KATE BROWN *PhD, MMath*

Applied Mathematics Research Associate at Newcastle University with programming expertise, versatile communication skills and extensive experience of handling complex data, looking to move into a data-oriented industry role.

CONTACT INFO

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KEY SKILLS

- Programming
- Data manipulation, analysis and visualisation
- Problem solving
- Technical writing
- Public speaking
- Leadership
- Teamwork
- High performance computing

SOFTWARE

- Excel
- Fortran
- LaTex
- MATLAB
- Python
- R
- SQL
- Tableau
- UNIX
- XMDS2

REFERENCES

- Prof. Ian Moss
  ian.moss@newcastle.ac.uk
- Dr Thomas Billam
  thomas.billam@newcastle.ac.uk

WORK EXPERIENCE

Research Associate/Assistant

Newcastle University — *Sep 2019 - Present*

(Associate from Dec 2023, after successful PhD defence)

- Simulated dynamics of ultracold atoms using high performance computing resources.
- Manipulated large, stochastic data sets into a user-friendly format.
- Characterised data effectively using a variety of analysis and visualisation techniques.
- Regularly reported findings to collaborators and advised experimentalists on how best to concentrate resources.
- Presented research at international conferences and delivered seminars.
- Produced posters to showcase data stories.
- Authored, edited, and reviewed journal articles.
- Organised conferences. Led catering team, handled participant and supplier enquiries, optimised schedules.
- Served as school EDI representative. Drove initiatives tackling gender inequality and period poverty.

Urgent Care Receptionist

Northumbria Healthcare — *Aug 2015 - Dec 2023*

- Developed verbal communication and teamwork skills by liaising with healthcare professionals and the public, both in person and virtually.
- Performed well under pressure by managing a busy waiting room and responding calmly and compassionately to emergency situations.
- Strengthened problem solving skills by resolving patient complaints and navigating software failures promptly.
- Worked well independently, by carrying out duties efficiently and prioritising workload appropriately when manning reception alone.
- Handled and accurately recorded high volumes of confidential data in accordance with GDPR.

Ad Hoc Lecturer in Computational Modelling

Newcastle University — *Sep 2020 - Jul 2022*

- Wrote, delivered and examined an introductory course on XMDS2 and pseudo-spectral methods for postgraduate students.
- Gave tutorials on UNIX command line and data visualisation in MATLAB.
- Led problems classes on special relativity, variational methods and multivariable calculus.
- Developed online exams for additional undergraduate modules using NUMBAS software. Prioritised awarding fair partial credit by incorporating adaptive marking.
- Invigilated exams and marked assignments.

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EDUCATION

PhD in Applied Mathematics
Newcastle University *Sep 2019 - Dec 2023*

Thesis Title: Theoretical Investigations of Early Universe Simulators

Funding: Fully funded by STFC

- For full details, please see **Research Associate/Assistant** role in WORK EXPERIENCE section.

MMath, First Class Honours
Newcastle University *Sep 2015 - Jul 2019*

Dissertation Title: Periodic Quenches Across the BKT Transition

- Modelled reversible condensate formation in a 2D, finite temperature Bose gas using Fortran and XMDS2 simulations of the stochastic projected Gross-Pitaevskii Equation.
- Extensive post-processing and data-visualisation carried out in MATLAB.

Relevant Modules:

- Applied Probability - 97%
- Bayesian Inference - 89%
- Computational Modelling - 87%
- Experimental Design - 97%
- Generalized Linear Models - 89%
- General Relativity - 90%
- Partial Differential Equations - 91%
- Quantum Fluids - 83%
- Quantum Mechanics - 100%

Achievements:

- Prize for best Mathematics dissertation project in cohort.
- Prize for best Applied Mathematics research poster in cohort.
- Highest Applied Mathematics grade in cohort.

Secondary Education
St Thomas More RC Academy, North Shields *Sep 2011 - Jul 2015*

- A-levels: A*A*A (Biology, Mathematics, Further Mathematics)
- AS-levels: AB (Geography, German)
- 11 GCSEs: 8A*s, 3As

RECENT PUBLICATIONS

- *Mitigating boundary effects in finite temperature simulations of false vacuum decay*
  In preparation TBA
- *Bubble nucleation in a cold spin-1 gas*
  New J. Phys. **25**, 043028 2023
- *False-vacuum decay in an ultracold spin-1 Bose gas*
  Phys. Rev. A **105**, L041301 2022
- *Simulating cosmological supercooling with a cold atom system II*
  Phys. Rev. A **104**, 053309 2021
- *Periodic Quenches across the BKT transition*
  Phys. Rev. Research **3**, 013097 2020

RECENT TALKS

- *Mitigating Boundary Effects in Finite Temperature Simulations of False-Vacuum Decay*
  WE-Heraus-Seminar 823 Dec 2024
- *Finite Temperature Simulations of False-Vacuum Decay in a Spin-1 Bose Gas*
  CQD Heidelberg University Sep 2024
- *Simulating False Vacuum Decay in a Spin-1 Gas*
  Northern Quantum Meeting 10 Jun 2024
- *Bubble Nucleation in a Cold Spin-1 Gas*
  QSimFP @ Perimeter Institute Jun 2023
- *Early Universe Vacuum Decay*
  Recontres de Moriond Jan 2022