Personal details

Personal details

First / given name	Harry
Second given name	
Third given name	
Surname/family name	Griffiths
Date of birth	09 November 2002
Preferred first/given name	Harry
Previous surname	
Country of birth	United Kingdom
Legal nationality	British National
Dual nationality	
Country of residence	United Kingdom
Have you previously studied with us at the University of Bristol?	No

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	GU2 7AL
Address Line 1	Mp-R/DJ47-6,Manor Park Block R
Address Line 2	Daphne Jackson Road
City	Guildford
County	Surrey
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 correspondence address?	Yes
Country	United Kingdom
Postcode	GU2 7YW
Address Line 1	Mp-R/DJ47-6
Address Line 2	Manor Park Student Village
City	Guildford
County	Surrey
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 programme?	Full Time

Qualifications

Qualifications

Institution	Qualification	Type	Subject	Actual/predicted	Grade	Start date	End date
University of Surrey	First degree BA/BSC etc	Academic Qualification	Mathematics	Predicted	1st	12/Sep/2022	16/Jul/2025

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	University of Surrey Student Union Union House, University Campus, GU2 7XH
Job title and main duties	Job Title: Team Member I worked as bar staff for the student union's on-campus club Rubix. My duties consisted of maintaining a clean workspace while serving alcohol to customers, manning the cloakroom, operating the box office and tickets, etc.
Full time/Part time	Part time
Date of Appointment	01 February 2023
End date (if applicable)	01 June 2023

Previous employment 1

Employer name and address	
Job title and main duties	
Full time/Part time	
Date of Appointment	
End date (if applicable)	

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?	No
Please provide details	

Personal statement

Personal details

Do you have a personal statement to upload?	Yes
Please type your personal statement in the box	

Research proposal

Research proposal

Proposed supervisor 1	Dr Tim Dokchitser
Proposed supervisor 1	Dr Jonathan Bober
Proposed project title (max 150 chars)	Investigating Better Bounds for Altered Prime Sequences

Passport and visa

Visa required

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

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 upload?	No
Type of reference	Academic
Referee title	Dr
Forename	Bin
Surname	Cheng
Position	Senior Lecturer
Institution/Company	University of Surrey
Email address	b.cheng@surrey.ac.uk
Country	United Kingdom

Referee 2

Do you have a second reference to upload?	No
Type of reference	Academic
Referee title	Dr
Forename	Jon
Surname	Bevan
Position	Associate Professor
Institution/Company	University of Surrey
Email address	j.bevan@surrey.ac.uk
Country	United Kingdom

Funding

Funding 1

What is your likely source of funding?	University of Bristol scholarship
Please give the name of your scholarship or Studentship	
Please specify	
Percentage from this source	75
Is this funding already secured?	No

Funding 2

What is your likely source of funding?	Other
Please give the name of your scholarship or Studentship	
Please specify	Heilbronn Doctoral Partnership (in addition to all your other available funding sources)
Percentage from this source	75
Is this funding already secured?	No

Funding 3

What is your likely source of funding?	Yourself/family
Please give the name of your scholarship or Studentship	
Please specify	
Percentage from this source	25
Is this funding already secured?	No

Other funding

I would like to be considered for other funding opportunities	Yes

Submission

Documents

Document type	File name
Research proposal	Research_Proposal__Anonymous_.pdf
Curriculum vitae	Academic_CV__Anonymous_.pdf
Personal statement	Bristol_Personal_Statement.pdf
Transcript	Progress Report 6686215.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 signification 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.

Anonymous As Requested

Education and Qualifications

University of Surrey (09/2022 - Present)
BSc Mathematics

- Expected First Class
- Modules include: Linear PDEs; Advanced Algebra; Graphs and Networks; Functions of a Complex Variable; Numerical and Computational Methods; Introduction to Function Spaces; BSc Project

Coombe Sixth Form/Coombe Boys' School
A Levels: Mathematics - A*, Chemistry - B, Drama and Theatre Studies - B 2021
GCSEs: Passed 9 GCSE's, ranging from grades 5-9, with 2 grade 9's and a GCSE in French 2019

Employment

University of Surrey Student Union (02/2023 - 06/2023)
Team Member (bar staff at on-campus nightclub Rubix)

- Serving alcoholic drinks, following alcohol laws (e.g. not serving to drunk people, specific shot measurements)
- Maintaining a clean station, regularly restocking bottles, and preparing my station for use on the following day
- Being responsible for making sure I have the focus and energy to last through a 4-6 hour night shift on weekdays

Coombe Boys' School (02/2022 - 08/2022)
Drama Department Assistant

- Being responsible for children aged 9 to 18, and keeping them to their busy schedule and their own responsibilites
- Carrying heavy objects around site, setting up gazebos, props, costumes etc

Research Experience

University of Surrey Undergraduate Vacation Research Internship (06/2024 - 08/2024)

- A short intense project, on my chosen area of interest - Investigating Variations of the Betrand-Chebyshev Theorem
- Focus on Number Theory, which required beneficial further reading due to a lack of specialist at the university
- Python Coding with Numerical Analysis to determine better bounds for variations of prime sequences

BSc Project (07/2024 - 06/2025)

- Aim is to improve mathematical accessibility to the Monge-Ampere Equation for undergraduate students
- Understanding and being able to construct the rigorous proofs for non-linear partial differential equations, optimal transport theory, the continuity method, etc
- Resulting paper is still in preparation, as well as oral presentation for panel of department staff

Technical Skills

- Experience with data presentation methods and research/idea proposals
- Python - Coding skills improved to a high standard from consistent use over several university coding projects, as well as research projects

Additional Skills/Relevant Interests

- Team Leadership skills, developed from experiences as director and revision group leader
- Beginner Level in French, Spanish, Italian and Japanese. Keen on becoming more fluent in Japanese
- Adaptability, learnt from time as an actor requiring quick learning and ability to change plan on-the-fly
- Attended LMS Summer School 2024 at the University of Essex to learn about more specialized areas, important postgraduate skills for projects, and pathways to get into the research industry

Dreams Thriving Despite The Circumstances

It would be fair to say my career choices up until a point have been different to the average mathematician. For A-Levels, my STEM subjects were Mathematics and Chemistry, and my aspiration at this point was to be an actor! After a few rounds of failing in getting into drama school, I thought it would be best to have a back-up this time round. I've been a keen maths reader, loving to keep up to date with breakthroughs and theorems, particularly in Number Theory, so I thought I'd have a maths undergrad as a back-up. After this round of applications, I was successful in receiving an offer for a drama school. It's at this point I felt a change of direction. Now having achieved my "dream", I realised that getting that acceptance letter was simply a side goal. The countless hours of rehearsals were a means of escape from a household I was not comfortable in, and getting accepted into a drama school was my way of proving to those who belittled me that I could achieve what I wanted. But in pursuing this achievement, my true aspiration was clouded. Seeing offers for maths courses come in made me realise that what I really wanted to do was pursue a research career. Learning about new developments were highlights of my childhood, so deep down I wanted to contribute to this grand world of axioms. Thus, this led me to attending the University of Surrey for a BSc Mathematics course.

Despite not taking A-Level Further Maths and also having a gap year, my maths skills and knowledge had not deteriorated. In comparison to my peers I was excelling greatly, as evident with my consistently high grades throughout the course. Something that was made clear to me early on was how much a community of peers can help boost everyone's performance, so I decided to become a course representative, and form a consistent large revision group where I and others will assist those who are struggling. Being a course representative utilises my communication and presentation skills when collecting student feedback and giving it back in a constructive manner to relevant faculty. Leading the revision sessions demonstrates my team-working skills as well as my attitude and focus towards good collaboration. In pursuit of conversing with many mathematicians, learning their mathematical interests and passions, I attended the LMS Undergraduate Summer School in the

summer of 2024. Here I had the wonderful opportunity to hear many talks by leading experts in areas such as Knot Theory, Number Theory and PDEs present in Mathematical Biology. Even though many of these areas aren't present in my undergrad course, I was transfixed with the monumental size of the mathematical research world. With so many experts in so many fields, surely I could find my place in this industry.

I knew years prior to this revelation, that hoping to get into a PhD with my experience as an actor would not be enough. So in my first meeting with my personal tutor I made it clear that I wanted to gain research experience. I had no options to do so professionally in my first year, hence I made use of that time by noting down my research interests and formulating presentations for each one. This list consisted of ideas from investigations into an identity element for division with the use of Complex Analysis and Group Theory, to observations and questioning of the Bertrand-Chebyshev Theorem. The latter would be the focus of my first research foray, as part of my university's Vacation Research Internship Scheme. With this opportunity, I got valuable experience with coding and mathematical reading. A challenge with that project was it involved a heavy use of Number Theory, but there was no specialist in my department for that area. However, having read through the works of Hardy, Fermat and others for pure interest, I was able to overcome this hurdle with ease by being confident and enthusiastic with the material.

It all comes down to what happens next. With quite a turbulent start to this abnormal path, I'd say I'm prepared to take on the task that is a PhD. I've never shied away from new material with my desire to research, and have embraced working in a collaborative atmosphere from the second I started my undergraduate course. It simply comes down to where I would like to go. Suffice to say, the opportunity to work at an institution with such a dedication to research excellence, as well as a large research group interested in both Number Theory and Algebra, would be an honour to take and utilise.

1 Introduction

1.1 Background and Context

Bertrand's Postulate, first conjectured in 1845 by Joseph Bertrand, is an important statement in Number Theory. It was an attempt to show bounds for prime numbers, with the lesser restrictive version of the conjecture stating that: for every $n \geq 1$,

$$p_{n+1} \leq 2p_n, \tag{1}$$

where p_n is the nth prime.

This conjecture was later proved in 1852 by Chebyshev, thus becoming the Bertrand-Chebyshev Theorem. As the years have gone by, more mathematicians have tried to improve the bound for p_{n+1}, which I will go into more detail later.

1.2 The Research Problem I'd like to address

My hope with this research is to find my own improvement for this bound, but with a focus on altered prime sequences. For example, I have previously done some work on the sequence of squared primes, where p_n^2 is the smallest squared prime greater than or equal to n. So my initial focus of the project would be finding a more stricter bound than what I have already computed, which is: for every $n \geq\approx 90,000$,

$$p_{n+1}^2 \leq \left(1 + \frac{1}{\ln(n)^{\frac{9}{\ln(n)}}}\right) n. \tag{2}$$

Upon finding this better upper bound, I would write out a more rigorous proof for it so the reliance on computational estimations is removed. After this, I would like to expand my methodology to other altered prime sequences to spot emergent patterns. All to hopefully construct a general upper function bound for any possible alteration.

1.3 Relevance and Importance of this Research

It goes without saying that patterns and results from primes have been highly discussed in the world of mathematics. However it is my belief that by expanding our study into alterations of primes, there may be a more general theory we have been missing out on this entire time. And of course with any study into this more general realm of "altered primes", there's the strong possibility of finding new properties and theorems regarding unaltered primes. For example, this research could illuminate methods to go about solving Oppermann's Conjecture.

2 Discussing Relevant Literature

As I've mentioned previously, this research is entering new territory that has not really been explored in great detail. When starting it for my summer project, my supervisor and I realised there was very little to no prior literature on altered primes, most likely due to the industry focus on primes themselves. Thus discussing any immediate relevant literature is quite difficult to do. However I can still make mention of the literature I studied as inspiration for my method, and those that helped broaden my understanding of the initial material.

Firstly it's important to understand the proofs of the Bertrand-Chebyshev Theorem (from here on referred to as B-C Theorem) and any latter theorems we wish to focus on. Over the decades there's been several proofs constructed for the B-C Theorem, and the one I chose to focus on was Erdős's proof [Galvin (2016)]. Here, Galvin details how Erdős went about proving the B-C theorem using facts about the middle binomial coefficient $\binom{2n}{n}$. Studying this paper made me appreciate the rigorous proofs that can go behind such seemingly simple claims, and while I don't believe I can expand on it I do think that some of it could be applied to my current methodology. Particularly backing up my conjectures that I initially create with computational work.

Now since I'm looking to improve this bound for altered primes, it's vital to understand the ways people improved the bound for normal primes. This led to me Pierre Dusart, who has written several papers on improving the bound in the form of $x < p \leq (1+\epsilon)x$, where p is prime and ϵ is a constant or function to be found. In an article he wrote in 2016 for The Ramanujan Journal [Dusart (2016)], he explained one of these better bounds: for all $x \geq 468,991,632$, there exists a prime p such that

$$x < p \leq \left(1 + \frac{1/5000}{\ln^2(x)}\right) x. \tag{3}$$

This proof is done rigorously, but he mentions how it has to be verified computationally at the lower bound of the validity range. This is what gave me the inspiration to investigate bounds using computational methods.

3 Research Plan

I have already summarised what I'd like to do as part of the project in Section 1.2, but here I'll expand on some of those points, and explain my methods so far.

So how did I find my current best upper bound? Firstly I wrote up code, utilising the Miller-Rabin primality test, to give me a list of prime numbers less than or equal to a given input. To ensure this was working correctly, I created graphs highlighting the lower bound, prime number sequence, and upper bound described by Dusart. Once confident with it working, I then went about changing the Miller-Rabin test to output the least squared prime greater than n, less than or equal to the given input. This created a function that looked like a staircase. Hence leading me to define the jumps up as "riser primes". Next, I adjusted the test to output "maximum riser primes", i.e. riser primes that jumped a value greater than any riser prime before it. This is where my research highlights many potential branches and thus open questions I'd like to go into as part of this project:

- Is this function of "maximum riser primes" onto?
- Does the rate of "maximum riser primes" appearing increase as an interval grows?
- What's the best upper bound that fits this function?

- Does the area under "riser primes" diverge away or converge to the area under "maximum riser primes"?
- How does the "riser prime" function change in look as we vary the alteration made (e.g cubed primes)

As you can see, I've set up a lot of potential with my work so far. Hopefully with the direction of an experienced supervisor, I'll be able to dedicate focus to areas they believe to be more relevant and have greater potential.

If the supervisor thinks it's best for me to stick with what I want to focus on, then here is what my current plan is:

1. Continue testing to see if I can find a better upper bound than what I've already got in (2).
2. Find/Create a proof to back up my claim for a best upper bound
3. Test for a best upper bound for a differing altered prime sequence, most likely cubed primes.
4. Find/Create a proof for this best upper bound, with the hopes of spotting an emergent pattern with the previous proof
5. Construct a general theorem for the upper bound of altered prime sequences, with regards to the power of the prime being the main alteration.
6. Set up the framework for other focuses of the alteration (e.g e^p, $\ln p$, polynomials).

Due to the high presence of coding in my method, as well as needing to let the code run to gather prime sequences in the millions and more, a high performance computing cluster would improve the efficiency immensely. My work up to this point has been without one, so it's not absolutely necessary. However time cost scales rapidly as the sample size grows, so a HPC cluster would cut back on waiting times.

References

Dusart, P. (2016), 'Explicit estimates of some functions over primes', *The Ramanujan Journal* .

Galvin, D. (2016), *Erdos's proof of Bertrand's postulate*, University of Notre Dame.

PROGRESS REPORT

Name	Harry Griffiths	**University Number**	6686215
Date of Birth	09 Nov 2002	**HESA ID**	
Faculty	Faculty of Engineering and Physical Sciences		
Programme	Mathematics BSc FT		
Route	Mathematics BSc FT		
Date Enrolled	19 Sep 2022	**Expected Completion Date**	06 Jun 2025
		Qualification Aim	Bachelor of Science
Current Level	HE6	**Mode of Attendance**	FULL-TIME
Current Status	Enrolled	**Tutor**	CHENG Bin (Maths & Phys)

Level	Credit Attempted	Credit Awarded	Compensation Credit	AP(E)L Credit	Total Credit	Aggregate Level Mark Achieved	Board of Examiner's Decision
HE4	120	120			**120**	**78**	Pass Proceed after Summer Assessment
HE5	120	120			**120**	**79**	Pass Progress
HE6	75				**0**	**0**	

The total credits and aggregate level marks are subject to regular recalculation. If a calculation has not been carried out since marks have been entered the summary lines may not reflect what is shown in the detail area of the transcript.

Module Code	Module Level	Credit Value	Module Title / Unit of Assessment	Attempt	Year Taken	Agreed Mark	Agreed Credit	Retake
Level HE4 Assessment								
MAT1005	HE4	15	MS102, VECTOR CALCULUS		2022/3	75	15	
			EXAM (2 HOURS)	1		87		
			IN-SEMESTER TEST (50 MINUTES)	1		40		
MAT1030	HE4	15	MAT1030, CALCULUS		2022/3	73	15	
			COURSEWORK 1	1		71		
			COURSEWORK 2	1		61		
			COURSEWORK 3	1		59		
			COURSEWORK 4	1		62		
			EXAM (2 HRS)	1		76		
MAT1031	HE4	15	MAT1031, ALGEBRA		2022/3	87	15	
			COURSEWORK 1	1		76		
			COURSEWORK 2	1		84		
			COURSEWORK 3	1		92		
			COURSEWORK 4	1		86		
			EXAM (2 HRS)	1		88		
MAT1032	HE4	15	MAT1032, REAL ANALYSIS 1		2022/3	89	15	
			EXAM (2 HOURS)	1		95		
			IN-SEMESTER TEST (50 MINUTES)	1		70		
MAT1033	HE4	15	MAT1033, PROBABILITY AND STATISTICS		2022/3	85	15	
			EXAM (2 HOURS)	1		85		
			IN-SEMESTER TEST (50 MINUTES)	1		83		
MAT1034	HE4	15	MAT1034, LINEAR ALGEBRA		2022/3	73	15	
			EXAM (2 HOURS)	1		66		
			IN-SEMESTER TEST (50 MINUTES)	1		95		
MAT1036	HE4	15	MAT1036, CLASSICAL DYNAMICS		2022/3	64	15	
			EXAM (2 HOURS)	1		68		

PROGRESS REPORT

Name Harry Griffiths **University Number** 6686215

Module Code	Module Level	Credit Value	Module Title / Unit of Assessment	Attempt	Year Taken	Agreed Mark	Agreed Credit	Retake
			IN-SEMESTER TEST (50 MINUTES)	1		50		
MAT1042	HE4	15	MAT1042, MATHEMATICAL PROGRAMMING AND PROFESSIONAL SKILLS		2022/3	78	15	
			GROUP PROJECT	1		79		
			INDIVIDUAL REPORT	1		70		
			PRESENTATION	1		92		
Level HE5 Assessment								
MAT2001	HE5	15	MS211, NUMERICAL AND COMPUTATIONAL METHODS		2023/4	69	15	
			ASSESSED COURSEWORK	1		84		
			EXAMINATION (2 HOURS)	1		65		
MAT2003	HE5	15	MS238, STOCHASTIC PROCESSES		2023/4	84	15	
			EXAM (2 HOURS)	1		81		
			IN-SEMESTER TEST (50 MINUTES)	1		98		
MAT2004	HE5	15	MS218, REAL ANALYSIS 2		2023/4	69	15	
			EXAM (2 HOURS)	1		64		
			IN-SEMESTER TEST (50 MINUTES)	1		90		
MAT2007	HE5	15	MS213, ORDINARY DIFFERENTIAL EQUATIONS		2023/4	86	15	
			EXAM (2 HOURS)	1		82		
			IN-SEMESTER TEST (50 MINUTES)	1		100		
MAT2011	HE5	15	MS217, LINEAR PDES		2023/4	72	15	
			EXAM (2 HOURS)	1		67		
			IN-SEMESTER TEST (50 MINUTES)	1		90		
MAT2013	HE5	15	MS237, MATHEMATICAL STATISTICS		2023/4	85	15	
			EXAM (2 HOURS)	1		85		
			IN-SEMESTER TEST (50 MINUTES)	1		85		
MAT2048	HE5	15	MAT2048, GROUPS & RINGS		2023/4	77	15	
			EXAM (2 HOURS)	1		80		
			IN-SEMESTER TEST (50 MINUTES)	1		66		
MAT2052	HE5	15	MAT2052, INTRODUCTION TO COMPLEX ANALYSIS		2023/4	90	15	
			EXAM (2 HOURS)	1		93		
			IN-SEMESTER TEST (50 MINUTES)	1		78		
Level HE6 Assessment								
MAT3004	HE6	15	MS310, INTRODUCTION TO FUNCTION SPACES		2024/5			
			END-OF-SEMESTER EXAMINATION (2 HRS)	1				
			IN-SEMESTER TEST (50 MIN)	1				
MAT3019	HE6	30	MS340, BSC PROJECT		2024/5			
			ORAL PRESENTATION	1				
			WRITTEN REPORT	1				
MAT3032	HE6	15	MAT3032, ADVANCED ALGEBRA		2024/5			
			END-OF-SEMESTER EXAMINATION (2 HOURS)	1				
			IN-SEMESTER TEST (50 MIN)	1				
MAT3053	HE6	15	MAT3053, MATHEMATICS OF WEATHER AND CLIMATE		2024/5			
			END-OF-SEMESTER EXAMINATION (2 HOURS)	1				
			IN-SEMESTER TEST (50 MINS)	1				

PROGRESS REPORT

Name Harry Griffiths **University Number** 6686215

Notes:

The number of credits attributed to an individual module reflects the notional learning time which a student might be expected to take to achieve the learning outcome(s) at a given level. One credit is attributed to learning achieved within 10 hours of notional learning time at a given level.

Signed: Date Issued: 26/11/2024

This information recorded in this progress report is subject to approval by the Senate Progression and Conferment Executive where appropriate. This progress report is for advisory purposes only and is not a confirmation of attainment or award of a degree at the University of Surrey. A formal exit transcript will be issued to the student at the end of their programme of study.

6 December 2024

UNIVERSITY OF SURREY

Department of Mathematics
Guildford, Surrey GU2 7XH UK

Dr. Bin Cheng
Senior Lecturer

T: (0) +44 (0)1483 683023
F: +44 (0) 1483 686071
E: B.Cheng@surrey.ac.uk

To Whom It May Concern

I am offering my recommendation for Mr. **Harry Griffiths** in support of his application for admission to the Ph.D. course in Mathematics at your University.

Harry has been my personal tutee since 09/2022 when he started a BSc in Mathematics course at University of Surrey. His marks are very impressive. What has impressed me the most was his initiative in conducting his own investigation into topics he was passionate about, and his capability of carrying out advanced research both independently and under supervision. He showed strong motivation and strong initiatives for *actively* pursuing mathematics as a career. For example, he often can be seen as the most active student in our UG common room leading mathematical discussion with great enthusiasm. Currently in his third year, he is conducting a research project under my supervision on the 2nd boundary value problem of the Monge-Ampere equation. I am impressed by how he can read highly advanced research papers – not just individually, but in relation to each other – and came up with his own understanding and analysis.

In conclusion, Mr. Harry Griffiths is one of the best undergraduate students I have ever known and worked with. He is a bright student with strong passion and drive for research. I recommend him to your PhD course without reservation. Please feel free to contact me if you have further enquiries.

Sincerely yours,
Bin Cheng, Ph.D.

UNIVERSITY OF SURREY

School of Mathematics and Physics
Guildford, Surrey, GU2 7XH UK

Dr Jonathan Bevan
Reader in Mathematics

T: +44 (0)1483 68 2620
F: +44 (0) 1483 686071
E: j.bevan@surrey.ac.uk

5 December 2024

To whom it may concern,

This is a letter of recommendation in support of Harry Griffiths. I have known Harry since he enrolled on the BSc Mathematics course at the University of Surrey in September 2022, initially as a student on the Analysis course I taught in what was his first semester and later as a student representative on the Student Staff Liaison Committee. He is a strong and diligent student with an ironclad will to succeed, and he is equally assiduous as an advocate for his fellow students.

Harry's mean module marks across Year 1 and Year 2 are 78% and 79% respectively, with a standard deviation of just 8% in Year 2: he seems to have been consistently good at everything - a genuine all-rounder. The exam board reports from Year 2 indicate Harry sits 7th out of a year group of 56 students. The subjects Harry has studied across his first two years are fairly typical and include Analysis, Algebra, ODEs, PDEs, some Statistics and also Complex Variable. In Year 3 he has so far chosen to follow courses in Advanced Algebra, Function Spaces and the Mathematics of Climate and Weather, as well to work on a project that will contribute one quarter of his final year mark. Although the marks are not yet in for these courses, Harry's trajectory to date suggests he will perform very well indeed. He is on course for a well-deserved first class degree, I would say.

Harry has already shown that he has the right attitude and abilities to undertake research, as I saw for myself when working with him this year on a vacation research project on extensions of the Bertrand-Chebyshev theorem. This was a student-led piece of work in the sense that it realised a long-term interest of Harry's, so the credit goes to him for the idea as well as for carrying out the planned work, much of which required him to pick up new skills as he went along. During the project I was struck by how adaptable Harry was and how steadily, once his thoughts were properly organised, results started to come together. I have no hesitation in concluding that this approach will serve him well on any PhD programme to which he is admitted. Harry is friendly, polite, enthusiastic and is in many ways the ideal student whose ambition to do mathematics research is both realistic and laudable.

I warmly recommend him to you.

Yours Sincerely,

Jonathan Bevan