Dr. Vincent A. Knight

Cardiff University
School of Mathematics
Senghennydd Road
Cardiff, CF24 4AG
(+44) 29 2087 5548

www.vknight.org
G+: +Vincent Knight
twitter: @drvinceknight
github: drvinceknight
blog: Un peu de math

- *Senior lecturer*
- *Deputy director of engagement*
- *Fellow of the Sustainable Software Institute*
- *Chair of the OR in Schools taskforce*
- *Area editor for Health Systems*
- *Member of the Phoenix project advisory board*
- *Organiser of the Cardiff Python user group meetup*
- *Member of the PyCon UK organising committee*

APPOINTMENTS

Senior Lecturer — *2016 - present*
Cardiff University

Lecturer — *2011 - 2016*
Cardiff University

Post Doctoral Researcher — *2009 - 2011*
Cardiff University

ACADEMIC QUALIFICATIONS

Postgraduate Certificate in University Teaching and Learning,
Obtained with distinction
Cardiff University — *2013*

Ph.D. in Enumerative Combinatorics,
Alternating Sign Matrix Polytopes
Cardiff University — *2009*

B.Sc. (Hons) Mathematics,
Graduated top of my class
Cardiff University — *2005*

Baccalaureat Scientifique,
Fluent in French
Lycee du Pre Saint Sauver, St Claude, Jura, France — *2002*

PUBLICATIONS

27. *2016:* ***Ambulance Allocations for Maximising Survival within a Heterogeneous Population using a Heterogeneous Fleet.***
Leanne Smith, Paul Harper, Vincent Knight
Submitted to the journal of the operational research society.

26. *2016:* ***Measuring the Price of Anarchy in Critical Care Unit Interactions.***
Knight VA., Komenda I, Griffiths J.

Accepted in the journal of the operational research society.

25. *2016:* ***An Open Framework for the Reproducible Study of the Iterated Prisoners Dilemma.***
Vincent Knight, Owen Campbell, Marc Harper, Karol Langner, James Campbell, Thomas Campbell, Alex Carney, Martin Chorley, Cameron Davidson-Pilon, Kristian Glass, Nikoleta Glynatsi, Tom Ehrlich, Martin Jones, Georgios Koutsovoulos, Holly Tibble, Jochen Mller, Geraint Palmer, Piotr Petunov, Paul Slavin, Timothy Standen, Luis Visintini, Karl Molden.
Journal of open research software.
http://openresearchsoftware.metajnl.com/article/10.5334/jors.125/

24. *2016:* ***Time-dependent stochastic methods for managing and scheduling Emergency Medical Services***
J.L. Vile, J.W. Gillard, P.R. Harper, V.A. Knight.
Operations Research for Health Care.
http://www.sciencedirect.com/science/article/pii/S2211692314200518

23. *2015:* ***Containment of socially optimal policies in multiple-facility Markovian queueing systems.***
Rob Shone, Vincent Knight, Paul Harper, Janet Williams, John Minty
Journal of the Operational Research Society.
http://link.springer.com/article/10.1057/jors.2015.98

22. *2015:* ***Playing games: a case study in active learning applied to Game Theory.***
Vince Knight
Connections
https://journals.gre.ac.uk/index.php/msor/article/view/254

21. *2015:* ***Compliance with National Guidelines for Stroke in Radiology.***
Izabella Komenda, Hannah Williams, Vincent Knight
Operations Research for Health Care.
http://www.sciencedirect.com/science/article/pii/S2211692314200191

20. *2015:* ***Modelling of psoriasis patient flows for the reconfiguration of secondary care services and treatments***
Kayne Putman, Alex Anstey, Paul R Harper, Vince A Knight
Health Systems.

19. *2015:* ***Rostering staff at a mathematics support service using a finite-source queueing model***
Gillard J., Knight V., Vile J., Wilson R.
IMA Journal of Management Mathematics. 27 (2)

18. *2014:* ***Mathematical modelling of patient flows to predict critical care capacity required following the merger of two district general hospitals into one***
J. Williams, S. Dumont, J. Parry-Jones, I. Komenda, J. Griffiths, V. Knight
Anaesthesia. 70 (1)

17. *2014:* ***Operational research ambassadors in schools***
Bradshaw N.A., Harper P, Knight V., Orpin L.
Proceedings of the HEA STEM, Edinburgh 2014

16. *2014:* ***Tweeting the Terror: Modelling the Social Media Reaction to the Woolwich Terrorist Attack***
Burnap P, Williams ML, Sloan L, Rana O, Housley W, Edwards A, Knight V, Procter R., Voss A. (
Social Network Analysis and Mining

15. *2014:* ***Mathematical modelling of patient flows to predict critical care capacity required following the merger of two district general hospitals into one.***
J. Williams, S. Dumont, J. Parry-Jones, I. Komenda, J. Griffiths, V. Knight.
Anaesthesia. 70 (1)

14. *2013:* ***Selfish routing in public services.***
Knight VA, Harper PR.
European Journal of Operational Research. 230 (1) 122-132

13. *2013:* ***Using Singular Spectrum Analysis to Obtain Staffing Level Requirements in Healthcare.***
Knight VA, Gillard J
Journal of the Operational Research Society

12. *2013:* ***Comparisons between observable and unobservable M/M/1 queues with respect to optimal customer behavior***
Shone R, Knight VA, Williams JE
European Journal of Operational Research

11. *2012:* ***Ambulance Allocation for Maximal Survival with Heterogeneous Outcome Measures.***
Knight VA, Harper PR, Smith L
OMEGA - The International Journal of Management Science. 40 (6) 918–926

10. *2012:* ***How Efficient can an Emergency Unit be? A Perfect World Model.***
Baboolal K, Griffiths J, Knight VA, Nelson AV, Voake C, Williams JE.
Emergency Medicine Journal.

9. *2012:* ***Discrete Conditional Phase-Type Models Utilising Classification Trees: Application to Modelling Health Service Capacities.***
Harper PR, Knight VA, Marshall A.
European Journal of Operational Research. 219 (3) 522–530

8. *2012:* ***Modelling Emergency Medical Services with Phase Type Distributions.***
Knight VA, Harper PR.
Health Systems. 1 53-68

7. *2011:* ***On the Peter Principle: An Agent Based Investigation into the Consequential Effects of Social Networks and Behavioural Factors.***
Fetta A, Harper PR, Knight VA, Williams JW, Vieira I
Physica A: Statistical Mechanics and its Applications.

6. *2011:* ***Forecasting Welsh Ambulance Demand using Singular Spectrum Analysis.***
Williams J, Gillard J, Harper PR, Knight VA
Journal of the Operational Research Society.

5. *2011:* ***Bed Management in a Critical Care Unit.***
Griffiths J, Knight VA, Komenda I.
IMA Journal of Management Mathematics.

4. *2011:* ***Modelling Patient Choice in Healthcare Systems: Development and Application of a Discrete Event Simulation with Agent-Based Functionality.***
Knight VA, Williams JE, Reynolds I.
Journal of Simulation.

3. *2011:* ***Cost-Effective Workforce Planning: Optimising the Dental Team Skill-Mix for England.***
Harper PR, Kleinman ER, Gallagher JE, Knight VA
Journal of Enterprise Information Management

2. *2010:* ***Forecasting Welsh Ambulance Demand using Singular Spectrum Analysis.***
Williams J, Gillard J, Harper PR, Knight VA
In Proceedings of the XXXVI International ORAHS Conference

1. *2008:* ***Higher Spin Alternating Sign Matrices***
Behrend RE, Knight VA
Electronic Journal of Combinatorics. 14(1): R83, 38pp.

RESEARCH STUDENTS

27. *Nikoleta Glynatsi (PhD)* *2016 - present*
Machine learning and the Prisoner's Dilemma

26. *James Campbell (BSc)* *2016 - present*
Fingerprinter prisoner's Dilemma strategies

25. *Cindy Huang (Nuffield Research Placement)* *2016 - 2016*
Investigating deadlock in queues with vacation and baulking

24. *Rhys Ward (Summer)* *2015 - 2015*
Building Game Theoretical Software in a Research Environment

23. *James Campbell (Summer)* *2015 - 2015*
Building Game Theoretical Software in a Research Environment

22. *Tobenna Peter Igwe (Google Summer of Code)* *2015 - 2015*
Extending Game Theory in Sage

21. *Ffinian Sullivan (Nuffield Research Placement)* *2015 - 2015*
Understanding mixed behaviour in queue balking threshold policies

20. *Hannah Lorrimore (Summer)* *2015 - 2015*
Building Game Theoretical Software in a Research Environment

19. *Geraint Palmer (PhD)* *2014 - present*
Jackson networks and healthcare

18. *Imogen Dunne (BSc.)* *2014 - 2015*
The Effect of Personality Traits on Academic Achievement in Flipped versus Traditional Learning Environments

17. *James Campbell (Summer)* *2014 - 2014*
Building Game Theoretical Software in a Research Environment

16. *Rhys Jones (BSc.)* *2013 - 2014*
Modelling Rugby Lineout Strategies Using Game Theory

15. *Jason Young (MMath)* *2013 - 2014*
Markov Decision Processes for the study a system of two queues in series.

14. *Ceri Morse (BSc.)* *2012 - 2013*
Modelling Lineout Strategies using Game Theory

13. *Jason Young (Summer)* *2012 - 2012*
Understanding the effect of selfish behaviour in a series of 2 queues

12. *Rob Shone (PhD)* *2011 - 2014*
Individually and Socially Optimal Policies in Queueing Systems with Multiple Heterogeneous Facilities

11. *Angelico Fetta (PhD)* *2011 - 2014*
Agent Based Simulation for Complex Health Systems Interventions

10. *Chappman Sin (BSc.)* *2011 - 2012*
Mathematical modelling of Risk (the board game)

9. *Iain Reynolds (Summer)* *2011 - 2011*
Modelling patient choice in healthcare systems development and application of a discrete event simulation with agent-based functionality

8. *Izabela Komenda (PhD)* *2010 - 2013*
Bed management in a critical care unit

7. *Tatjana Timofejeva (BSc.)* *2010 - 2011*
Impact of unscheduled care Modelling time varying activities at a Hospital

6. *Stuart MacGregor (BSc.)* *2010 - 2011*
A study into two player hide and seek games verifying results from game theory using monte carlo simulation, with a particular application to anti-submarine warfare

5. *Catherine Fortune (BSc.)* *2010 - 2011*
Game Theory and the Lemke-Howson algorithm

4. *Julie Vile (PhD)* *2009 - 2012*
   Time-dependent stochastic modelling for predicting demand and scheduling of emergency medical services

3. *Fern Gould (BSc.)* *2009 - 2010*
   Game Theory and the Iterated Prisoner's Dilemma

2. *Tamsin Griffiths (BSc.)* *2009 - 2010*
   Troops to Task Tool and Refugee Estimation

1. *Leanne Smith (PhD)* *2008 - 2013*
   Modelling emergency medical vehicle services

GRANT FUNDING

Sustainable software institute
Fellowship
£3,000 *2013 - ongoing*

Cardiff and Vale University Health Board
Operational Research Modelling to Support Cardiff and Vale UHB
£371,427 *2013 - 2018*

EPSRC
Identifying and modelling victim, business regulatory and malware behaviours in a changing cyberthreat landscape
£101,659 *2013 - 2016*

Aneurin Bevan Health Board
Creation of a Mathematical/OR Modelling Unit to Support the Aneurin Bevan Health Board
£319,944 *2013 - 2015*

ESRC
Hate speech? Understanding the modelling of social media identity formation and behaviour through the Cardiff Online Social Media Observatory (COSMOS)
£7,015 *2013 - 2016*

Health Foundation and Cardiff and Vale University Health Board
Estimating quality improvement and cost reduction for the patient and local health economy of transferring ENT/audiology services into a community setting
£61,237 *2013 - 2014*

LANCS (EPSRC)
Post-Doctoral Training Scheme Grant: Investigating the Effects of Individual Behaviour on Hierarchical queueing Systems
£5,000 *2012 - 2012*

Cardiff University CUROP Award
Developing and Evaluating Mathematical Teaching Resources through Open Source Software
£2,200 *2012 - 2012*

LANCS (EPSRC)

Post-Doctoral Training Scheme Grant: Choice and Healthcare Investigation Project
£2,500 *2010 - 2011*

Cardiff University CUROP Award
Patient Choice: A Discrete Event Simulation
£2,500 *2010 - 2012*

TEACHING

Courses I am currently teaching:

3. *Computing for Mathematics: A course introducing programming to mathematics students.*
2. *Introduction to Object Oriented Programming: A hackathon introduces students to fundemantal aspects of object oriented prgramming.*
1. *OR2 - Game Theory: A final year mathematics course covering introductory game theory.*

Courses I have taught in the past:

4. *MSc. Week 0: An overview of fundamental mathematics concepts for new MSc students.*
3. *OR Methods: A course covering: queueing theory, game theory and Markov processes.*
2. *Introduction to LaTeX: A brief introduction to LaTeX.*
1. *Advanced Statistical Packages: A course teaching the SAS and R software packages.*

MEDIA

6. *2016-09-26: Pythagoras' trousers - Election polling*
5. *2016-01-27: Namibia broadcasting company - Discussing PyCon Namibia*
4. *2015-06-16: BBC Radio Wales - Game Theory and Nash Equilibrium*
3. *2015-04-16: Sci screen screening - The Imitation Game*
2. *2014-05-05: 2014 Pythagoras Lecture - Mathematics and Healthcare Management*
1. *2014-03-19: BBC Parliament - Voice of the Future 2014*

OUTREACH

- *Monmouth Science initiative.*
- *Regular workshops at the School of Mathematics.*
- *STEM live: a university wide event.*
- *Speaking at the British Science festival 2015.*

SOFTWARE PROJECTS

- *Axelrod: A Python library/github project that replicates Axelrod's tournament.*
- *Game Theory in Sage: A collection of code to continue the integration of Game Theoretic capabilities in to Sage.*
- *Virtual Microscope: A web application to display and annotate scanned slides.*
- *ghtalks: Organise and share talks with gh-pages*
- *sklDj: A Django web app interface to machine learning algorithms*
- *Ciw: A Python library for simulation queueing networks*

SOFTWARE COMMUNITY

- *PyDiff: I help organise the Cardiff Pyton user group meetup.*
- *DjangoCon Europe 2015: I was on the organising committee for this year's DjangoCon Europe.*
- *Python Namibia: I help run the Pycon Namibia conference.*
- *PyCon UK: I am on the orgnising committee for PyCon UK.*
- *School of mathematics code club: I help run a code club open to mathematics students.*