Thomas Kite

Cambridge, United States

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thomas-kite TomKite57 Thomas Kite

SUMMARY

- PhD in Theoretical Physics with six publications – three first author.
- Passionate about combining fundamental science and computational solutions to create real world impact.
- Strong scientific communication skills: I have presented at multiple international conferences, workshops, internal seminars and journal clubs.
- Motivated self-learner: I have independently undertaken reading on design patterns, completed courses on algorithms, attended machine learning workshops and frequently visit various coding puzzle websites.
- Extensive teaching experience: I have been involved teaching in Python and C++ at many experience levels.

TECHNICAL SKILLS

- Highly skilled in C++ and Python
- GPU & CPU parallelism (both C++ & Python)
- Git Version Control
- Unix Based Systems
- Familiar with Bash, Julia and Javascript
- Deep Learning (PyTorch)
- Data Visualisation
- OOP Programming
- Scientific Writing

PROFESSIONAL EXPERIENCE

Massachusetts General Hospital **09 2023 – present day**

Research Fellow - Data Science & Biophysics for Intensive Care Cardiology *Massachusetts, United States*

- Leveraging deep learning techniques to extract groundbreaking insights in intensive care cardiology.
- Innovating software systems to deliver real-time, clinician-friendly metrics, empowering informed decision-making.
- Creating biophysical models for the advancement of personalized healthcare through digital twin concepts.
- Managing IT infrastructure, including hardware selection, ensuring data accessibility, and optimizing system resources for the team's data science workflows.

Evotec **01 2023 – 06 2023**

Scientific Software Developer - In Silico R&D (Innovation department) *Abingdon, United Kingdom*

- I developed Python tools to streamline and automate the workflow for computational chemistry and analysis within the company. These tools efficiently facilitated the running of computational chemistry codes and enabled the analysis of output data.
- Developed an understanding of the fundamentals of drug discovery, biological molecules and *ab initio* computational chemistry methods.

EDUCATION

University of Manchester **08 2019 – 03 2023**

Ph.D (Astronomy and Astrophysics) *Manchester, United Kingdom*

Thesis: CMB spectral distortions and anisotropies from the primordial Universe Supervisor: Prof. Jens Chluba

- Studying future detection prospects of primordial signals originating in very early Universe. Analytically deriving equations which can then be numerically solved in a computationally feasible way – often requiring carefully optimised and multithreaded code. Publications available at inspirehep.net/authors/1873147

University of Manchester **09 2015 – 06 2019**

M.Phys (Physics with Theoretical Physics) - 1st class (Hons) *Manchester, United Kingdom*

Thesis: Field Theory of Topological Defects Supervisor: Prof. Apostolos Pilaftsis

- Research into advanced topics of pure Mathematics (group theory, topology, differential manifolds, etc.) and their application to the study of theoretical Physics. Verification of expected phenomena via simple numerical simulations.

PUBLICATIONS

- Bridging the gap: spectral distortions meet gravitational waves **08 2021**
- Clarifying transfer function approximations for the large-scale gravitational wave background in ΛCDM **01 2022**
- Spectro-spatial evolution of the CMB I: discretisation of the thermalisation Green's function **10 2022**
- Spectro-spatial evolution of the CMB II: generalised Boltzmann hierarchy **10 2022**
- Spectro-spatial evolution of the CMB III: transfer functions, power spectra and Fisher forecasts **12 2022**
- Disentangling the primordial nature of stochastic GWBs with CMB spectral distortions **09 2023**

RELEVANT EXPERIENCE

University of Manchester **12 2019 – present day**
Lead developer of `CosmoTherm`*'s Anisotropy Module* *Manchester, United Kingdom*

- Refactoring and developing a C++ based Physics research code, `CosmoTherm`, to make it more modular and object oriented. As part of my refactoring I chose a code architecture more closely following the underlying mathematical formalism of Cosmological Perturbation Theory and ensured the code could be easily parallelised using OpenMP.

University of Manchester **09 2019 – present day**
Graduate Teaching Assistant *Manchester, United Kingdom*

- Supervised and aided students with coding in both Python and C++, ranging from complete beginners to experienced coders. I have taught in all undergraduate coding courses: introduction to programming for physicists, computational physics, theory computing project, object oriented programming in C++.
- As well as providing real-time hands-on help in the coding labs, my responsibilities included reviewing code, assigning grades and providing detailed written feedback to hundreds of students.

University of Manchester **07 2018 – 09 2018**
Particle Physics research internship *Manchester, United Kingdom*

- Supervised by Prof. Terry Wyatt, I performed a feasability study for detecting the tau lepton VBF interaction vertex using the ATLAS detector. This was performed using `ROOT` a large C++ code base commonly used in Particle Physics research. Writing efficient code capable of analysing and visualising large amounts of data was especially important in this project.
- I delivered a presentation on this work to the members of the Particle Physics department, and was awarded a prize for best talk.

Cheadle Hulme High School **06 2018 – 07 2018**
Teacher training internship *Cheadle Hulme, United Kingdom*

- 4 weeks receiving hands-on experience in the world of teaching Physics and Maths. This involved attending pedagogy sessions aimed at all ages and partaking in the Friday *science club* at the school.

Self Employed **2014 – 2018**
Private tutoring *Spain & United Kingdom*

- Tutoring in the fields of Maths, Physics and Chemistry in both English and Spanish. This ranged from GCSE to University. I developed key skills such as clear communication, strong leadership and the ability to explain topics effectively and efficiently from various viewpoints.

OTHER EXPERIENCE

- Fundraised with Manchester's Raise and Give (RAG) to support Childreach International. As part of a group we raised almost £60000 with our challenge to summit Kilimanjaro. For my fundraising I hosted an outreach event with Prof. Brian Cox, which sold 600 tickets, raising £2500 for the charity.
- Built a working backpropagation engine in C++, and used it to construct a multilayer perceptron. See Github link, and blog post.
- Completed LinkedIn skill assessments for Python, C, C++ and OOP.
- Completed LinkedIn course on *C++ best practices for developers.*
- Completed a course on *Fundamentals of Accelerated Computing with CUDA C/C++.*
- Completed a course on *Fundamentals of Accelerated Computing with CUDA Python.*
- Completed a course on *Data Parallelism: How to Train Deep Learning Models on Multiple GPUs.*
- Attended the N8 CIR Machine Learning Workshop: *Introduction to Artificial Neural Networks in Python.*
- A wealth of coding experience through websites like Advent of Code, Project Euler and Rosalind.
- Completed a coure on algorithms provided by AlgoExpert.
- Created *wikiguesser.io*, a game based on guessing Wikipedia article titles from popular words within the article. This exposed me to using APIs and effective web scraping.
- I have peer reviewed articles within my field for Europhysics Letters (EPL).
- Driving license (type B)
- Languages: English (native), Spanish (fluent), Italian (learning)

REFERENCES

References available upon request.