

Personal details

Personal details

First / given name Luke

Second given name David

Third given name

Surname/family name Wentworth

Date of birth 17 June 2000

Preferred first/given name Luke

Previous surname

Country of birth England

Legal nationality British National

Dual nationality

Country of residence United Kingdom

Have you previously studied with Yes
us at the University of Bristol?

Contact details

Home address

Please provide your permanent residential address. If you have another address and would prefer for us to contact you at that address instead you have the opportunity to add a correspondence address in the next section.

Country United Kingdom

Postcode TN38 0UW

Address Line 1 26 The Links

Address Line 2

City St Leonards On Sea

County East Sussex

Telephone

If you would like us to send any postal correspondence to an address which is not your home address please enter an alternative address here. If you want us to send correspondence to your home address then please select No.

Do you want to add a Yes
correspondence address?

Country United Kingdom

Postcode BS7 8PX

Address Line 1 66 Falmouth Road

Address Line 2

City Bristol

County

Telephone

Agent

Agent details

Agency Name

Email address

Other information

Additional Documents

Please upload required documents as outlined in your admissions statement

Mode of study

How would like to study this Full Time programme?

Qualifications

Qualifications

Institution	Qualification	Type	Subject	Actual/predicted	Grade	Start date	End date
University of Sussex	Master's Degree (PG)	Academic Qualification	Mathematics	Predicted	First	01/Sep/2019	01/Jun/2024

If these qualifications have altered since your last application please note the changes in the free text box here.

English Language

Is English your first language? Yes

What is your first language?

Did you study at school/university where you were taught in English?

For how many years?

Have you sat a relevant English language test?

TOEFL (internet-based)

Registration number

Date of TOEFL test

TOEFL reading score

TOEFL listening score

TOEFL speaking score

TOEFL writing score

TOEFL total score

IELTS (International English Language Testing System)

Test report form (TRF) number

UKVI number (if applicable)

Date of IELTS test

IELTS listening score

IELTS reading score

IELTS writing score

IELTS speaking score

IELTS total score

Pearson Test of English

Score report code

Date of Pearson test

Pearson listening score

Pearson reading score

Pearson speaking score

Pearson writing score

Pearson overall score

Other English Language test

Name of course

Registration number

Date of test

Listening score

Writing score

Reading score

Total score

Experience

Current Employer

Employer name and address Retail and Assets Solutions 1 Elmfield Park, Bromley BR1 1LU

Job title and main duties Stock Counter- Team Leader

Full time/Part time Part time

Date of Appointment 17 June 2018

End date (if applicable) 01 September 2019

Previous employment 1

Employer name and address University of Sussex University of Sussex, Sussex House, Brighton, BN1 9RH

Job title and main duties Student Ambassador Working registration and giving campus/ accommodation tours on open, applicant and school visit days.

Full time/Part time Part time

Date of Appointment 09 November 2023

End date (if applicable) 01 August 2024

Previous employment 2

Employer name and address

Job title and main duties

Full time/Part time

Date of Appointment

End date (if applicable)

Previous employment 3

Employer name and address

Job title and main duties

Full time/Part time

Date of Appointment

End date (if applicable)

Other Experience

Do you have any other relevant work experience to support your application?

Please provide details

Personal statement

Personal details

**Do you have a personal Yes
statement to upload?**

**Please type your personal
statement in the box**

Research proposal

Research proposal

Proposed supervisor 1 Dr Emma Bailey

Proposed supervisor 1 Dr Joseph Najnudel

**Proposed project title
(max 150 chars)**

Passport and visa

Visa required

**Do you require a visa to study in No
the UK?**

Please fill out your passport details below. If you are unable to provide these at the current time you will have another opportunity to upload your passport after you submit the form. If you do not provide us with this information we will be unable to issue you with your confirmation of acceptance number and you will be unable to obtain a visa.

Passport details

Passport number

Further details

**Have you previously studied in
the UK?**

**What was the highest level of
study in the UK?**

**Please confirm the total length of
your UK study in years**

Referees

Referee 1

**Do you have a reference to No
upload?**

Type of reference Academic

Referee title Dr

Forename Nicholas

Surname Simm

Position Principal Research Fellow (Mathematics)

Institution/Company University of Sussex

Email address N.J.Simm@sussex.ac.uk

Country United Kingdom

Referee 2

**Do you have a second reference No
to upload?**

Type of reference Academic

Referee title Dr

Forename Vladislav

Surname Vysotskiy

Position Reader in Statistics and Probability (Mathematics)

Institution/Company University of Sussex

Email address V.Vysotskiy@sussex.ac.uk

Country United Kingdom

Funding

Funding 1

What is your likely source of Scholarship funding?

Please give the name of your scholarship or Studentship

Please specify

Percentage from this source 100

Is this funding already secured? No

Funding 2

What is your likely source of funding?

Please give the name of your scholarship or Studentship

Please specify

Percentage from this source

Is this funding already secured?

Funding 3

What is your likely source of funding?

Please give the name of your scholarship or Studentship

Please specify

Percentage from this source

Is this funding already secured?

Other funding

I would like to be considered for Yes other funding opportunities

Submission

Documents

Document type	File name
Application form PDF (anonymised)	Anon 2614689~02~01.pdf
Personal statement	Bristol Personal Statement 2.pdf
Curriculum vitae	CV (generalized, no name, updated).pdf
Research proposal	Research Proposal.pdf
Transcript	transcript.pdf

By ticking the checkbox below and submitting your completed online application form, you acknowledge the University of Bristol will use the information provided from time to time, along with any further information about you the University may hold, for the purposes set out in the [University's full Data Protection Statement](#). Applicants applying to the collaborative programmes of doctoral training should also read the [Data Protection Statement](#) for collaborative programmes of doctoral training.

The information that you provided on your application form will be used for the following purposes:

- To enable your application for entry to be considered and allow our Admissions Advisors, where applicable, to assist you through the application process;
- To enable the University to compile statistics, or to assist other organisations to do so. No statistical information will be published that would identify you personally;
- To enable the University to initiate your student record should you be offered a place at the University.

All applicants should note that the University reserves the right to make without notice changes in regulations, courses, fees etc at any time before or after a candidate's admission. Admission to the University is subject to the requirement that the candidate will comply with the University's registration procedure and will duly observe the Charter, Statutes, Ordinances and Regulations from time to time in force.

By ticking the checkbox below and submitting your completed online application form, you are confirming that the information given in this form is true, complete and accurate and that no information requested or other material information has been omitted. You are also confirming that you have read the Data Protection Statement and you confirm the statement below.

I can confirm that the information I have provided is true, complete and accurate. I accept that the information given in my application will be stored and processed by the University of Bristol, in accordance with the *UK General Data Protection Regulation and Data Protection Act 2018*, in order to:

- Consider my application and operate an effective and impartial admissions process;
- Monitor the University's applicant and student profile;
- Comply with all laws and regulations;
- Ensure the wellbeing and security of all students and staff;
- If my application is successful to form the basis of the statement made within my application.

If the University of Bristol discovers that I have made a false statement or omitted significant information from my application, for example examination results, I understand that it may have to withdraw or amend its offer or terminate my registration, according to circumstances.

Profile Statement.

A professional Mathematics masters student with experience in various workplaces within the area of retail and manual labour; all of which occurred alongside my GCSE and A Level studies (since 2015). Due to this, I have developed skills in teamwork, leadership, and time management. During university, I was my years student representative and work with faculty members to improve the course for my cohort, this entails that I take my fellow students' complaints and suggestions, and relay them professionally to the mathematics department. I'm looking forward to potentially dedicating my time and skills to your business.

Core qualities

- Specialising in communicating with customers, leading to sales.
- Adhering to protocol and instructions from superiors.
- Computational skills, statical analysis and programming.
- Communicating with those who rank both higher and lower than me in a professional environment.

Career Highlights

- Unskilled manual labourer

In 2015 in the weeks prior to starting college, I mainly worked in the departments of painting and decorating as well as various other “odd jobs”. During this time, I would converse with clients, as well as members of the public, in a professional manner as to represent the company.

- Tree surgeon/Gardener

At weekends throughout 2017 and 2018, I worked under a gardener in an apprenticeship like position. During this time, I further developed my teamworking and communication skills from what I had previously gained in 2015 working as a labourer. In this position, it was required for me to converse with a variety of clients from a multitude of different backgrounds, learning how to best convey what was needed depending on their circumstances.

- Stock counter/Retail worker

From 2018 to 2019, I worked with *Retail and Assets Solutions* (formally *OCS Assets Solutions*). During this time, I would work night shifts whilst also balancing my A-level studies. I had to learn to stay dedicated to both my college work and retail work, despite the long hours. In late November I was promoted from a stock-counter to a team-leader which gave me the additional responsibilities of both organising and instructing my team on what was required and communicating with current shoppers in the store- being able to help them whenever necessary. This required communicational

and leadership skills to ensure that everybody in my team was both working efficiently and that no two people would end up doing the same task. This would prove difficult at times due to time pressure above and the unsociable working hours. However, despite this, myself and my team would always complete our tasks in ample time.

- Private Maths Tutor

From 2020 to present, I have been tutoring both GCSE and A-level mathematics. I find this work both intriguing and rewarding; I enjoy helping a tutee to understand a subject or concept. In these tutoring sessions, the tutee will struggle with a single part of a concept such as the differences in different distributions and when a certain distribution would be appropriate. Often, I'll need to recognise and isolate the troubling concept and find a way to explain the concept clearly with examples that the tutee will understand.

Education

- Graduated from Bexhill College in 2019 with passing grades, notably a B in mathematics.
- Graduated with a first class masters degree in Mathematics from the University of Sussex.
- Currently enrolled at the University of Bristol, studying a second masters in mathematics.

Hobbies

In my spare time I enjoy playing chess and other tabletop games, as well as light-hearted card games. I enjoy the critical thinking and problem-solving elements of these games, as well as the competitive aspects. I have also spent the last two and a half years learning to play the piano- I had always wanted to learn, even as a child. Other than these, I enjoy socialising with friends and trying new things, such as escape rooms and sightseeing.

Contact details

- Email: (Name included in email)
- Mobile: 07948756148

Thank you for taking the time to consider my application,

Yours sincerely,

...

Course: PhD Mathematical Sciences

In my experience, analysing sequences which abide to some rule, can be some of the most mind twisting problems I've ever faced. However, they also have some of the most elegant solutions. Throughout my master's degrees, I've come to realise that it's these kinds of problems which keep you up at night and are the most satisfying to solve. In my experience, and from the advice given by my peers, the University of Bristol's maths department comes second to none in the study of random matrix theory. I believe that it is the best place to be to further research into the subject, building from questions in combinatorics and number theory.

I'm currently studying at the University of Bristol, following from my time at the University of Sussex, beginning in a foundation year, to an integrated masters (in Sussex), to my current masters with Bristol. It was during this time that I truly began to enjoy the academic lifestyle. Before starting university, I primarily focused on work first, and education second. From sixteen, I worked as a manual labourer when I could. Then from eighteen, I would work nightshifts as a stock counter in tandem with college lessons during the day. This is the normal progression that people in my town would take from school as a high level of education isn't seen to be valuable. As you might expect, it was an eye-opening experience starting university, and it introduced me to different lifepaths which I wouldn't have realised if I had not attended. Due to my found interest in academia, I think that in the long run I would like to become a researcher. However, naturally this path would be financially straining. Unfortunately, my family does not have the means to support me through a master's and PhD. Because of this, and my desire to continue academia, I applied to the Martingale Foundation and was awarded a full scholarship for my masters, and as of writing this, have been fortunate enough to be apart of there PhD navigator program, which could offer a full PhD scolarship. Through the connections I've made within the Martingale Foundation with both academics and fellow students, Its clear that Bristol is the place that would benefit my studies the most.

Within sussex, I was supervised for my masters dissertation by Dr Nicholas Simm in the study of the Ulam-Hammersley Problem. The relivence of this was in the study of edge statistics of the spectrum of GUE matrices, **I have elected to use the research propoisal to go into deeper detail of the mathematics and relivence toward my proposed supervisors.** I am throughly interested however in how spectrums of random matrices can be applied to other problems in mathematics, I truly believe that it is an area that will prove itself to be vital to be studied. In my experience, It can be difficult to find the right resources (and time) to effectivly learn about these connections between random matrix theory and questions in number theory and combinatorics. This is my motivation for wanting to study a Ph.D, as I would like to seek guidance from those who are experts in the field and be able to dedicate my time to truly understanding the subject. I'm aware that a focus on the Riemann Hypothesis has perhaps taken center stage for Random Matrix Theorists over the last few decades, I would like to know why there seems to be a connection between the two, maybe more than a solution to the Hypothesis itself. This is why I am applying to work under Dr Bailey, as from what I've read from her papers, She also shares this interest in the reasons for these connections, which was also made apparent in a meeting we had. I'm also applying to work under Dr Najnudel as he has a great backlog of papers about the properties and connections of different random matrices, and I'm sure would be able to offer incredible

guidence. It should be noted also that Professor Nina Snaith gave high praises and high recommendations to both potential supervisors.

I am looking forward to furthering my studies. It's exciting to be able to build upon the content that I've studied the past five and a half years such as discrete and continuous time Markovian Chains, Poisson Point Processes and Probability Theory, and to have found an area of maths that I would like to go further into. I have thoroughly been enjoying the process of researching my dissertation as it allows for studying that's more 'hands free' than lectures. I think it gives a good representation of what a PhD might entail. With my dissertation, research and learning is derived from pure interest and curiosity which isn't always available in the structured format of lectures. Having spent perhaps more time in university than the average applicant, I think that this has given me the unique opportunity to grasp strong fundamentals across the board of the subject. This has led me to understand which areas are most interesting to me, which has caused me to be well acquainted with some of the more advanced concepts. Some examples are Measure Theory, including Lebesgue integration, Brownian Motion, Martingales, Topology and Complex Analysis. I also have had the chance to learn about some adjacent subjects, like financial subjects and Mathematical Biology.

Thank you for your consideration and I look forward to hearing from you.

Bristol Research Proposal

Although I am yet to have a completed title in mind, the area of research that I would like to undertake is in the connection between random matrices and separate problems in mathematics. In particular, problems in number theory and combinatorics.

While undertaking my Masters at the University of Sussex, I was supervised for my dissertation by Dr Nicholas Simm in the study of the Ulam-Hammersley Problem. The relevance of this was in the study of edge statistics of the spectrum of GUE matrices. Surprisingly, the limiting behaviour of the largest eigenvalue as we increased the size of the matrix acted exactly the same as the longest increasing subsequence of a permutation in its own natural limit. We looked into Wigner's semi-circle law and the empirical spectral measure, working towards the Tracy-Widom distribution in the edge statistic. Unfortunately, in the case of the Tracy-Widom distribution, this was decided to be too advanced for a Masters dissertation. However, I would like the opportunity to study it further, such as to gain a better grasp of the airy function and Painlevé II transcendence of ODES. I spoke with Dr Emma Bailey recently and she outlined some of the theory behind CUE matrices, which were new to me at the time of the meeting. I'm curious about how different sorts of random matrices connect to different areas of mathematics such as Probability and Number Theory, and perhaps more importantly, why these connections exist.

I have read at least some of Dr Emma Bailey's and Professor Nina Snaith's Ph.D Theses and I gather that there is agreement between the probability density function of the logarithm of imaginary parts of values close to large roots on the critical line of the zeta function, and the characteristic polynomial of CUE matrices (From Nina's thesis). From my work with Dr Nicholas Simm, I am well acquainted with the problem of the largest increasing subsequence of a permutation, and how in asymptotics, it matches the largest eigenvalue of a GUE Matrix in distribution. Finally from reading, although I will make no claims to be an expert, fluctuations of the "arctic circle" of a random tiling of the "Aztec Diamond" is also distributed by Tracy-Widom.

What I would like to understand however, is why these connections exist. I have begun to research into Free-Probability as I have heard that this may be a promising place to start. However, as you might be aware, the literature and content can be perhaps unfriendly. I also understand that study of the characteristic polynomials is vital to any potential Ph.D in random matrices, and it is perhaps a shortcoming that I have as of current, only touched on their significance. However, I do intend to catch up on this either through self study or via my second Masters dissertation topic.

I understand that Dr Emma Bailey's work relates to the moments of CUE, COE and CSE matrices and their relations to the Riemann Hypothesis, Quadratic Dirichlet L-functions and elliptic curves. From her recommendation, I have been going through some of the preliminary work to this, and familiarising myself with the sorts of calculations used in CUE which have served as different to the ones calculated with respect to the GUE case. It is also my understanding that Dr Bailey works with Moments of Moments, which in my limited experience might seem similar to a proof I gave for showing that the Lebesgue-Stieltjes integral of a compactly supported function with respect to the empirical spectral measure converges in probability to the same integral with respect to Wigner's semi-circle distribution as the number of eigenvalues approaches infinity from method of moments and consideration of Weierstrass Approximation Theorem, Dyke Paths, and Typesetting. I am particularly proud of this proof and I think the approach used somewhat mirrors Dr Emma Bailey's style of work from what I can tell.

Dr Joseph Najnudel however, after reading sections of some of his papers, namely the paper "The distribution of Eigenvalues of Randomized Permutation Matrices" as naturally I expected some shared content with Ulam-Hammersley (which wasn't really the case). However I have also looked over "On smooth mesoscopic linear statistics of the eigenvalues of random permutation matrices" and

the concept of the permutation matrices seem intriguing to study further. Unfortunately, I have not yet been able to meet Dr Najnudel (as of writing this), which is a shame as I am curious about the motivation behind replacing the 1's of the permutation matrix with random variables and also the reason for using the Ewens measure in the random selection of permutation matrix rather than a uniform one. I have also seen that Dr Najnudel has published about CUE matrices a few years back, which very much emphasises to me that it is a subject worth studying. Irrespective of the outcome of the Ph.D, I would like to undertake my second masters thesis with one either supervisor in the field mentioned, both as this would undoubtedly benefit the possible Ph.D and as it is the area of which I enjoy.

To summarise, since completing my project with Dr Simm, I have been immensely curious about the reason of the connection between the GUE eigenvalues and the length of the longest increasing subsequence of a permutation. Due to this, Dr Simm encouraged me to move to the University of Bristol. Since starting my second masters and deliberating on the impending PhD application, I have seen that this quiry is just a small part of a wide series of much larger questions being tackled by a modern, vibrant, tightnit subsection of mathematicians, of which I would like the opportunity to one day be a part of.

I hope that you consider my application and I look forward to hearing from you.

Year	Stage	Code	Course Title	FHEQ Level	Mark	Resit	Result	Credits	ECTS Credits	Notes
19/20	0	F3301	Foundation Mathematics A	3	84.00		P	15.00	7.50	
	0	F3302	Foundation Mathematics B	3	88.00		P	15.00	7.50	
	0	G5112	Statistics and Decision Mathematics	3	73.00		P	15.00	7.50	
	0	G5129	Project (FY Maths)	3	77.00		P	15.00	7.50	
	0	G5131	Further Mathematics A	3	74.00		P	15.00	7.50	
	0	G5132	Further Mathematics B	3	77.00		P	15.00	7.50	
	0	N1582F	Quantitative Methods for Business and Economics: Maths	3	78.00		P	15.00	7.50	
	0	N2582F	Quantitative Methods for Business and Economics: Statistics	3	77.00		P	15.00	7.50	
20/21	1	G5082	Geometry	4	64.87		P	15.00	7.50	
	1	G5084	Numerical Analysis 1	4	96.00		P	15.00	7.50	
	1	G5085	Analysis 1	4	78.00		P	15.00	7.50	
	1	G5086	Calculus	4	89.00		P	15.00	7.50	
	1	G5087	Introduction to Pure Mathematics	4	89.00		P	15.00	7.50	
	1	G5088	Linear Algebra	4	97.00		P	15.00	7.50	
	1	G5089	Mathematics in Everyday Life	4	76.00		P	15.00	7.50	
	1	G5130	Discrete Mathematics	4	91.00		P	15.00	7.50	
21/22	2	G5095	Analysis 2	5	90.00		P	15.00	7.50	
	2	G5096	Algebra	5	94.00		P	15.00	7.50	
	2	G5097	Differential Equations	5	82.00		P	15.00	7.50	
	2	G5098	Probability and Statistics	5	89.00		P	15.00	7.50	
	2	G5110	Complex Analysis	5	71.00		P	15.00	7.50	
	2	G5125	Numerical Analysis 2	5	85.00		P	15.00	7.50	
	2	G5210	Calculus of Several Variables	5	92.00		P	15.00	7.50	
	2	G5211	Introduction to Probability	5	92.00		P	15.00	7.50	
22/23	3	G1026	Topology and Advanced Analysis (L6)	6	73.00		P	15.00	7.50	
	3	G1032	Cryptography (L.6)	6	79.00		P	15.00	7.50	
	3	G1070	Measure and Integration (L.6)	6	57.00		P	15.00	7.50	
	3	G1100	Probability Models	6	58.00		P	15.00	7.50	
	3	G1101	Random processes (L.6)	6	62.00		P	15.00	7.50	
	3	G5106	Introduction to Mathematical Biology	6	76.00		P	15.00	7.50	
	3	G5126	Dynamical Systems	6	91.00		P	15.00	7.50	
	3	G5216	Statistical Inference (L.6)	6	67.00		P	15.00	7.50	
23/24	4	832G1	Mathematical Models in Finance and Industry	7	78.00		P	15.00	7.50	
	4	846G1	MMath Project	7	80.00		P	30.00	15.00	
	4	852G1	Advanced Numerical Analysis (L.7)	7	83.00		P	15.00	7.50	
	4	865G1	Monte Carlo Simulations (L7)	7	71.80		P	15.00	7.50	
	4	971G1	Linear Statistical Models (L7)	7	91.00		P	15.00	7.50	
	4	972G1	Continuum Mechanics (L7)	7	70.00		P	15.00	7.50	
	4	G5078	Financial Mathematics (L.7)	7	91.00		P	15.00	7.50	

Qualified for the degree of Master of Mathematics from the University of Sussex with First Class Honours in Mathematics

Overall Average Mark: 79.000

Date of Award: 19-Jun-2024

Date of Completion: 1-Jun-2024

Notes - Key to codes used

AB = absent from assessment; XAB = condoned absence (reason accepted)
 NS = non-submission (of essay, project, etc.); NXN = condoned non-submission (reason accepted)
 EX2 = unit of assessment set aside by Examination Board for classification purposes but credit awarded
 NFA = course is not formally assessed

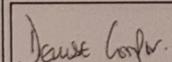
COR = course assessed by course report, no numeric grade is awarded just credit
 General Credit is awarded by Examination Boards in compensation for failed courses
 Result P = Pass, F = Fail, C = Compensated Credit
 * in the Result column indicates that the full mark was obtained at resit attempt

7 CERTIFICATION OF THE TRANSCRIPT/SUPPLEMENT

7.1 Date:

June 21, 2024

7.2 Transcript Certification Officer Signature


7.3 Official stamp:



This is to certify that

Luke Wentworth

has been awarded the
Master of Mathematics
with Honours First Class

Mathematics

19 June 2024

Sadie Labrenz

VICE-CHANCELLOR



US
UNIVERSITY
OF SUSSEX

4951401511620418393

Transcript and European Diploma Supplement

This Diploma Supplement follows the model developed by the European Commission, Council of Europe and UNESCO/CPES. The purpose of the supplement is to provide sufficient recognition of qualifications (diplomas, degrees, certificates etc.). It is designed to provide a description of the nature, level, context and content of the studies that were pursued and successfully completed by the individual named on the original qualification to which this supplement is appended. It should be free from any value judgements, equivalence statements or suggestions about the recognition.

1 INFORMATION IDENTIFYING THE HOLDER OF THE QUALIFICATION		4 INFORMATION ON THE CONTENTS AND RESULTS GAINED	
1.1 Surname: Wentworth		4.1 Mode of study: Full-time	
1.2 First Name(s): Luke		4.2 Programme requirements: http://www.sussex.ac.uk/math	
1.3 Date of Birth: June 17, 2000		4.3 Detail of study: Please see next page	
1.4 Student Identification Numbers: Registration Number: 21904940 HUSID: 1511620418393		4.4 Grading Scheme. This is the University's normal classification scheme used for this undergraduate course of study: Students with 120 final stage credits	
		Overall Average At least 70% At least 60% At least 50% At least 40%	Classification First Class Honours Second Class Honours, Division 1 Second Class Honours, Division 2 Third Class Honours
		Overall average marks are normally based on marks for courses at stage 2 and above (weighting of stages varies between degree programmes). Students with at least 60 level 6 credits but less than 120 level 6 credits may be awarded an Ordinary degree.	
		4.5 Overall classification of qualification: First Class Honours	
2 INFORMATION IDENTIFYING THE QUALIFICATION			
2.1 Name of qualification: Master of Mathematics		5 INFORMATION ON THE FUNCTION OF THE QUALIFICATION	
2.2 Main Field(s) of study for the Qualification: Mathematics		5.1 Access to further study: Access to postgraduate study (2nd cycle degree)	
2.3 Name of institution awarding the qualification: University of Sussex		5.2 Professional status (if applicable): Successful completion of this programme normally gives professional status with Institute of Mathematics and its Applications. Please contact this body to confirm the accreditation details of this individual.	
2.4 Name and status of institution administering studies (if different from 2.3):			
2.5 Language(s) of instruction: English		6 ADDITIONAL INFORMATION	
		6.1 Additional information: _____	
3 INFORMATION ON THE LEVEL OF THE QUALIFICATION			
3.1 Level of qualification: Masters Degree (1st Cycle Degree)		6.2 Further information sources: www.sussex.ac.uk/ssro/transcripts	
3.2 Official length of course: 4 years full-time			
3.3 Access requirements: The University's standard entrance requirement for applicants aged under 21 is two A level passes of equivalent (which includes kitemarked Access courses) and a good general level of numeracy and competence in use of English evidenced by a pass at grade C or above in relevant GCSEs, or equivalent. For applicants aged over 21, individual judgements are made about readiness for university study.			

Year	Stage	Code	Course Title	FHEQ Level	Mark	Resit	Result	Credits	ECTS Credits	Notes
19/20	0	F3301	Foundation Mathematics A	3	84.00		P	15.00	7.50	
	0	F3302	Foundation Mathematics B	3	88.00		P	15.00	7.50	
	0	G5112	Statistics and Decision Mathematics	3	73.00		P	15.00	7.50	
	0	G5129	Project (FY Maths)	3	77.00		P	15.00	7.50	
	0	G5131	Further Mathematics A	3	74.00		P	15.00	7.50	
	0	G5132	Further Mathematics B	3	77.00		P	15.00	7.50	
	0	N1582F	Quantitative Methods for Business and Economics: Maths	3	78.00		P	15.00	7.50	
	0	N2582F	Quantitative Methods for Business and Economics: Statistics	3	77.00		P	15.00	7.50	
20/21	1	G5082	Geometry	4	64.87		P	15.00	7.50	
	1	G5084	Numerical Analysis 1	4	96.00		P	15.00	7.50	
	1	G5085	Analysis 1	4	78.00		P	15.00	7.50	
	1	G5086	Calculus	4	89.00		P	15.00	7.50	
	1	G5087	Introduction to Pure Mathematics	4	89.00		P	15.00	7.50	
	1	G5088	Linear Algebra	4	97.00		P	15.00	7.50	
	1	G5089	Mathematics in Everyday Life	4	76.00		P	15.00	7.50	
	1	G5130	Discrete Mathematics	4	91.00		P	15.00	7.50	
21/22	2	G5095	Analysis 2	5	90.00		P	15.00	7.50	
	2	G5096	Algebra	5	94.00		P	15.00	7.50	
	2	G5097	Differential Equations	5	82.00		P	15.00	7.50	
	2	G5098	Probability and Statistics	5	89.00		P	15.00	7.50	
	2	G5110	Complex Analysis	5	71.00		P	15.00	7.50	
	2	G5125	Numerical Analysis 2	5	85.00		P	15.00	7.50	
	2	G5210	Calculus of Several Variables	5	92.00		P	15.00	7.50	
	2	G5211	Introduction to Probability	5	92.00		P	15.00	7.50	
22/23	3	G1026	Topology and Advanced Analysis (L6)	6	73.00		P	15.00	7.50	
	3	G1032	Cryptography (L6)	6	79.00		P	15.00	7.50	
	3	G1070	Measure and Integration (L6)	6	57.00		P	15.00	7.50	
	3	G1100	Probability Models	6	58.00		P	15.00	7.50	
	3	G1101	Random processes (L6)	6	62.00		P	15.00	7.50	
	3	G5106	Introduction to Mathematical Biology	6	76.00		P	15.00	7.50	
	3	G5126	Dynamical Systems	6	91.00		P	15.00	7.50	
	3	G5216	Statistical Inference (L6)	6	67.00		P	15.00	7.50	
23/24	4	832G1	Mathematical Models in Finance and Industry	7	78.00		P	15.00	7.50	
	4	846G1	MMath Project	7	80.00		P	30.00	15.00	
	4	852G1	Advanced Numerical Analysis (L7)	7	83.00		P	15.00	7.50	
	4	865G1	Monte Carlo Simulations (L7)	7	71.80		P	15.00	7.50	
	4	971G1	Linear Statistical Models (L7)	7	91.00		P	15.00	7.50	
	4	972G1	Continuum Mechanics (L7)	7	70.00		P	15.00	7.50	
	4	G5078	Financial Mathematics (L7)	7	91.00		P	15.00	7.50	

Qualified for the degree of Master of Mathematics from the University of Sussex with First Class Honours in Mathematics

Overall Average Mark: 79.00

Date of Award: 19-Jun-2024

Date of Completion: 1-Jun-2024

Notes - Key to codes used

AB = absent from assessment XAB = condoned absence (reason accepted)
NS - non-submission (of essay, project, etc.). NXS = condoned non-submission (reason accepted)
EX2 = a unit of assessment set aside by Examination Board for classification purposes but credit awarded
NFA = course is not formally assessed

COR = course assessed by course report, no numeric grade is awarded, just credit
General Credit is awarded by Examination Boards in compensation for failed courses
Result P = Pass, F = Fail, C = Compensated Credit
* in the Resit column indicates that the full mark was obtained at resit attempt

7 CERTIFICATION OF THE TRANSCRIPT/SUPPLEMENT

7.1 Date:

June 21, 2024

7.2 Transcript Certification Officer Signature

7.3 Official stamp:



Diagram of Higher Education Qualification Levels in England, Wales & Northern Ireland

Framework for Higher Education Qualifications (FHEQ)		Credit	
Typical Qualification	Level	Typical UK	Typical ECTS credit ranges
Doctoral Degrees (e.g. PhD)	8	Typically not credit rated	Typically not credit rated
Professional Doctorates (EdD, DSW)		540	
Master of Philosophy (MPhil)	7	Typically not credit rated	The minimum requirement is 60 ECTS; however, a range of 90-100 ECTS is more typical at 2 nd cycle level
Taught Master's Degrees (e.g. MA, MSc, MBA, MEd, MFA, MRes)		180	
Integrated Master's Degrees (e.g. MEng, MChem, MPharm)	7	480 (120 at FHEQ level 7)	
Postgraduate Diploma (PgDip)		120	
Postgraduate Certificate (PgCert)	6	90	180 – 240 ECTS
Postgraduate Certificate in Education (PGCE)		90	
Bachelor's Degree with Honours (e.g. BA, BEng, BMus, BSc, LLB)	6	360	
Bachelors 'Degree		300	
Graduate Diploma	6	90	
Graduate Certificate		45	
Foundation Degree	5	240	Approximately 120 ECTS
Diploma of Higher Education (DipHE)			
Higher National Diploma	4	120	
Certificate of Higher Education CertHE)			
Higher National Certificate			
Foundation Year	3	120	

For students with the necessary pre-requisites, entry to each FHEQ level is possible from the next lower level in the NQF or Framework for Higher Education Qualifications.

National Qualifications Framework for England, Wales and Northern Ireland (NQF)/ Qualifications and Credit Framework (QCF)	
Typical Qualification	Level
Vocational Qualifications level 8	8
Fellowships Vocational Qualifications level 7	7
Vocational Qualifications level 6	6
Vocational Qualifications level 5 Higher National Diplomas (HND)	5
Vocational Qualifications level 4 Higher National Certificate (HNC)	4
Vocational Qualifications level 3 GCE AS and A levels Advanced Diploma Welsh Baccalaureate Advanced	3



Levels 2, 1 and entry

Description of Higher Education in England, Wales and Northern Ireland

In England, Wales and Northern Ireland¹, higher education institutions are independent, self-governing bodies active in teaching, research and scholarships. They are established by Royal Charter or legislation and most are part-funded by government.

Higher Education (HE) is provided by many different types of institution. In addition to universities and university colleges, whose charters and statutes are made through the Privy Council which advises the Queen on the granting of Royal Charters and incorporation of universities, there are a number of publicly-designated and autonomous institutions within the higher education sector. Publicly funded higher education provision is available in some colleges of further education by the authority of another duly empowered institution (Degree Awarding Body). Teaching to prepare students for the award of higher education qualifications can be conducted in any higher education institution and in some further education colleges.

Office for Students (OfS) Registration

Under the 2017 Higher Education and Research Act (HERA), a higher education provider in England is required to register with the OfS if it wishes to:

- access public grant funding (such as funding to support teaching), and/or student support funding (such as enabling students at a provider to access student finance)
- apply to the Home Office for a Tier 4 licence to recruit international students, or to maintain an existing licence
- apply for degree awarding powers in order to award their own degrees, and/or university title.

In order to be registered with the OfS, HE providers are required to meet initial and general ongoing conditions that must be satisfied at the initial point of registering and which must continue to be met to maintain registration. The Register is a list of all English higher education providers officially registered by the OfS and can be found at:
<https://www.officeforstudents.org.uk/advice-and-guidance/the-register/the-ofs-register/>

Degree awarding powers and the title 'university'

All universities and many higher education colleges have the legal power to develop their own courses and award their own degrees, as well as determine the conditions on which they are awarded. Some HE colleges and specialist institutions without these powers offer programmes, with varying extents of devolved authority, leading to the degrees of an institution which has degree awarding powers.

The Higher Education and Research Act 2017 (HERA) amended relevant legislation to give the Office for Students (OfS) the power to authorise the use of the word 'university' in a higher education provider's name. Higher education providers that are currently authorised to use either 'university college' or 'university' as part of its name do not need to apply to the OfS to retain this authorisation. Such providers are, however, required to register with the OfS (see above). Higher education institutions in England, who fulfil designated criteria can apply for university college title or university title. All of these institutions are subject to the same regulatory and funding requirements as universities; and all institutions decide for themselves which students to admit and which staff to appoint. Degrees and other higher education qualifications are legally owned by the awarding institution, not by the state.

The names of institutions with their own degree awarding powers, known as 'Recognised Bodies' can be found at: <https://www.gov.uk/check-a-university-is-officially-recognised/recognised-bodies>. Higher education institutions, further education colleges and other organisations able to offer courses leading to a degree of a Recognised Body are listed by the English,

Welsh and Northern Irish authorities, and are known as "Listed Bodies". View the list at: <https://www.gov.uk/check-a-university-is-officially-recognised/listed-bodies>

Qualifications

The types of qualifications awarded by higher education institutions at sub-degree and undergraduate (first cycle) and postgraduate level (second and third cycles) are described in the Framework for Higher Education Qualifications in England, Wales and Northern Ireland (FHEQ). This also includes qualification descriptors that were developed with the HE sector by the Quality Assurance Agency for Higher Education (www.qaa.ac.uk). The FHEQ meets the expectations of the Bologna Declaration and thus aligns with *A Framework for Qualifications of the European Higher Education Area (QF-EHEA)*. Compatibility with the QF-EHEA was verified by QAA in 2008 for the FHEQ.

Other national qualifications frameworks (which incorporate vocational education and training and general and secondary education) in the UK comprise: the National Qualifications Framework (NQF) and the Qualifications and Credit Framework (QCF); the Scottish Credit and Qualifications Framework (SCQF) and the Credit and Qualifications Framework for Wales (CQFW). England and Northern Ireland have three national qualifications frameworks, and the FHEQ is separate from those that comprise general education and vocational qualifications. The NQF and the QCF each have eight levels (numbered 1-8) and also support qualifications at lower levels (entry levels 1, 2 and 3). Qualifications aligned to each of these frameworks include vocational and general education qualifications. Both the NQF and the QCF provide for higher level qualifications (at levels 4 to 8) which compare with the corresponding levels of the FHEQ. There are opportunities for progression from qualifications on one framework to qualifications on another framework.

Quality Assurance

Academic standards are established and maintained by higher education institutions themselves using an extensive and sophisticated range of shared quality assurance approaches and structures. Standards and quality in institutions are underpinned by the universal use of external examiners, a standard set of indicators and other reports, by the activities of the QAA, and in professional areas by relevant Professional, Statutory and Regulatory Bodies. This ensures that institutions meet national expectations described in the FHEQ, the UK Quality Code for Higher Education and in subject benchmark statements. OfS registration includes initial and ongoing conditions of registration that relate to quality, reliable standards and positive outcomes for all students which HE providers are required to continue to meet in order to maintain registration.

Credit Systems

Most higher education institutions in England and Northern Ireland belong to one of several credit consortia and most operate local credit accumulation and transfer systems for students moving between programmes and/or institutions. A framework of national guidelines, the Higher Education Credit Framework for England, was launched in 2008. Credit is also an integral part of the Credit and Qualifications Framework (CQFW) and the QCF. It may be possible for credit awarded in one framework to be recognised by education providers whose qualifications sit within a different framework. HE credit systems in use in England, Wales and Northern Ireland are compatible with the European Credit Transfer System (ECTS) for accumulation and transfers within the European Higher Education Area, and are used to recognise learning gained by students in institutions elsewhere in Europe.

Admission

The most common qualification for entry to higher education is the General Certificate of Education at 'Advanced' (A) level. Other appropriate NQF level 3 qualifications and the kite-marked Access to HE Diploma may also provide entry to HE. Level 3 qualifications in the CQFW, including the Welsh Baccalaureate, also provide entry, as do Scottish Highers, Advanced Highers or qualifications at the same levels of the Scottish Credit and Qualifications Framework. Part-time and mature students may enter HE with these qualifications or alternatives with evidenced equivalent prior formal and/or experiential learning. Institutions will admit students whom they believe to have the potential to complete their programmes successfully.

¹ The UK has a system of devolved government, including for higher education, to Scotland, to Wales and to Northern Ireland.

Reference letter for Mr Luke Wentworth – 8th January 2025

It's a pleasure to write a reference for Luke Wentworth's application for PhD positions. I was Luke's academic advisor (pastoral tutor) at University of Sussex from Oct 2020 to July 2024. I also supervised his final year research project from Oct 2023 to July 2024. Luke does not come from a traditional academic background and has suffered financial hardship. Luke is currently a student at University of Bristol studying for an MSc in Mathematics, supported by the Martingale Foundation.

Academic performance: I can only comment on Luke's achievements at the University of Sussex and in the time period mentioned above. At Sussex, Luke obtained a 1st class MMath degree with a grand mean of 79%. Browsing his transcript, one sees numerous instances of Luke scoring above 90%. This puts Luke in a small handful of students able to perform this well. In fact, in the following 5 modules consisting of approximately 70 students, I can confirm that Luke was the top performer of the entire cohort:

Discrete maths (Year 1): 91%

Analysis 2 (Year 2): 90%

Introduction to Probability (Year 2): 92%

Calculus of Several Variables (Year 2): 92%

Probability and Statistics (Year 2): 89%

For his year 2 academic performance, University of Sussex awarded Luke the prize for outstanding achievement. In his third year module Dynamical Systems he obtained 91%, which was again the top performance in that module (cohort of approximately 60 students). In his fourth and final year at Sussex, he achieved some excellent results, such as in Linear Statistical Models (91%), Financial Mathematics (91%), Advanced Numerical Analysis (83%).

Research experience: I had the pleasure of supervising Luke's final year MMath research project at Sussex. Of the projects I offered, Luke opted to study a problem about permutations. In this project, one takes a permutation on n symbols, and asks the question: what is the length of the longest increasing subsequence of the permutation? If that permutation is chosen uniformly at random, what are the statistics of the length? Luke worked on understanding some of the results and proofs in Dan Romik's book 'The Surprising Mathematics of Longest Increasing Subsequences'. Luke also wrote computer code to simulate the length of the longest increasing subsequence.

During the project, Luke worked independently and required minimal input from myself. In Luke's final report, we were particularly impressed with the breadth in which he dealt with the topic, which touched on some aspects of random matrices and combinatorics. The latter topics may be of relevance for Luke's application in Bristol. If I were to mention one area for development, I think that Luke can take a bit more care with his writing of mathematics, as his report required quite a lot of feedback from myself to become readable. More occasionally, this also extended to slight misunderstandings with mathematical details. Overall, it was a good project and Luke scored 80%.

I can vouch for Luke's warm and friendly personality. At Sussex, Luke actively participated in student affairs, including as student representative for his year group and being elected to the board of study. Beyond his exam scores and strong mathematical ability, Luke has a natural curiosity and enthusiasm for research in mathematics. I think this makes him well suited to pursuing a PhD in mathematics and I give my strong support for his application to PhD positions at Bristol.

Dr. Nick Simm (Royal Society University Research Fellow at University of Sussex)



University of Sussex

Department of Mathematics

7th January 2025

Dear Admission Committee,

This is a reference letter for Mr Luke Wentworth to apply for a Martingale PhD scholarship.

I know Luke as a lecturer of the three modules he took at the Department of Mathematics at Sussex. Luke performed excellently in my Year 2 module ‘Introduction to Probability’, where he achieved above 90% for both the total and the exam marks, which were respectively the second and the first results in his cohort of 70 students.

I got in a closer contact with Luke during his third year, when he took my modules on ‘Measure and Integration’ and ‘Probability Models’. These are optional modules with smaller enrollment, where the faculty has a chance to know our students better. These modules are considered by both students and the colleagues to be among the hardest ones in our Mathematics programmes, and these choices of Luke definitely reflect his interest in probability theory. Luke scored a bit below 60% in both modules, which still is a good result given the difficulty of the modules. Luke was engaged with both modules, attended my office hours, and had been asking thoughtful questions during the lectures.

After this, I was a second marker for Luke’s MMath project on “Increasing subsequences and random matrix theory”. It covered a rather impressive variety of topics and had a lot of good mathematics resented. This was a good work on a hard topic, which we evaluated at 78%. However, I felt that Luke somewhat sacrificed the depth of his understanding for the breadth of the presentation, since I spotted a few errors in the mathematics.

contact us

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To

7th January 2025

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Feel free to contact me for further information at a later time if the need arises.

Yours sincerely,

Vladislav Vysotsky
Reader in Probability