

Alexis TOUMI

DEGREES

- 2018 – 2022 **DPhil Computer Science**, *University of Oxford*.
Oxford–DeepMind Graduate & Harrison Scholarship for Quantum Foundations.
- 2016 – 2018 **MSc Mathematics & Foundations of Computer Science**, *University of Oxford*.
Categories, Proofs & Processes (99), Quantum Computer Science (95), Categorical Quantum Mechanics (70), Distributional Models of Meaning (82), Computational Game Theory (98).
- 2012 – 2015 **BSc Computer Science**, *University of Oxford*, (First-Class Honours).
Lambda Calculus, Computational Complexity, Learning Theory, Knowledge Representation.

THESES

- DPhil Proposal: **Quantum Structures for Linguistics, Cognition and AI**, under the supervision of Prof. Bob Coecke and Dr. Dan Marsden. See [1, 2, 3, 5].
- MSc **Categorical Compositional Distributional Questions, Answers & Discourse**, supervised by Prof. Bob Coecke. This followed [6] and [7].
- BSc **Equilibrium Checking in Reactive Modules Games**, supervised by Dr. Julian Gutierrez and Prof. Michael Wooldridge. This was followed by [8] and [9].

PAPERS

- [1] K. Meichanetzidis, S. Gogioso, G. De Felice, N. Chiappori, A. Toumi, and B. Coecke. “Quantum Natural Language Processing on Near-Term Quantum Computers”. In: *QPL 2020* (to appear).
- [2] G. de Felice, E. Di Lavore, M. Román, and A. Toumi. “Functorial Language Games for Question Answering”. In: *Electronic Proceedings in Theoretical Computer Science* 333 (2021).
- [3] G. de Felice, A. Toumi, and B. Coecke. “DisCoPy: Monoidal Categories in Python”. In: *Electronic Proceedings in Theoretical Computer Science* 333 (2021).
- [4] E. Boros, A. Toumi, E. Rouchet, B. Abadie, D. Stutzmann, and C. Kermorvant. “Automatic Page Classification in a Large Collection of Manuscripts Based on the International Image Interoperability Framework”. In: *2019 International Conference on Document Analysis and Recognition, ICDAR 2019, Sydney, Australia, September 20-25, 2019*. IEEE, 2019.
- [5] G. de Felice, K. Meichanetzidis, and A. Toumi. “Functorial Question Answering”. In: *Proceedings Applied Category Theory 2019, ACT 2019, University of Oxford, UK, 15-19 July 2019*. Ed. by J. Baez and B. Coecke. Vol. 323. EPTCS. 2019.
- [6] B. Coecke, G. de Felice, D. Marsden, and A. Toumi. “Towards Compositional Distributional Discourse Analysis”. In: *Electronic Proceedings in Theoretical Computer Science* 283 (2018).
- [7] B. Coecke, F. Genovese, M. Lewis, D. Marsden, and A. Toumi. “Generalized Relations in Linguistics & Cognition”. In: *Theoretical Computer Science* (2018).

- [8] M. Wooldridge, J. Gutierrez, P. Harrenstein, E. Marchioni, G. Perelli, and A. Toumi. "Rational Verification: From Model Checking to Equilibrium Checking". In: *Proceedings of the Thirtieth AAAI Conference on Artificial Intelligence, February 12-17, 2016, Phoenix, Arizona, USA*. 2016.
- [9] A. Toumi, J. Gutierrez, and M. Wooldridge. "A Tool for the Automated Verification of Nash Equilibria in Concurrent Games". In: *Theoretical Aspects of Computing - ICTAC 2015 - 12th International Colloquium Cali, Colombia, October 29-31, 2015, Proceedings*. 2015.

TEACHING

- 2019 **Quantum Computer Science**, *University of Oxford*, Class Tutor.
String diagrams for quantum processes, ZX-calculus, quantum foundations and algorithms.
- 2019 **Logic & Proof**, *University of Oxford*, Class Tutor.
Propositional logic, SAT and constraint satisfaction, first-order logic and unification.
- 2018 **Computational Complexity**, *University of Oxford*, Class Tutor.
Turing machines and reductions, randomisation, introduction to descriptive complexity.
- 2018 **Data Science with Python**, *ESILV Paris*, Teaching Assistant.
Feature extraction from images, clustering, classification. Methodology for model evaluation.
- 2012 – **Elementary mathematics, physics and computer science**, Private Tutor.

INDUSTRY

- 2019 – 2021 **Research Scientist – Part Time**, *Cambridge Quantum Computing*, Oxford.
Natural language processing on noisy intermediate-scale quantum (NISQ) hardware.
- 2017 – 2018 **Data Scientist**, *Institut de Recherche et d'Histoire des Textes – CNRS*, Paris.
Deep learning for the automated analysis of manuscripts from the Middle Ages, see [4].
- 2015 – 2016 **Data Scientist – R&D Intern**, *Tinyclues*, Paris.
Tensor factorisation on complex relational data: users, products, emails, clicks and sales.
- 2014 – 2015 **Data Scientist – Summer Intern**, *Yonderlabs*, Berlin.
Probabilistic graphical models (HMM and CRF) applied to natural language processing.

SOFTWARE

I'm the main developer of DisCoPy [3], the Python library for computing with monoidal categories.

LANGUAGES

- Human Fluent in English and French. Basic German and beginner Arabic.
- Machine Advanced Python. Working knowledge of Haskell, Scala, C, SQL.

OTHER

- Philosophy Spinoza, Leibniz, Marx, Peirce, Bergson, Wittgenstein, Foucault, Deleuze.
- Literature Rimbaud, Baudelaire, Camus, Ionesco, Kafka, Borges, Kundera, Damasio.
- Music 10 years of DJing, digital and vinyl. House, Techno, Disco, Funk, World.