Alex Wendland

Personal Data

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Research Interests

Geometric group theory with interest in finiteness conditions, geometrization of combinatorial group theory and connections between graphs and groups. Topics within graph theory. I have an interest in inter-disciplinary work where possible, be it in an academic, commercial, or policy setting.

Education

2015 – 2019	**Current**- PhD in MATHEMATICS, **University of Warwick**, Coventry Under the supervision of Agelos Georgakopoulos
2011 – 2015	Masters in MATHEMATICS, **University of Warwick**, Coventry 1st Class (Hons)
2004 – 2011	Secondary school, **Beechen Cliff School**, Bath A Levels: Further Maths (A^*), Maths (A^*), Physics (A)

Publications and Preprints

- S. Spooner, A. Wendland, Z. Li, S. Sridhar, M. A. Williams and J. M. Warnett *The Effects of Height and Blow Time on Droplet-Size-Distributions in the Emulsion Phase of a BOF*. Available on request, to be submitted.

- G. Morina, K. Latuszynsky, P. Nayar, and A. Wendland. *From the Bernoulli Factory to a Dice Enterprise via Perfect Sampling of Markov Chains.* Available on request, to be uploaded.

- D. Rumynin and A. Wendland. *2-Groups, 2-Characters and Burnside Rings*. Advances in Mathematics, 338: 196-236, 2018.

- A. Wendland. *Coloring of Plane Graphs with Unique Maximal Colors on Faces*. J. Graph Theory, 83(4):359–371, 2016.

Selected Seminars and Talks

May. 2018	Geometry and Topology Seminar, University of Glasgow "Presenting vertex-transitive graphs like groups"
May. 2018	Junior Geometry and Topology Seminar, University of Oxford "Presenting vertex-transitive graphs like groups"
Feb. 2018	Mathematics Colloquium, University of Iceland "Facially restricted graph colouring's"
May 2017	Junior Geometry and Topology seminar, University of Warwick "Finiteness conditions in infinite groups"
Feb. 2017	Junior Algebra seminar, University of Cambridge "Group distance"
Aug. 2016	Young Researchers in Mathematics, University of St Andrews "Planar Groups"
Feb. 2015	Warwick Imperial Spring Meeting, Imperial Collage London "The Coin Game"
Feb. 2013	Tomorrows Mathematician Conference, University of Surrey "Bernouli Factory via Markov Chains"

Professional Experience

APRIL 2019	**European Study Group with Industry –UNIVERSITY OF CAMBRIDGE** This was a week long conference where I worked with a group of Mathematicians from a mix of backgrounds on a project for the Defence Science and Technology Laboratory, UK government. We investigated methods to harden image classifiers against malicious attacks.
JANUARY - APRIL 2019	**EPSRC-funded Policy Internships Scheme – CENTRE FOR SCIENCE AND POLICY, UNIVERSITY OF CAMBRIDGE** The Centre for Science and Policy's main mission is to connect policy makers with academics to encourage science based approachs to problems. During my internship I met policy makers and academics, attending talks on multiple topics such as the Post-Brexit Agricultural Policy, Solar Panel Technology and Climate Change. My main project in CSaP used NLP techniques on their database to find experts for a given question.
SUMMER 2018	**The Effects of Height and Blow Time on Droplet-Size-Distributions in the Emulsion Phase of a BOF –WARWICK MANUFACTURING GROUP** This is joint work with Stephen Spooner, Zushu Li, Seetharaman Sridhar, Mark A Williams and Jason M. Warnett studying the distribution of droplet sizes in a steel mixing furnace. I worked within MatLab to analysis and compare different distributions to see how they fit the data. The work is in the process of being published.
JULY 2018	**European Study Group with Industry –UNIVERSITY OF BATH** This was a week long conference where I worked with a team of Mathematicians from different universities on a scheduling problem for Heathrow Airport. We produced a model of the problem and tried to validate it against real world data. From the model we drew conclusions on the cost effectiveness of changing strategies.
FEBRUARY 2018	**Research visit to Rögnvaldur Möller –UNIVERSITY OF ICELAND, Reykjavik** Funded by the University of Warwick and the University of Iceland.
SUMMER 2014	**Research project with Professor Daniel Král' –UNIVERSITY OF WARWICK, CHARLES UNIVERSITY AND UNIVERSITY OF WEST BOHEMIA** Funded by the Undergraduate Research Scholarship Scheme and the Graph coloring and structure grant of the Czech Science Foundation. The project involved an Academic visit to Charles University in Prague to work with Zdenek Dvořák and Ondrej Pangrác as well as to the University of West Bohemia to work with Tomás Kaiser. Published in the Journal of graph theory
SUMMER 2013	**Summer of Student Innovation –JISC, Coventry** Three peers and I started to develop a Mathematical virtual learning platform aimed at non-maths graduate students called Mimir. The unique selling point was to have a system that diagnosed where potential errors in students' calculations were made.
SUMMER 2013	**Research project with Dr Krzysztof Latuszynski –UNIVERSITY OF WARWICK, Coventry** Funded by the Undergraduate Research Scholarship Scheme at Warwick University. Which has been written into a paper with Krzysztof Latuszynski, Giulio Morina, and Piotr Nayar.
2010 - 2012	**Team member / Retail supervisor –ODEON CINEMA, Bath** During sixth form, I worked in a large team responsible for the operations of a cinema. Within my first year I was promoted to a retail supervisor in charge of the customer retail team and managing stock level.

Awards and Grants

2016 – 17	**Mathematics Institute Postgraduate Teaching Prize – UNIVERSITY OF WARWICK, Coventry** "These are awarded to supervisors/TAs by vote of the undergraduates, so are earned through the genuine appreciation of people you taught in 2016 – 17."
2015 – 19	**Engineering and Physical Sciences Research Council Doctoral Award – UNIVERSITY OF WARWICK, Coventry** Funding to undertake a PhD in Mathematics at the university of Warwick.
2014	**Undergraduate Research Scholarship Scheme – UNIVERSITY OF WARWICK, Coventry** Awarded £1000 to do a summer project with Professor Daniel Král' in University of Warwick, Charles University and the University of West Bohemia. This was also supported by Graph coloring and structure grant of the Czech Science Foundation.
2013 – 14	**Giving to Warwick Student Prize – UNIVERSITY OF WARWICK, Coventry** "In recognition of outstanding contribution to the department with the department of Mathematics"

2013	Summer of Student Innovation –JISC, Coventry
	Award £5000 to develop a virtual learning platform for university students teaching them graduate level techniques.

2013	Undergraduate Research Scholarship Scheme – University of Warwick, Coventry
	Awarded £1000 to do a summer project with Dr Krzysztof Latuszynsky in University of Warwick.

2012 – 13	Ron Lockhart Student Prize – University of Warwick, Coventry
	"In recognition of Academic excellence and outstanding contribution to the Mathematics Institute."

Teaching Experience

2019	Lecturer –University of Warwick, Coventry
	Employed by Warwick Maths department to give lectures for the 4th year course Group Theory. In the initial feedback for the course I received the comment "Alex is one of the best lecturers I've ever had."

2015 – Current	Class Teacher –University of Warwick, Coventry
	Employed by Warwick Maths and Computer Science Departments to run the Support Classes for the modules: Analysis 1, Discrete Maths and its Applications 2, Experimental Maths, Geometric group theory, Group Theory, Groups and Representations, Lie Algebras, and Set Theory. I received the following comment when people voted in the Postgraduate teaching award "Just an all round nice guy who marks work quick and gives good feedback with amazing subject knowledge."

2015 – Current	Marking – University of Warwick, Coventry
	Exam marking for modules: Algebra I, Foundations, Introduction to Abstract Algebra, Lie Algebras, and Set theory.

2014 – 2017	Supervisions –University of Warwick, Coventry
	Employed by Warwick Maths department to supervise two groups of five first year students helping with each of their core modules and mark work weekly.

2013 – Current	Revision lectures – University of Warwick, Coventry
	I have given multiple revision lectures at the University of Warwick for Foundations, Analysis 1, Analysis 2, Linear Algebra, Algebra 1 and Set Theory as well as catch up lectures for struggling students during term.

2013 – 2014	Academic support for Warwick Maths Society –University of Warwick, Coventry
	In the role of Academic support for Warwick Maths Society I have ran weekly drop in sessions for students, helping with material from all years.

Positions of Responsibility

2017 – Current	Reviewing Articles – University of Warwick, Coventry
	I have reviewed articles for publication.

2016 – Current	Diversity Committee – University of Warwick, Coventry
	I am a member of the diversity committee as a Postgraduate representative. I have contributed to the successful submission for a Bronze Athena Swan award for the Mathematics department in 2017.

2016 – 2017	Postgraduate Seminar Organiser – University of Warwick, Coventry
	I have organized the Postgraduate Seminar for this Academic year. Organising a years' worth of talks as well as the Postgraduate talks for two open days.

2015 – Current	Staff and Graduate student Liaison Committee – University of Warwick, Coventry
	I am an active member of the Staff and Graduate student Liaison Committee for the Warwick Maths department. Of which I was joint chair from 2017 to 2018.

2013 – 14	Academic Support for WMS – University of Warwick, Coventry
	I was the Academic Support for Warwick Maths Society where I organised a host of revision lectures given by myself and others for the exam period. I also ran weekly drop in sessions, LaTeX support classes, lecture catch up sessions and helped with activities ran by the society such as socials, academic talks and careers events.

2011 – 15	Student Staff Liaison Committee – University of Warwick, Coventry
	I have been an active member of the Student Staff Liaison Committee since first year and chaired the Committee for my third and fourth years at university. In this role I represented students and their issues in the Committee, as chair I represented the student body in the Staff meetings and Teaching committee meetings.

Programming Projects

Intermediate Knowledge:	LaTeX, Python and Java
Basic Knowledge:	Matlab, MAGMA, C, SQL and Lua
GitHub:	https://github.com/AlexWendland

April 2019 — **European Study Group with Industry – University of Cambridge**

This was a week long conference where I worked with a group of Mathematicians from a mix of backgrounds on a project for the Defence Science and Technology Laboratory, UK government. We used PyTorch (a python neural network package) to make image classifiers, which we then attacked using different styles of perturbation attacks. We investigated how to harden these image classifiers against such attacks.

Spring 2019 — **EPSRC-funded Policy Internship – Centre for Science and Policy, University of Cambridge**

Working on a Natural Language Processing project on the profiles of experts to better enable search methods. These tools are also being used to understand how different areas of policy draw upon the same pool of experts to better inform cross governmental cooperation. For this project I have been given access to CSaP's database, processing data using Python and SQL. Please find a depositary on my GitHub with code to date.

Summer 2018 — **Droplet size analysis – University of Warwick, Warwick Manufacturing Group**

For the paper "The Effects of Height and Blow Time on Droplet-Size Distributions in the Emulsion Phase of a BOF" I used MatLab to analyse the distribution of gas droplet radii within a steel mixing furnace. I deployed statistical techniques such as chi-squared tests and data visualisation to give insights into the mixing process.

Summer 2018 — **European Study Group with Industry – University of Bath**

I attended a weeklong conference where a team of Mathematicians worked on a problem set by Heathrow Airport. The question was "is it cost effective to schedule construction work?" For this we analysed 5 years of project data provided by Heathrow. We designed a data driven statistical model in Python and trialled out the cost effectiveness of different scheduling strategies. Please find a selection of the code on my GitHub account.

Summer 2013 — **Summer of Student Innovation – JISC, London**

Three students and I won £5000 of funding to develop a Virtual Learning Environment aimed at non-Maths university students to learn university level Mathematics. The USP of the project was a question generator that used decision trees to understand where students made mistakes. This was called Mimir and the depositary is available on my GitHub.

2012–2013 — **Hypochondriapp – University of Warwick, Computer Science department**

Two students and I programmed an Android App with a Java server back end as part of the Group Programming Project during the 2nd year of my undergraduate degree. The server used twitter data to access the density of 'illness' within areas of London, then used Transport for London data with a cellular automaton styled model to predict the future spread of flu. Please find the code on my GitHub account.

Interests and Activities

I enjoy cycling, hiking, climbing, playing board games, economics, phycology, and politics. I also take an interest in genetic algorithms and neural networks, programming in my free time.