

# Alexander Koziell-Pipe

UNIVERSITY OF OXFORD • QUANTUM COMPUTING • ARTIFICIAL INTELLIGENCE • CATEGORY THEORY

Quantum Group, Dept. of Computer Science, University of Oxford, UK

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## Education

### Wolfson College, University of Oxford

DPHIL COMPUTER SCIENCE - SUPERVISORS: PROF. ALEKS KISSINGER, PROF. BOB COECKE

- Research focus: Category Theory, Quantum Computing, Artificial Intelligence and the intersection thereof.
- Wolfson Harrison UK Research Council Quantum Foundation Scholarship.
- Member of the Oxford Quantum Group.

Oxford, UK

Oct. 2021 - present

### Lincoln College, University of Oxford

MPhys MASTER OF PHYSICS - 1ST CLASS HONOURS

- Thesis Title: Interaction of Chiral Magnetic Skyrmions
- Lord Crewe Scholarship (£700).

Oxford, UK

Oct. 2015 - Jun. 2019

### St Paul's School

A LEVELS & GCSE

- (A2 Level) Mathematics: A\*, Physics: A\*, Further Mathematics: A\*, Chemistry: A\*
- (AS Level) all of the above: As, Biology: A (A highest awarded grade at AS Level)
- (GCSE) 9 A\*s and 3 As including A\*s Maths, Physics, Chemistry, Biology, Electronics

London, UK

Sept. 2009 - Jun. 2014

## Preprints

**Functorial Language Models (Extended Abstract)**, arXiv:2103.14411

2021 Presented at Semspace (Workshop on Semantic Spaces at the Intersection of NLP, Physics, and Cognitive Science) and ACT (Applied Category Theory Conference), 2021

Alexis Toumi, Alex  
Koziell-Pipe

## Experience

### Hitachi Vantara LLC

SE LUMADA FELLOW

- Applied machine learning algorithms and statistical modelling techniques to solve real-world problems for clients.
- Python, Seaborn, Time Series Analysis, Anomaly Detection, Data Mining, Graphical Models, Random Forests, SQL.

London, UK

Sept. 2020 - Dec. 2020

### Helix RE Inc.

COMPUTER VISION ENGINEER

- Designed Computer Vision algorithms and applied Deep Learning as part of a mission to create 'digital twins' of buildings.
- Contributed production-level code used in the company's main data processing pipeline.
- Python, C++, Matplotlib, Computational Geometry, Linear Algebra.

London, UK

Jul. 2019 - Oct. 2019

### Online Education Partnership Ltd.

MATHEMATICS AND SCIENCE TUTOR

- Taught Maths and Science to students around the world (Hong Kong, US, Dubai) via an online interface.
- Communication of abstract ideas to students through innovative use of video and online whiteboard software.
- Subjects: Mathematics, Further Mathematics Physics, Chemistry and Biology, up to and including A Level. University-level Linear Algebra.

Remote/Worldwide

Jun. 2016 - Sept. 2020

### National Tsing Hua University

CONDENSED MATTER PHYSICS INTERN

- Introduction to research on Weyl Semimetals: solid state crystals in a topologically non-trivial phase of matter.

Hsinchu, Taiwan

Mar. 2015 - Apr. 2015

### University of Texas at Dallas

ATMOSPHERIC PHYSICS INTERN

- Ran computer simulations in FORTRAN to study the effect of airborne particles on cloud formation.

Dallas, Texas, USA

Feb. 2015 - Mar. 2015.

### Source Lifestyle Inc.

COMPETITOR ANALYST

- Research of 100+ potential competitors for a former startup company.

London, UK

Jan. 2015 - Feb. 2015

## Extracurricular Activity

### Wolfson Quantum Foundations Research Cluster

RESEARCH CLUSTER REPRESENTATIVE

Wolfson College, Oxford

Oct. 2021 - present

- Organized and chaired events focused on tackling the biggest questions about the nature of our universe.
- Previous topics include 'The Fundamental Nature of Geometry', 'Cognitive Structures of Space-time' and 'Supersymmetry as an Evolutionary Adaptation'.

### Oxford University Gymnastics

MEN'S CAPTAIN

Oxford University Sport

Oct. 2021 - Mar. 2022

Mar. 2018 - Mar. 2019

- Contributed, as part of a committee, to managing Oxford University Gymnastics Club.
- Attended meetings, organized and led a team, and supported and taught other club members.
- Elected by teammates and members of the gymnastics club.

### Oxford University Gymnastics

IT OFFICER

Oxford University Sport

Mar. 2017 - Mar. 2018

- Maintained a website, produced video content, managed publicity and multiple social media accounts.
- HTML, CSS, Image and Video Editing (GIMP, DaVinci Resolve), Social Media Management.

### Halley Science Society

CLUB PRESIDENT

St Paul's School

Sep. 2013 - Jun. 2014

- Invited speakers and hosted lectures for the St Paul's School Science Society.
- Notable speakers include Professor John Ellis, who talked about the Higgs Boson shortly after its experimental confirmation.

## Grants, Awards & Achievements

### ACADEMIC

- 2018-19 **Lord Crewe Scholarship (£700)**, awarded to 11 out of 304 students to mark outstanding work.
- 2017 **Sidgwick Exhibition 2017-18 (£150)**, awarded for exceptional academic achievement and promise.
- 2014 **Senior Mathematics Prize**, chosen for outstanding work out of approximately 20 students.
- 2013-14 **Senior Academic Scholarship (£50)**, for top results in AS-level and excellent work throughout the year.

University of Oxford

University of Oxford

St Paul's School

St Paul's School

### SPORTING

- 2019 **Full Blue (Artistic Gymnastics)**, Oxford University's highest sporting achievement.
- 2018 **Full Blue**, as above.
- 2017 **Half Blue**, Oxford University's second highest sporting achievement.
- 2016 **Half Blue**, as above.

University of Oxford

University of Oxford

University of Oxford

University of Oxford

### GRANTS

- 2018 **Club Development Grant (£1000)**, won in open competition to support further development of Oxford University Gymnastics Club.
- 2016, 17,19 **Blues Fund (£150, £270, £125)**, to support achievement in gymnastics.

University of Oxford

Sport

Lincoln College,

University of Oxford

## Skills

<b>Research</b>	Mathematics (Category Theory), Quantum Computing, Artificial Intelligence
<b>Programming Languages</b>	Python, Javascript, HTML, CSS, Rust, Haskell
<b>Natural Languages</b>	Fluent English, Niveau Intermédiaire Français, 初級日本語

## Extra Information

**Technical Interests** Algorithms, Programming Languages, Web Development, IOS App Development, Deep Learning, Pytorch, Tensorflow, Data Science, Blockchain Technology, Cryptocurrency, Cryptoeconomics, Game Development, Command Line, Linux, Version Control, Git, Github Pro Account

**Sport** Artistic Gymnastics, Skiing, Snowboarding, Tennis, Windsurfing, Horsemanship, Martial Arts

**Music** Trumpet Grade 4, Piano Grade 2