

David Watson

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EDUCATION

University of Oxford

October 2017—
Oxford, UK

- DPhil in Information, Communication, and the Social Sciences
- Developing new methods for fair and interpretable machine learning
- Researching high-dimensional causal inference

The Alan Turing Institute

October 2018—September 2019
London, UK

- Doctoral Enrichment Student
- Helped draft ICO's *Project ExplAIIn Guidance*
- Led weekly reading group on statistical learning theory

University of Oxford

October 2014—August 2015
Oxford, UK

- MSc in Social Science of the Internet
- Studied big data analytics, internet economics, and information visualisation
- Wrote a thesis on crowdsourcing in the natural sciences

Dartmouth College

September 2007—June 2011
Hanover, NH

- BA in Philosophy, High Honors
- Studied philosophy of science, linguistics, and literature
- Wrote a thesis on the metaphysics of quantum cosmology

PROFESSIONAL EXPERIENCE

Chief Technology Officer, ThermoAI

July 2018—
New York, NY

- Test and implement algorithms for optimizing combustion processes
- Oversee data collection and software development
- Coordinate with fellow chief executives on strategic vision

Teaching Assistant, University of Oxford

October 2018—December 2019
Oxford, UK

- Lectured on the philosophy and ethics of information
- Led seminars on the foundations of social data science
- Developed curricula for future MSc cohorts

Freelance Contributor, *The Economist*

March 2016—October 2017
London, UK

- Wrote articles for the Graphic Detail section and Game Theory blog
- 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
London, UK

- Conducted exploratory and inferential analytics for bioinformatics projects
- Developed unsupervised learning algorithms for genomic data integration
- Created visualization software for gene expression studies

Assistant Editor, HarperCollins Publishers

December 2011—September 2014
New York, NY

- Read and reviewed manuscripts for publication
- 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. & Tansey, W. (2020). smoothFDR: An empirical Bayes method for exploiting spatial structure in large multiple-testing problems. URL: <https://github.com/dswatson/smoothFDR>.
- Watson, D. (2020). biopltr: Pretty, simple, optionally interactive plots for bioinformatics analysis pipelines. URL: <https://github.com/dswatson/biopltr>.

- 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 Bruton 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.