Paul Druce

Last updated: June 13, 2024

Professional Summary

Senior Software Engineer with a proven track record in designing, implementing and testing scalable, cloud-native applications and robust CI/CD pipelines. Proficient in a diverse range of programming languages including Golang, JavaScript, and Python with a strong foundation in mathematical sciences and experience in academic mentoring.

Current responsibilities

Senior Software Engineer in Test, The MathWorks May 2023 - Current
I work with multiple teams to implement comprehensive CI pipelines and help design software to make it testable, scalable and cloud-native.

Key Skills:

- Kubernetes based web app development using Go/JS.
- Deployment on Azure and AWS.
- Software release pipelines.
- Golang development and testing.

Software Engineer in Test, The MathWorks May 2022 - May 2023
As part of the Cloud Platform Integrations team at MathWorks, I worked on integrating MATLAB in Jupyter notebooks. Also worked on Modelscape - a new offering from The MathWorks aimed at helping financial institutions manage their models.

Key Skills:

- JavaScript and TypeScript development.
- Python development.
- Build and test pipelines in TeamCity and GitHub Actions.
- Automated interactive testing with Playwright framework.

Skills

Programming Languages: C, C++, JavaScript/TypeScript, Python, Bash, Golang.

Development Tools: Git, Perforce, Docker, TeamCity, GitHub Actions

Cloud Platforms: Azure, AWS

Professional Experience

Consulting Engineering at MachineWorks May 2021 - April 2022
Aided commercial 3D software developers.
Created demonstrative applications and new workflows.

I crafted showcase applications to introduce MachineWorks software to new markets. I developed algorithms and example code for customers, accelerating their products' time to market.

Academic Tutor and Mentor Aug 2017 - May 2023
Tutored mathematics and physics at GCSE to Univesitory level.
Mentored students for mathematical entrance exams and competitions.

I gained extensive experience in both face-to-face and online tutoring using shared online whiteboards. I prepared tailored lessons and question sheets for my tutees, fostering their confidence and skills while providing a supportive environment for them to ask questions.

Education

PhD in Mathematical Sciences, University of Nottingham, UK: 2015 - 2020
Title: Spectral Geometry of Fuzzy Spaces Supervisor: Prof. John Barrett

I developed the understanding of finite non-commutative geometries and how they might be useful in a theory of quantum gravity.

Mathematical areas studied: Differential geometry, non-commutative geometry, quantum geometry, representation theory.
Key skills: independent working, public speaking, data analysis using Python, knowledge of Monte Carlo simulations

First Class Masters in Mathematics and Physics, University of Warwick, UK: 2011 - 2015
Masters Dissertation: Multiferroicity Emerging from Frustrated Spin Interactions
Supervisors: Prof J. Staunton and Dr J. Lloyd-Hughes

Studied a wide range of mathematics and physics topics at Warwick, achieving an average grade of 81%. Developed proficiency in C programming for high-performance computing, specializing in parallel computing with OpenMP and MPI frameworks.

Teaching and Mentorship Experience

UKMT Volunteer Mentor October 2020 - May 2022

- Mentored students for advanced mathematics exams.

PhD Demonstrating and Marking Oct 2015 - Jul 2019

- Assisted students in various undergraduate mathematics modules:
  - 1st Year Modules: Mathematics for Physics and Astronomy, Calculus and Linear Algebra, Applied Mathematics
  - 2nd Year Modules: Introduction to Mathematical Physics, Mathematical Analysis, Differential Equations and Fourier Analysis
  - 3rd Year Modyles: Fluid Dynamics

Non-commutative Geometry Seminar Series for Master Students Oct 2016 - Apr 2017

Undergraduate Revision Classes 2012 - 2015

Academic Activities

Research Interests: Mathematical descriptions of the universe, spacetime, noncommutatie geometry.

Outreach: Organized Pint of Science 2019 in Nottingham

Research Projects:

- PhD Research Project - Spectral Geometry of Fuzzy Space 2015 - 2019
- Masters Research Project - Multiferroicity Emerging from Frustrated Spin Interactions 2014 - 2015
- Undergraduate Summer Research - Knotted Nematics Summer 2014

Publications and Honours

- *Spectral estimators for finite non-commutative geometries.* Barrett, J., Druce, P., Glaser, L.: J Phys Math Theor. 52, 275203 (2019). doi:10.1088/1751-8121/ab22f8
- EPSRC Studentship, University of Nottingham (2015 - 2018)
- Undergraduate Research Scholarship Scheme, University of Warwick (Summer 2014).

Talks

- *Noncommutative Geometry and Gravity Models* Talk given at Collabor8.2 meeting at Lancaster University, UK, May 2018. Slides here.
- *Fuzzy Geometries and Spectral Zeta Functions.* Invited by L Glaser at Radboud University, Netherlands, April 2017. Slides here.
- *Algebraic Knots and Liquid Crystals.* At the Warwick Imperial Autumn Meeting, 2014 (University of Warwick, UK, November 2014). Slides here.