017—**
- DPhil in Information, Communication, and the Social Sciences — **Oxford, UK**
- Developing new methods for fair and interpretable machine learning
- Researching high-dimensional causal inference

The Alan Turing Institute — **October 2018—September 2019**
- Doctoral Enrichment Student — **London, UK**
- Helped draft ICO's *Project ExplAIn Guidance*
- Led weekly reading group on statistical learning theory

University of Oxford — **October 2014—August 2015**
- MSc in Social Science of the Internet — **Oxford, UK**
- Studied big data analytics, internet economics, and information visualisation
- Wrote a thesis on crowdsourcing in the natural sciences

Dartmouth College — **September 2007—June 2011**
- BA in Philosophy, High Honors — **Hanover, NH**
- Studied philosophy of science, linguistics, and literature
- Wrote a thesis on the metaphysics of quantum cosmology

Professional Experience

Chief Technology Officer, ThermoAI — **July 2018—**
- Test and implement algorithms for optimizing combustion processes — **New York, NY**
- Oversee data collection and software development
- Coordinate with fellow chief executives on strategic vision

Teaching Assistant, University of Oxford — **October 2018—December 2019**
- Lectured on the philosophy and ethics of information — **Oxford, UK**
- Led seminars on the foundations of social data science
- Developed curricula for future MSc cohorts

Freelance Contributor, *The Economist* — **March 2016—October 2017**
- Wrote articles for the Graphic Detail section and Game Theory blog — **London, UK**
- Built simulations to estimate the probability of global events
- Collaborated with editorial staff to research and develop new stories

Data Scientist, Queen Mary University of London — **November 2015—October 2017**
- Conducted exploratory and inferential analytics for bioinformatics projects — **London, UK**
- Developed unsupervised learning algorithms for genomic data integration
- Created visualization software for gene expression studies

Assistant Editor, HarperCollins Publishers — **December 2011—September 2014**
- Read and reviewed manuscripts for publication — **New York, NY**
- Launched and managed e-book classics program
- Appointed Editorial Director of the National Poetry Series

SELECT PUBLICATIONS

Watson, D. & Floridi, L. (2020). The explanation game: A formal framework for interpretable machine learning. *Synthese*. DOI: 10.1007/s11229-020-02629-9.

John, C.R., Watson, D., Russ, D., Goldmann, K., Ehrenstein, M., Pitzalis, C., … Barnes, M. (2020). M3C: Monte Carlo reference-based consensus clustering. *Scientific Reports*, *10*(1), 1816. DOI: 10.1038/s41598-020-58766-1.

John, C.R., Watson, D., Barnes, M.R., Pitzalis, C., & Lewis, M. (2020). Spectrum: Fast density-aware spectral clustering for single and multi-omic data. *Bioinformatics*, *36*(4), 1159-1166. DOI: 10.1093/bioinformatics/btz704.

Watson, D. (2019). The rhetoric and reality of anthropomorphism in artificial intelligence. *Minds & Machines*, *29*(3), 417-440. DOI: 10.1007/s11023-019-09506-6.

Watson, D. (2019). The price of discovery: A model of scientific research markets. In Öhman, C. & Watson, D. (Eds.), *The 2018 Yearbook of the Digital Ethics Lab*, pp. 51-63. Heidelberg: Springer. DOI: 10.1007/978-3-030-17152-0_5.

Öhman, C. & Watson, D. (Eds.) (2019). *The 2018 Yearbook of the Digital Ethics Lab*. Heidelberg: Springer. DOI: 10.1007/978-3-030-17152-0.

Öhman, C. & Watson, D. (2019). Are the dead taking over Facebook? A big data approach to the future of death online. *Big Data & Society*, *6*(1), 1-13. DOI: 10.1177/2053951719842540.

Watson, D., Krutzinna, J., Bruce, I.N., Griffiths, C.E.M., McInnes, I.B., Barnes, M.R., & Floridi, L. (2019). Clinical applications of machine learning algorithms: Beyond the black box. *BMJ*, *364*, 446-448. DOI: 10.1136/bmj.l886.

O'Toole, S.M., Watson, D., Novoselova, T.V., Romano, L.E.L., King, P., Bradshaw, T.Y., … Chapple, J.P. (2019). Oncometabolite induced primary cilia loss in pheochromocytoma. *Endocrine-Related Cancer*, *26*(1), 165-180. DOI: 10.1530/ERC-18-0134.

Watson, D. & Floridi, L. (2018). Crowdsourced science: Sociotechnical epistemology in the e-research paradigm. *Synthese*, *195*(2), 741–764. DOI: 10.1007/s11229-016-1238-2.

Foulkes, A.C., Watson, D., Carr, D.F., Kenny, J.G., Slidel, T., Parslew, R., … Barnes, M.R. (2018). A framework for multi-omic prediction of treatment response to biologic therapy for psoriasis. *Journal of Investigative Dermatology*, *139*(1), 100-107. DOI: 10.1016/j.jid.2018.04.041.

Cabrera, C.P., Manson, J., Shepherd, J.M., Torrance, H.D., Watson, D., Longhi, M.P., … Brohi, K. (2017). Signatures of inflammation and impending multiple organ dysfunction in the hyperacute phase of trauma: A prospective cohort study. *PLOS Medicine*, *14*(7), e1002352. DOI: 10.1371/journal.pmed.1002352.

Foulkes, A.C., Watson, D., Griffiths, C.E.M., Warren, R.B., Huber, W., & Barnes, M.R. (2017). Research techniques made simple: Bioinformatics for genome-scale biology. *Journal of Investigative Dermatology*, *137*(9), e163–e168. DOI: 10.1016/j.jid.2017.07.095.

PREPRINTS

Watson, D. & Wright, M. (2019). Testing conditional independence in supervised learning algorithms. *arXiv* preprint, 1901.09917.

SOFTWARE

Watson, D. (2020). bioplotr: Pretty, simple, optionally interactive plots for bioinformatics analysis pipelines. URL: https://github.com/dswatson/bioplotr.

Watson, D. & Wright, M. (2020). cpi: Testing conditional independence in supervised learning algorithms. URL: https://github.com/dswatson/cpi.

John, C.R. & Watson, D. (2020). M3C: Monte Carlo reference-based consensus clustering. URL: https://bioconductor.org/packages/release/bioc/html/M3C.html.

John, C.R. & Watson, D. (2019). Spectrum: Fast adaptive spectral clustering for single and multi-view data. URL: https://cran.r-project.org/package=Spectrum.

Select Presentations

'Machine learning for predicting clinical outcomes.' PSORT Showcase. Royal College of Physicians, London, November 2019.

'No explanation without inference: What's wrong with explainable AI and how to fix it.' The Digital Ethics Lab, University of Oxford, October 2019.

'Information ethics: Theories, problems, strategies.' Learn, develop & design: Ethics principles through cross-disciplinary collaboration. Royal College of Art, London, September 2019.

'The explanation game: A formal framework for interpretable machine learning.' 12th Annual MuST Conference on Statistical Reasoning and Scientific Error. Ludwig Maximilian University, Munich, July 2019.

'Interpretable machine learning for clinical medicine.' Mining Science Data for Medicine Workshop. University of Manchester, April 2019.

'The rhetoric and reality of anthropomorphism in artificial intelligence.' The Digital Ethics Lab, University of Oxford, January 2019.

'Attention economies and the ethics of design.' London Doctoral Design Centre, Royal College of Art, London, November 2018.

'High-dimensional model explanations with applications to genomics.' The Alan Turing Institute, London, April 2018.

'Formal frameworks for interpretable machine learning.' The Digital Ethics Lab, University of Oxford, November 2017.

'The EAGLE has landed: real-time win probabilities in men's major golf tournaments.' MIT Sloan Sports Analytics Conference. Hynes Convention Center, Boston, February 2017.

'Omics primer for clinicians: an introduction to high-dimensional statistics.' British Association of Dermatologists Workshop. University of Manchester, December 2016.

'Measuring the epistemological and social impact of citizen science.' St. Anne's College, University of Oxford, December 2016.

'Modelling biologic response: clinical and statistical considerations.' Stratified Medicine Workshop. Francis Crick Institute, London, October 2016.

'Feature selection in high-dimensional classification problems.' CSAMA Conference on Statistical Data Analysis for Genome Scale Biology. University of Padua, Brixen, July 2016.

Honours and Awards

- Edith McMorran Verse Translation Prize. St Hugh's College, Oxford, 2015.
- Avril Gilchrist Bruten Award for Creative Writing. St. Hugh's College, Oxford, 2015.
- Francis W. Gramlich Prize for outstanding achievement in philosophy. Dartmouth College, 2011.
- James O. Freedman Presidential Scholar. Dartmouth College, 2008—2011.