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

- *Topic editor for the Journal of Open Source Software*
- *Local organiser of the SSI Collaborations 2018 Conference*
- *Data Innovation Research Institute Management Board*
- *Editor for the Cardiff Centre for Education Innovation Learning Hub*
- *Member of the PyCon UK organising committee*
- *Sustainable Software Institute Fellow*
- *Deputy director of engagement*
- *Phoenix project advisory board*
- *Cardiff Python User Group Meetup Organiser*
- *Mathematical modelling area editor for Health Systems*
- *Chair of Operational Research in Schools taskforce*

AWARDS

- *2021: Lyn Thomas award award in recognition of academic OR research which best demonstrates both novelty and real world impact backed up by evidence.*
- *2020: School of Mathematics student award for personal tutor of the year*
- *2020: School of Mathematics student award for best lecturer*
- *2020: School of Mathematics student award for most approachable member of staff*
- *2019: School of Mathematics student award for personal tutor of the year*
- *2019: School of Mathematics student award for most influential member of staff in the final year*
- *2019: School of Mathematics student award for best lecturer*
- *2018: Nominated for Cardiff University Enriching Student Life Awards: Most innovative member of staff*
- *2017: John Pinner award for contribution to the Python community*
- *2017: Times higher education award for international collaboration: Phoenix Project.*
- *2016: Shortlisted for Cardiff University Enriching Student Life Awards: Most innovative member of staff*
- *2016: School of Mathematics student award for best lecturer*
- *2015: Times higher education award for modelling unit*
- *2015: Shortlisted for Cardiff University Enriching Student Life Awards: Most innovative member of staff*
- *2014: Cardiff University Recognising Excellence Rising Star Award*
- *2005: Cardiff School of Mathematics - graduated top of my year*

RESEARCH INTERESTS

- *Game Theory: Strategic behaviour in queues and the Iterated Prisoner's dilemma*
- *Pedagogy: Active learning approaches*
- *Healthcare: Applied modelling of patient flow*
- *Markov modelling: Queueing processes and evolutionary dynamics*

APPOINTMENTS

Fellow of Sustainable Software Institute *2016 - 2016*
Cardiff University

Senior Lecturer/Associate Professor *2016 - present*
Cardiff University

Fellow of the Higher Education Academy *2013 - 2013*
Cardiff University

Lecturer/Assistant Professor *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

50. *2021:* ***Modelling changes in healthcare demand through geographic data extrapolation.***
Geraint Palmer, Paul Harper, Vincent Knight, Cathy Brooks
Health Systems

https://www.tandfonline.com/doi/abs/10.1080/20476965.2021.1906764?journalCode=thss20

49. 2021: ***Game Theory and Python: An educational tutorial to game theory and repeated games using Python.***
Vincent Knight, Nikoleta Glynatsi
Journal of Open Source Education
https://doi.org/10.21105/jose.00078

48. 2021: ***A meta analysis of tournaments and an evaluation of performance in the Iterated Prisoner's Dilemma***
Nikoleta Glynatsi, Vincent Knight
https://arxiv.org/abs/2001.05911

47. 2021: ***A bibliometric study of research topics, collaboration and centrality in the Iterated Prisoner's Dilemma***
Nikoleta Glynatsi, Vincent Knight
Humanities and Social Sciences Communications
https://www.nature.com/articles/s41599-021-00718-9
https://arxiv.org/abs/1911.06128

46. 2020: ***Matching: A Python library for solving matching games***
Henry Wilde, Vincent Knight, Jon Gillard
Journal of Open Source Software
https://joss.theoj.org/papers/10.21105/joss.02169

45. 2020: ***Using a theory of mind to find best responses to memory-one strategies***
Nikoleta Glynatsi, Vincent Knight
Accepted for publication in Scientific Reports
https://www.nature.com/articles/s41598-020-74181-y
https://arxiv.org/abs/1911.12112

44. 2020: ***Evolutionary Dataset Optimisation: Learning algorithm quality through evolution***
Henry Wilde, Vincent Knight, Jon Gillard
Applied Intelligence
https://link.springer.com/article/10.1007/s10489-019-01592-4
https://arxiv.org/abs/1907.13508

43. 2020: ***Segmentation analysis and the recovery of queuing parameters via the Wasserstein distance: a study of administrative data for patients with chronic obstructive pulmonary disease***
Henry Wilde, Vincent Knight, Jon Gillard, Kendal Smith
https://arxiv.org/abs/2008.04295

42. 2020: ***A novel initialisation based on hospital-resident assignment for the k-modes algorithm***
Henry Wilde, Vincent Knight, Jon Gillard
https://arxiv.org/abs/2002.02701

41. 2019: ***Recognising and evaluating the effectiveness of extortion in the Iterated Prisoner's Dilemma***
Vincent Knight, Marc Harper, Nikoleta Glynatsi, Jon Gillard

https://arxiv.org/abs/1904.00973

40. 2019: ***Memory depth of finite state machine strategies for the iterated prisoner's dilemma***
T.J. Gaffney, Marc Harper, Vincent Knight
https://arxiv.org/abs/1912.04493

39. 2019: ***A conservative index heuristic for routing problems with multiple heterogeneous service facilities***
Rob Shone, Vincent Knight, Paul Harper
Mathematical Methods of Operations Research
https://link.springer.com/article/10.1007/s00186-020-00722-w?wt_mc=Internal.Event.1.SEM.ArticleAuthorOnlineFirst

38. 2018: ***Evolution Reinforces Cooperation with the Emergence of Self-Recognition Mechanisms: an empirical study of the Moran process for the iterated Prisoner's dilemma***
Vincent Knight, Marc Harper, Nikoleta Glynatsi, Owen Campbell
PLOS One
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0204981
https://arxiv.org/abs/1707.06920

37. 2018: ***Determining patient outcomes from patient letters: A comparison of text analysis approaches***
Jennifer Morgan, Paul Harper, Vincent Knight, Andrew Nelson, Andreas Artemiou, Alex Carney
Journal of the Operational Research Society
https://www.tandfonline.com/doi/full/10.1080/01605682.2018.1506559

36. 2018: ***Nashpy: a Python library for the computation of Nash equilibria***
Vincent Knight, James Campbell
Journal of Open Source Software
https://doi.org/10.21105/joss.00904
http://orca.cf.ac.uk/116002/

35. 2017: ***Modelling deadlock in open restricted queueing networks***
Geraint Palmer, Paul Harper, Vincent Knight
European Journal of Operational Research
http://www.sciencedirect.com/science/article/pii/S0377221717309529

34. 2017: ***An Evolutionary Game Theoretic Model of Rhino Horn Devaluation***
Nikoleta Glynatsi, Vincent Knight, Tamsin Lee
Ecological Modelling
https://www.sciencedirect.com/science/article/pii/S0304380018303260
https://arxiv.org/abs/1712.07640

33. 2017: ***Predicting Adolescent Social Networks to Stop Smoking in Secondary Schools***
Angelico Fetta, Vincent Knight, Paul Harper, Janet Williams
European Journal of Operational Research
http://www.sciencedirect.com/science/article/pii/S0377221717306665?via%3Dihub

32. 2017: ***Reinforcement Learning Produces Dominant Strategies for the Iterated Prisoner's Dilemma***

Marc Harper, Vincent Knight, Martin Jones, Georgios Koutsovoulos, Nikoleta Glynatsi, Owen Campbell
PLOS One
http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0188046
https://arxiv.org/abs/1707.06307

31. *2017:* ***Ciw: An open source discrete event simulation library***
Geraint Palmer, Vincent Knight, Paul Harper, Asyl Hawa
Journal of Simulation
https://www.tandfonline.com/doi/abs/10.1080/17477778.2018.1473909
https://arxiv.org/abs/1710.03561

30. *2016:* ***Measuring the Price of Anarchy in Critical Care Unit Interactions.***
Vincent Knight, Izabela Komenda, Jeff Griffiths
The journal of the operational research society
http://www.readcube.com/articles/10.1057/s41274-016-0100-8?author_access_token=JAsSHKTcTl3NH3k5s
WULIi-5FaAMov8cp-zDTP1PJoVIArpmmPDcS9szSXf4MFhLgmkgDfNf-Es-tfeeFIWjcAd9ghBNqM6Ekw%3D%
3D

29. *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

28. *2016:* ***Editorial: Operations Research for Health Care ESI XXXI — OR applied to Health in a Modern World.***
Roberto Aringhieri, Vincent Knight, Honora Smith
Operations Research for Health Care, 8, 22–23.
http://doi.org/10.1016/j.orhc.2016.01.002

27. *2016:* ***An Open Framework for the Reproducible Study of the Iterated Prisoner's Dilemma.***
Vincent Knight, Owen Campbell, Marc Harper, Karol Langner, James Campbell, Thomas Campbell, Alex Carney, Martin Chorley, Cameron Davidson-Pilon, Kristian Glass, Nikoleta Glynatsi, Tomáš Ehrlich, Martin Jones, Georgios Koutsovoulos, Holly Tibble, Jochen Müller, 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/
https://arxiv.org/abs/1604.00896

26. *2016:* ***Time-dependent stochastic methods for managing and scheduling Emergency Medical Services***
Julie Vile, Jon Gillard, Paul Harper, Vincent Knight
Operations Research for Health Care.
http://www.sciencedirect.com/science/article/pii/S2211692314200518

25. *2016:* ***Editorial: Health Systems ESI XXXI — OR applied to Health in a Modern World.***
Roberto Aringhieri, Vincent Knight, Honora Smith
Operations Research for Health Care, 5, 3.
https://link.springer.com/article/10.1057/s41306-016-0012-5

24. *2015:* ***Rostering staff at a mathematics support service using a finite-source queueing model***
Jon Gillard, Vincent Knight, Julie Vile, Rob Wilson
IMA Journal of Management Mathematics. 27 (2)

23. *2015:* ***Compliance with National Guidelines for Stroke in Radiology.***
Izabela Komenda, Hannah Williams, Vincent Knight
Operations Research for Health Care.
`http://www.sciencedirect.com/science/article/pii/S2211692314200191`

22. *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`

21. *2015:* ***Playing games: a case study in active learning applied to Game Theory.***
Vincent Knight
Connections
`https://journals.gre.ac.uk/index.php/msor/article/view/254`

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

19. *2014:* ***Mathematical modelling of patient flows to predict critical care capacity required following the merger of two district general hospitals into one.***
James Williams, Steve Dumont, Jack Parry-Jones, Izabela Komenda, Jeff Griffiths, Vincent Knight
Anaesthesia. 70 (1)

18. *2014:* ***Operational research ambassadors in schools***
Noel-Ann Bradshaw, Paul Harper, Vincent Knight, Louise Orpin
Proceedings of the HEA STEM, Edinburgh 2014

17. *2014:* ***Tweeting the Terror: Modelling the Social Media Reaction to the Woolwich Terrorist Attack***
Peter Burnap, Matthew Williams, Luke Sloan, Omer Rana, Will Housley, Adam Edwards, Vincent Knight, Rob Procter, Alex Voss
Social Network Analysis and Mining

16. *2013:* ***Comparisons between observable and unobservable M/M/1 queues with respect to optimal customer behavior***
Rob Shone, Vincent Knight, Janet Williams
European Journal of Operational Research

15. *2013:* ***Using Singular Spectrum Analysis to Obtain Staffing Level Requirements in Healthcare.***
Vincent Knight, Jon Gillard
Journal of the Operational Research Society

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

13. *2012:* ***Discrete Conditional Phase-Type Models Utilising Classification Trees: Application to Modelling Health Service Capacities.***
Paul Harper, Vincent Knight, Adele Marshall
European Journal of Operational Research. 219 (3) 522–530

12. *2012:* ***Modelling Emergency Medical Services with Phase Type Distributions.***
Vincent Knight, Paul Harper
Health Systems. 1 53-68

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

10. *2012:* ***How Efficient can an Emergency Unit be? A Perfect World Model.***
Kesh Baboolal, Jeff Griffiths, Vincent Knight, Andrew Nelson, Cheryl Voake, Janet Williams
Emergency Medicine Journal.

9. *2012:* ***Simulating Bed Capacity: Evaluating the Impact of Healthcare Service Transfers***
Robert Bares, Jeff Griffiths, Vincent Knight, Janet Williams, Kesh Baboolal, Andrew Nelson
IEEE UKSim 14th International Conference on Computer Modelling and Simulation

8. *2011:* ***Forecasting Welsh Ambulance Demand using Singular Spectrum Analysis.***
Janet Williams, Jon Gillard, Paul Harper, Vincent Knight
In Journal of the Operational Research Society

7. *2011:* ***On the Peter Principle: An Agent Based Investigation into the Consequential Effects of Social Networks and Behavioural Factors.***
Angelico Fetta, Paul Harper, Vincent Knight, Janet Williams, Israel Vieira
Physica A: Statistical Mechanics and its Applications.

6. *2011:* ***Bed Management in a Critical Care Unit.***
Jeff Griffiths, Vincent Knight, Izabela Komenda
IMA Journal of Management Mathematics.

5. *2011:* ***Modelling Patient Choice in Healthcare Systems: Development and Application of a Discrete Event Simulation with Agent-Based Functionality.***
Vincent Knight, Janet Williams, Iain Reynolds
Journal of Simulation.

4. *2011:* ***Cost-Effective Workforce Planning: Optimising the Dental Team Skill-Mix for England.***
Paul Harper, E Kleinman, Jenny Gallagher, Vincent Knight
Journal of Enterprise Information Management

3. *2011:* ***Operational Research Informing National Health Policy***
Paul Harper, Vincent Knight, Israel Vieira, Janet Williams
Cardiff University. ISBN: 978-0-9569158-0-1

2. *2010:* ***Forecasting Welsh Ambulance Demand using Singular Spectrum Analysis.***
Janet Williams, Jon Gillard, Paul Harper, Vincent Knight
In Proceedings of the XXXVI International ORAHS Conference

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

RESEARCH STUDENTS

43. *Katie McGoldrick (BSc)* *2020 - 2020*
Game theory software development

42. *Katie Murphy (MMath)* *2020 - 2021*
Visualisation of data

41. *Michalis Panayides (PhD)* *2019 - present*
Emergent behaviour in healthcare

40. *Sophie Shapcott (MMath)* *2019 - 2020*
Empirical evidence for Folk like theorems.

39. *Tara Hussain (BSc)* *2018 - 2018*
Further game theoretic modelling of Rhino poaching

38. *Ben Black (MSc)* *2018 - 2018*
Empirical investigation of the Ohtsuki-Nowak approximation

37. *Eleanor Owen (BSc)* *2018 - 2018*
Investigating coordinated cooperation games

36. *Solomon Keedle-Isack (Summer)* *2018 - 2018*
Further evolutionary game theoretic modelling of Rhino poaching

35. *Will Guo (Nuffield Research Placement)* *2017 - 2017*
Investigating Axelrod's second tournament

34. *Henry Wilde (PhD)* *2017 - 2021*
New methods for algorithm evaluation and cluster initialisation with applications to healthcare

33. *Mansour Hakem (Nuffield Research Placement)* *2017 - 2017*
Investigating Axelrod's second tournament

32. *Thomas Rodwell (PhD)* *2017 - present*
Diary planner for healthcare ward

31. *Toby Devlin (BSc)* *2017 - 2017*
Machine learning for optimisation of move sequence

30. *Lewis Parsons (Summer)* *2017 - 2017*
Building a framework for research excellence framework submission coordination

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

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

27. *James Campbell (BSc)* *2016 - 2016*
Fingerprinting prisoner's Dilemma strategies

26. *Nikoleta Glynatsi (MSc)* *2016 - 2016*
The effect of graph topology on the Prisoner's Dilemma

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

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

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

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

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

18. *Geraint Palmer (PhD)* *2014 - 2018*
Modelling deadlock in queueing systems

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

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

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

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

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

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

11. *Rob Shone (BSc)* *2011 - 2011*
Queueing models of choice in multi facility networks

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

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

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

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

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

Cardiff University CUROP Award
Further game theoretic dynamics of Rhino poaching
£2,100 *2018 - 2018*

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*

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

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

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*

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: Investigating the Effects of Individual Behaviour on Hierarchical queueing Systems
£5,000 *2012 - 2012*

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

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

TEACHING

Courses I am currently teaching:

5. *Writing with LaTeX: A brief introduction to LaTeX*
4. *Introduction to Object Oriented Programming: A hackathon introduces students to fundamental aspects of object oriented programming*
3. *Game Theory: A final year mathematics course covering introductory game theory*
2. *Research Software Development: A course introducing best practice for software development*
1. *Computing for Mathematics: A course introducing programming to mathematics students*

Courses I have taught in the past:

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

MEDIA

12. *2018-10-18: Pythagoras' trousers - Discussing the recent claims of a proof of the Riemann Hypothesis.*
11. *2018-06-07: Pythagoras' trousers - Mathematics behind modelling jet stream as a traffic jam*
10. *2017-03-23: Talk Python to Me Podcast - Game Theory and the Axelrod library*
9. *2017-03-17: Cardiff University YouTube Channel - PyCon Namibia and the Phoenix project*
8. *2017-01-09: Pythagoras' trousers - Mathematics in animation*
7. *2017-01-02: Pythagoras' trousers - Alpha Go*
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

I participate in a variety of mathematics outreach activities.

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

SOFTWARE PROJECTS

- *Axelrod: A Python library/github project that replicates Axelrod's tournament.*
- *Ciw: A Python library for simulating queueing networks*
- *Conference Scheduler: A Python library to schedule conferences using integer linear programming*
- *Game Theory in Sage: A collection of code to continue the integration of Game Theoretic capabilities in to Sage.*
- *Nashpy: A Python library to find equilibria in 2 player normal form games*
- *Virtual Microscope: A web application to display and annotate scanned slides.*
- *blackbook: A python library to format Jupyter notebooks with black*
- *ghtalks: Organise and share talks with gh-pages*
- *sklDj: A Django web app interface to machine learning algorithms*

SOFTWARE COMMUNITY

- *DjangoCon Europe 2015: I was on the organising committee for DjangoCon Europe 2015.*
- *PyCon UK: I am on the organising committee for PyCon UK (I took a sabbatical in 2018)*
- *PyDiff: I help organise the Cardiff Python user group meetup.*
- *Python Namibia: I help run the PyCon Namibia conference.*
- *sklDj: A Django web app interface to machine learning algorithms*