UNIVERSITY OF CAMBRIDGE COMPUTER LABORATORY

M.Phil in Advanced Computer Science

Summary List of Recommended Readings

October 2025

This list is prepared once a year for the benefit of College Librarians and those purchasing course books for M.Phil students. As such it aims to list the most recently available editions of current course books. However, this list should be used in conjunction with syllabus, which gives more information on the suitability of titles for each course. There is also a considerable overlap with the undergraduate reading lists.

Journal and conference papers are included in this list for the sake of completeness only. Most will be available online, or in other Cambridge libraries, and it is not expected that volumes of proceedings should be purchased for the sake of a single paper.

The syllabi for M.Phil modules can be found at:
`https://www.cl.cam.ac.uk/teaching/2526/acs.html`

The West Hub Library aims to keep at least one copy of each of the books in this list. Similarly, any journal or conference papers should be available within the University, possibly electronically.

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Aaronson, S. (2013). *Quantum computing since Democritus.* Cambridge University Press. ISBN 9780521199568.

Aaronson, S. (2016). *Introduction to quantum information science.* Unpublished lecture notes. Available at: `https://www.scottaaronson.com/qclec.pdf`.

Abadi, M., et. al. (2016). "TensorFlow: a system for large-scale machine learning". In *Proceedings of OSDI* 2016.

Aken, D. van (2017). "Automatic database management system tuning through large-scale machine learning". In *Proceedings of SIGMOD* 2017, pp. 1009-1024.

Anderson, T. & Dahlin, M. (2014). *Operating systems: principles and practice.* Recursive Books (2nd ed.).

Ansel, J., et. al. (2014). "OpenTuner: an extensible framework for program autotuning". In *Proceedings of PACT* 2014, pp. 303-316.

Arrieta, A.B., et al. (2020). "Explainable artificial intelligence". In *Information fusion* 58, pp. 82-115.

Aumasson, J.-P. (2025). *Serious cryptography.* No Starch Press (2nd ed.). ISBN 9781098182472.

Avigad, J., de Moura, L. & Kong, S. (2016). *Theorem proving in lean.* Privately published. Available at: `http://pstorage-cmu-348901238291901.s3.amazonaws.com/11937500/file.pdf`

Avigad, J. & Massot, P. (2025). *Mathematics in Lean.* Privately published. Available at: https://raw.githubusercontent.com/leanprover-community/mathematics_in_lean/master/mathematics_in_lean.pdf

Awodey, S. (2010). *Category theory.* Oxford University Press (2nd ed.).

Bertsekas, D. (2019). *Reinforcement learning and optimal control.* Athena Scientific. ISBN 9781886529397.

Bishop, C.M. (2006). *Pattern recognition and machine learning.* Springer. ISBN 0387310738. Available at: https://www.microsoft.com/en-us/research/uploads/prod/2006/01/Bishop-Pattern-Recognition-and-Machine-Learning-2006.pdf

Blackwell, A.F. (2024). *Moral codes: designing alternatives to AI.* MIT Press. ISBN 9780262548717. Available at: https://moralcodes.pubpub.org

Bonabeau, E., Dorigo, M. & Theraulaz, G. (1999). *Swarm intelligence: from natural to artificial systems.* Oxford University Press. ISBN 0195131592.

Boreskov, A. & Shikin, E. (2014). *Computer graphics: from pixels to programmable graphics hardware.* CRC Press. ISBN 9781439867303.

Bronstein, M.M., et. al. (2021). *Geometric deep learning: grids, groups graphs, geodesics and gauges.* Unpublished draft available at: https://arxiv.org/pdf/2104.13478

Chakravarty, S.R., Mitra, M. & Sarkar, P. (2015). *A course on cooperative game theory.* Cambridge University Press. ISBN 9781107691322.

Chilpala, A. (2019). *Certified programming with dependent types.* MIT Press. ISBN 9780262317870. Available at: http://adam.chlipala.net/cpdt/cpdt.html

Christiansen, D.T. (2023). *Functional programming in Lean.* Privately published. Available at: https://lean-lang.org/functional_programming_in_lean/

Critchlow, H. (2023). *Joined-up-thinking: the power of collective intelligence to change our lives.* Hodder. ISBN 9781529398434.

Crole, R.L. (1993). *Categories for types.* Cambridge University Press. ISBN 0521450926.

Day, J. (2007). *Patterns in network architecture: a return to fundamentals.* Prentice Hall.

Dalibard, V., Schaarschmidt, M. & Yoneki, E. (2017). "BOAT: Building auto-tuners with structured Bayesian optimization". In *Proceedings of WWW* 2017, pp. 479-488.

Dean, J., et. al. (2012). "Large scale distributed deep networks". In *Proceedings of Neural information processing systems* 2012.

Deisenroth, M.P., Faisal, A.A. & Ong, C.S. (2020). *Mathematics for machine learning.* Cambridge University Press. ISBN 9781108455145. Available at: https://mml-book.github.io/book/mml-book.pdf

Eisenstein, J. (2019). *Introduction to natural language processing.* MIT Press. ISBN 9780262042840.

Escardo, M.H. (2019). "Introduction to univalent foundations of mathematics". *ArXiv computer science.* Available at: https://arxiv.org/pdf/1911.00580

Frank, R.H. (2008). *The economic naturalist: why economics explains almost everything.* EBury Publishing. ISBN 9780753513385

Gollmann, D. (2011). *Computer security.* Wiley (3rd ed.). ISBN 9780470741153.

Goodfellow, I., Bengio, Y. & Courville, A. (2016). *Deep learning.* MIT Press. ISBN 9780262035613. Available at: `http://www.deeplearningbook.org/`

Hainich, R.R. & Bimber, O. (2020). *Displays: fundamentals and applications.* CRC Press (2nd ed.). ISBN 9781498765688.

Harper, R. (2016). *Practical foundations for programming languages.* Cambridge University Press (2nd ed.). ISBN 9781107150300.

Hamilton, W.L. (2020). *Graph representation learning.* Morgan & Claypool. ISBN 9781681739632.

Hennessy, J. & Patterson, D. (2019) *Computer architecture: a quantitative approach.* Elsevier (6th ed.). ISBN 9780128119051.

Herlihy, M., et. al. (2020). *The art of multiprocessor programming.* Morgan Kaufmann (2nd ed.). ISBN 9780124159501.

Heunen, C. & Vicary, J. (2019). *Categories for quantum theory: an introduction.* Oxford University Press. ISBN 9780198739616.

Jurafsky, D. & Martin, J. (2008). *Speech and language processing.* Prentice Hall.

Katz, J. & Lindell, Y. (2020). *Introduction to modern cryptography.* CRC Press (3rd ed.). ISBN 9780815354369.

Keshav, S. (1997). *An engineering approach to computer networking.* Addison-Wesley. ISBN 0201634422.

Kochenderfer, M.J., Wheeler, T.A. & Wray K.H. (2022). *Algorithms for decision making.* MIT Press. ISBN 9780262047012. Available at: `https://algorithmsbook.com/files/dm.pdf`

Krishnamurthy, B. & Rexford, J. (2001). *Web protocols and practice: HTTP/1.1, networking protocols, caching, and traffic measurement.* Addison-Wesley.

Lambek, J. & Scott, P.J. (1986). *Introduction to higher order categorical logic.* Cambridge University Press.

Laplace, P.S. (1902). *A Philosophical essay on probabilities.* Wiley.

Lyons, R.G. (2010). *Understanding digital signal processing.* Prentice Hall (3rd ed.). ISBN 9780132119375

Malewicz, G., et al. (2010). "Pregel: A System for Large-Scale Graph Processing". In *Proceedings of SIGMOD* 2010, pp. 135-146.

Mirhoseini, A., et. al. (2017). "Device placement optimization with reinforcement learning". In *Proceedings of ICML* 2017, pp. 2430-2439.

Molnar, C. (2022). *Interpretable machine learning.* Privately published. Available at: `https://christophm.github.io/interpretable-ml-book/`.

Murphy, K. (2022). *Probabilistic machine learning.* MIT Press. ISBN 9780262046824. Available at: `https://probml.github.io/pml-book/book1.html`

Murray, D.G., et al. (2013) "Naiad: A Timely Dataflow System", *Proceedings of SOSP* 2013, pp. 439-455.

Myers, B.A. & McDaniel, R. (2000) "Demonstrational interfaces". In H. Lieberman, (ed.) *Your wish is my command*. Morgan Kaufmann. ISBN 1558606882.

Narayanan, A., et. al. (2016). *Bitcoin and cryptocurrency technologies*. Princeton University Press. Draft copy available at: `http://d28rh4a8wq0iu5.cloudfront.net/bitcointech/readings/princeton_bitcoin_book.pdf`

Nielsen, M.A. & Chuang, I.L. (2010). *Quantum computation and quantum information*. Cambridge University Press (2nd ed.).

Nipkow, T. & Klein, G. (2014). *Concrete semantics with Isabelle/HOL*. Springer. ISBN 9783319105413. Available at: `http://concrete-semantics.org /concrete-semantics.pdf`

Nipkow, T., Paulson, L.C. & Wenzel, M. (2002). *Isabelle/HOL: a proof assistant for higher order logic*. Springer. ISBN 3540433767.

Nowak, M.A. (2011). *Super-cooperators: evolution altruism and human behaviour*. Canongate. ISBN 9781847673367.

Oppenheim, A.V. & Schafer, R.W. (2007). *Discrete-time digital signal processing*. Prentice Hall (3rd ed.).

Ostrom, E. (1990). *Governing the commons: the evolution of institutions for collective action*. Cambridge University Press. ISBN 0521405998

Patterson, D. & Hennessy, J. (2020) *Computer organisation and design*. Morgan Kaufmann (2nd RISC-V ed.). ISBN 9780128203316

Pierce, B.C. (2002). *Types and programming languages*. MIT Press. ISBN 0262162091.

Pierce, B.C. (2005). *Advanced topics in types and programming languages*. MIT Press. ISBN 0262162288.

Pitts, A.M. (2000). "Categorical Logic". In S. Abramsky, D.M. Gabbay and T.S.E. Maibaum (eds.) *Handbook of logic in computer science*, Volume 5. Oxford University Press.

Proceedings of the Arthur M. Sackler colloquium on the Science of Deep Learning. March 2019. Available at: `https://www.pnas.org/topic/529`

Rasmussen, C.E. & Williams, C.K.I. (2006). *Gaussian processes for machine learning*. MIT Press. ISBN 9780262182539.

Reinhard, E., et. al. (2010). *High dynamic range imaging*. Morgan Kaufmann (2nd ed.). ISBN 9780123749147 [**, II]

Rijke, E. (2025). *Introduction to homotopy type theory*. Cambridge University Press. ISBN 9781108844161. Available at: `https://arxiv.org/pdf/2212.11082`

Rudin, C., et al. (2022). "Interpretable machine learning". In *Statistics surveys* 16, pp. 1-85.

Sites, R.L. (2022). *Understanding software dynamics*. Addison-Wesley. ISBN 9780137589739.

Stein, J. (2000). *Digital signal processing – a computer science perspective*. Wiley.

Sutton, R.S. & Barto, A.G. (2020). *Reinforcement learning: an introduction*. MIT Press (2nd ed.). ISBN 9780262039246.

Szeliski, R. (2010). *Computer vision: algorithms and applications*. Springer. ISBN 9781848829343.

Szepesvári, C. (2020). *Algorithms for reinforcement learning.* Springer.
ISBN 9783031015519.

Telgarsky, M. (2021). *Deep learning theory lecture notes.* Unpublished lecture notes.
Available at: `https://mjt.cs.illinois.edu/dlt/index.pdf`

Zhang, B. (2020). *Machine learning and visual perception.* De Gruyter.
ISBN 9783110595536.