Personal details

Personal details

First / given name	Rhys
Second given name	Gareth
Third given name	
Surname/family name	Lewis
Date of birth	10 February 2003
Preferred first/given name	Rhys
Previous surname	
Country of birth	United Kingdom
Legal nationality	British National
Dual nationality	
Country of residence	Wales
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	SA62 4EW
Address Line 1	2 Woodholm Close
Address Line 2	Crundale
City	Haverfordwest
County	Pembrokeshire
Telephone	07932902750

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	S3 7EL
Address Line 1	Hillside House
Address Line 2	86 Winter Street
City	Sheffield
County	South Yorkshire
Telephone	07932902750

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 Sheffield	Master's Degree (PG)	Academic Qualification	Mathematics	Predicted	Distinction	30/Sep/2024	30/Sep/2025
University of Cambridge	First degree BA/BSC etc	Academic Qualification	Mathematics	Actual	2:1	05/Oct/2021	25/Oct/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	School of Maths and Science Olympiads, The Wenta Business Centre, Enfield EN3 7XU
Job title and main duties	Mathematics Tutor I have tutored children aged 9-18 in various levels of maths from the Junior Mathematical Challenge to the British Mathematical Olympiad and Oxbridge admissions
Full time/Part time	Part time
Date of Appointment	16 September 2020
End date (if applicable)	

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?	
Please provide details	

Personal statement

Personal details

Do you have a personal statement to upload?	No
Please type your personal statement in the box	My ambition is to become a university lecturer in mathematics, and I believe the Bristol PhD would be an ideal step towards achieving that goal and moving into the world of research. I already have some experience in tutoring students for both the British Mathematical Olympiad and MAT/STEP, having done so since 2020, and have recently undertaken an introduction to university mathematics with one of my students. I find passing on my mathematical knowledge and helping my students achieve better results to be extremely rewarding and a significant motivational factor for becoming a lecturer. In 2021, I gave some online talks in Modular Arithmetic and Euclidean Geometry and found both the preparation and delivery to be both enjoyable and fulfilling. If there is any opportunity as part of the Bristol PhD to help and tutor undergraduate students, I would love to take this on. I believe I would be a great candidate for this course as I have benefitted from the study of mathematics at a high level and in great detail and am prepared to further develop these skills at the next level. If I were to be accepted onto your course, you would find me to be an enthusiastic, engaging and conscientious student, who would relish the challenge Bristol has to offer.

Research proposal

Research proposal

Proposed supervisor 1	
Proposed supervisor 1	
Proposed project title (max 150 chars)	

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	Professor
Forename	David
Surname	Tong
Position	Director of Studies
Institution/Company	University of Cambridge
Email address	dt281@cam.ac.uk
Country	United Kingdom

Referee 2

Do you have a second reference to upload?	No
Type of reference	Academic
Referee title	Dr
Forename	Frazer
Surname	Jarvis
Position	Project Supervisor
Institution/Company	University of Sheffield
Email address	a.f.jarvis@sheffield.ac.uk
Country	United Kingdom

Funding

Funding 1

What is your likely source of funding?	Yourself/family
Please give the name of your scholarship or Studentship	
Please specify	
Percentage from this source	
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 other funding opportunities	Yes

Submission

Documents

Document type	File name
Application form PDF (anonymised)	Anon 2759141~01~01.pdf
Research proposal	Research Proposal (1).pdf
Transcript	Digitary Transcript.pdf
Degree certificate	University of Sheffield Offer.pdf
Transcript	Transcript Explanation.pdf
Degree certificate	Degree Certificate.pdf
Curriculum vitae	CV Bristol.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.

I am a Masters student in Mathematics at the University of Sheffield, completing a dissertation entitled "Kummer's Work on Fermat's Last Theorem", along with a directed reading module on elliptic curves, and am looking to embark on a PhD in Algebraic Number Theory, specifically in the study of Diophantine Equations.

Education

- University of Sheffield, 2024-, MSc
- University of Cambridge, 2021-24, BA Mathematics, 2:1
    - *Topics covered in final year: Number Theory, Number Fields, Graph Theory, Galois Theory, Topics in Analysis, Logic and Set Theory, Applied Probability, Probability and Measure*
- Haverfordwest High VC School, 2018-21:
    - *A Levels - 4 A*s in Mathematics, Further Mathematics, Chemistry and Music (2021)*
    - *AS Levels - A in Physics (2020)*
    - *GCSEs - 12 A*s, as well as a Distinction in Additional Mathematics (2016-19)*
    - *STEP - S grade in STEP 2 and STEP 3 (2021)*
- Sir Thomas Picton School, 2014-18

Experience

- Since September 2020, I have been employed by School of Maths and Science Olympiads tutoring children aged 9-18 in various levels of maths from the Junior Mathematical Challenge to the British Mathematical Olympiad and Oxbridge admissions.
- I was a member of the UK Squad for the 2021 International Mathematical Olympiad.
    - *In the same year, I achieved a silver medal at the Balkan Mathematical Olympiad,*
    - *I also attended training camps for the IMO in 2018, 2019-20 and 2021.*
- I have written several problems that have appeared on the British Mathematical Olympiad papers, winning the David Monk Prize for problem writing in 2023.

Skills

- I have proficiency with MATLAB, having used it for many projects as part of CATAM in my undergraduate studies, as well as LaTeX, having written up reports of said projects, writing my notes live in LaTeX during Michaelmas Term 2023, and using it for various other projects both as part of my Masters course and some fun side projects.
- I have a large amount of experience using Google Sheets/Docs for various extra-curriculars, including using conditional formatting and non-standard functions.
- I have leadership skills, having been President of the Cambridge University Quiz Society from May 2023 to July 2024, and having held various positions on the UK Quizbowl Committee.
- I was the conductor of my college orchestra for five concerts from 2022 to 2024, including organising rehearsals and fixing players.
- I was a member of the Welsh Youth Parliament from 2018 to 2021, and gave several speeches in the Siambr in the Senedd Building.

University of Sheffield

Mr Rhys Gareth Lewis
2 Woodholm Close
Crundale
Haverfordwest
Pembrokeshire
SA62 4EW

Admissions Service, Level 2, Arts Tower
Western Bank, Sheffield, S10 2TN
Telephone: +44 (0)114 222 8030
Email: study@sheffield.ac.uk
www.sheffield.ac.uk/study/askus

Application No: 245902060/1
(Please quote in all contact with the University)

18 September 2024
(Amended Offer, Original Offer Sent 05 September 2024)

Dear Rhys,

MSC, Master of Science Mathematics (Full Time) MAST30
Start date: 30 September 2024
Expected end date: 30 September 2025
Department: School of Mathematics and Statistics
CAH3 Code: CAH09-01-01

I am pleased to offer you a place to study the above course at the University of Sheffield. This offer is Unconditional.

Please let us know if you would like to accept or decline the offer by logging back into your original online application. There are no specific deadlines for accepting an offer. However, we encourage you to make a decision as soon as possible and you should do so within three months of receiving an offer at the latest, or by the course start date if that is earlier.

Postgraduate Online Application Form
www.sheffield.ac.uk/postgraduate/online

Attached with this letter is a copy of the University's formal Terms and Conditions upon Acceptance of an Offer, which will form part of our contract with you if you accept our offer. You can also view these on our webpages:

Terms and Conditions upon Acceptance of an Offer
www.sheffield.ac.uk/study/policies/terms

If this offer represents an amendment to a previous offer from the University (for example if you have deferred to a later start date), please note that the offer information and terms and conditions provided here supersede any previously issued.

You can find more information about supplying documents and how we verify them on our Supporting Documents webpage:

Supporting documents
www.sheffield.ac.uk/postgraduate/supporting

Details of key dates and deadlines for applications to postgraduate courses are available on our webpages:

Key dates and deadlines for postgraduate courses
www.sheffield.ac.uk/postgraduate/deadlines

You can find more information about what happens next on our webpages:

After you apply
www.sheffield.ac.uk/postgraduate/taught/apply/after

Course details

Module and other information about your course can be found by searching for the course title in our online course listings:

Postgraduate taught courses
www.sheffield.ac.uk/postgraduate/taught/courses

We recommend you save or print this information for your records.

From May of the year of entry, formal programme regulations will be available in our Programme Regulations Finder:

Programme Regulations Finder
www.sheffield.ac.uk/programmeregulationsfinder

We recommend you use the 'Print PDF' function to save or print these for your records.

The content of our courses is reviewed annually to make sure it is current and relevant. Individual modules may be updated or withdrawn in response to discoveries made through our world-leading research, funding changes, professional accreditation requirements, student or employer feedback, curriculum review, staff availability, and variations in student numbers. In the event of a material change the University will inform students in good time and take reasonable steps to minimise disruption.

Additional course information can be found in our online taught course listings:

Postgraduate taught courses
www.sheffield.ac.uk/postgraduate/taught/courses

Tuition fees

As a result of the questions you answered as part of your application, your provisional fee status is home. If we need any more information before we finalise your fee status, we will contact you. More information about fee status is available on our webpages:

Fee status at the University of Sheffield
www.sheffield.ac.uk/study/fee-status

For home fee payers, the academic fee for the session commencing September 2024 will be £12070.

Information about what your tuition fee covers, and details of any additional costs for your course, are available on departmental course webpages, accessible via our online postgraduate taught course listings at:

Postgraduate taught courses
www.sheffield.ac.uk/postgraduate/taught/courses

More information about fees and funding, including scholarships available for postgraduate students, is available on our finance webpages:

Postgraduate taught course tuition fees
www.sheffield.ac.uk/postgraduate/taught/fees
Postgraduate taught course funding
www.sheffield.ac.uk/postgraduate/taught/funding

Please note deposits are non-refundable unless one of the exceptions in paragraph 8.2 of the Terms and Conditions upon Acceptance of an Offer apply.

International student requirements

If you need a visa to study in the UK, you will need a Confirmation of Acceptance for Studies (CAS) number from the university you want to study at. You can find information about the CAS application process at Sheffield on our CAS application webpages:

CAS number application process
www.sheffield.ac.uk/cas-application

Student regulations

Regulations relating to your rights and responsibilities while studying at the University of Sheffield are set out in the University Calendar:

The University of Sheffield Calendar
www.sheffield.ac.uk/calendar

If you have applied for a degree leading to accreditation with a professional body (for example Medicine or Dentistry) we draw your attention in particular to the General Regulations relating to Student Fitness to Practise.

University policies relating to students are accessible via our Policies webpage:

Student policies
www.sheffield.ac.uk/study/policies

Additional information

If you want to apply for University of Sheffield accommodation, you can apply online. Applications open from March, and you can apply as soon as you have accepted your offer.

University of Sheffield accommodation
www.sheffield.ac.uk/accommodation

If you have been unhappy with any aspect of our admissions process please see our Appeals and Complaints Procedure for Applicants, and associated form, which are attached for your information.

Information about the support we provide for students with a disability or learning difficulty is available on our Disability and Dyslexia Support Service's webpages:

Disability and Dyslexia Support Service
www.sheffield.ac.uk/new-students/disability

*****We strongly recommend that you save or print this email and copies of all the information attached to it and linked to from it, as this forms the basis of your contract with us.*****

If you have any questions about this letter, please contact us by following the link below:

University of Sheffield

Contacts for prospective students
www.sheffield.ac.uk/contact/prospective-students

Yours sincerely

Helen Barrett
Admissions Manager

UNIVERSITY OF CAMBRIDGE

I hereby certify that
RHYS GARETH LEWIS
of TRINITY COLLEGE
in the University of Cambridge
was at a full congregation holden in
the Senate-House on
25 OCTOBER 2024
admitted to the degree of
BACHELOR OF ARTS

Witness my hand this
twenty fifth day of October, two thousand and twenty-four

Administrative Officer

Registrary of the University

I've always been interested in number theory, and throughout my studies at university have become particularly invested in the algebraic side of it. A lot of this stems from a love of solving Diophantine equations, which is my main focus of my dissertation, studying Fermat's Last Theorem. I love exploring the world of number fields, and how integers can be generalised to larger extensions of the rationals, with each field presenting new challenges to explore: do we have unique prime factorisation? Can we work out the class group? The fact that the latter task, at least for certain fields, can be boiled down to two phenomenally powerful results, namely the Minkowski Bound and Dedekind's Criterion, is mind-boggling but it gives an elegant way of tackling the smaller cases, and I'm really looking forward to tackling harder fields.

I remember being very excited when I was much younger trying to find Pythagorean Triples, along with the feeling of pride when I managed to find an algorithm for computing them, before realising many mathematicians had already beaten me to it! Diophantine equations were the questions I enjoyed the most in preparing for higher level mathematics, as there was often a neat trick that many could not see. Looking at Binary Quadratic Forms during my undergraduate degree, I was surprised to learn how the theory of Reduced BQFs could be used to prove Fermat's theorem on sums of two squares. This proves order in a famously chaotic set of numbers, and I was particularly fascinated at the existence of such integers whose squares sum to the prime, and also the uniqueness of them. How could this be remotely possible?

I remember also being fascinated when I first heard about Fermat's Little Theorem, and to learn that there was a pattern in the set of primes, once again showing order in chaos. Then upon learning of the generalisation of FLT, the Euler-Fermat Theorem, I was even more amazed. How could it be that a fairly random function, namely the Totient function, gives such an elegant result, particularly when it's in a power? This led me to unearth an area in Number Theory I find particularly beautiful, that is, the integers modulo n and the associated group of units. It combines the theory of integers with the similarly fantastic world of group theory. I remember completing an exercise proving an equivalent statement to Carmichael numbers and again it was great to learn that such a complicated set of numbers has a simple condition.

I love the interplay between different parts of number theory, for example how elliptic curves link with algebraic geometry, and how the worlds of number theory and complex analysis are so intertwined. I've enjoyed modules on Graph Theory and combinatorics, and am excited to potentially explore the worlds of additive and combinatorial number theory. I am reading notes from a friend on a course in additive combinatorics, and have enjoyed learning results such as the Cauchy-Davenport Theorem. As well as this, taking modules in algebra such as Galois Theory has made me keen to learn about further topics in algebra such as lie algebras and commutative algebra, and how they can relate to the world of number theory.

To summarise, in a PhD I would love to work on the study of Diophantine equations, and the world of algebraic number theory in general, along with learning about related aspects such as combinatorics and algebra, and how they connect with my core focus and passion.

Official Transcript

UNIVERSITY OF CAMBRIDGE

University Offices

INFORMATION IDENTIFYING THE HOLDER OF THE QUALIFICATION

Surname	Lewis
Forenames	Rhys Gareth
Date of Birth	10 February 2003
Unique student number	305277006
HESA unique student identifier	2111142770068

DEGREES AWARDED

No degree awarded.

INFORMATION IDENTIFYING THE QUALIFICATION(S)

Name and status of awarding institution	University of Cambridge
College	Trinity College
Name of Qualification	BA Degree (Hons 3yrs)
Level of Qualification	Undergraduate (Full-Time)
Main field(s) of study for the qualification	Mathematical Tripos
Official Length of Programme	Three Years
Course Start Date	Michaelmas Term 2021 (01 October 2021)
Language of Instruction and Examination	English

ACADEMIC RECORD

(*) denotes no marks recorded for this unit

Approved for the degree of Bachelor of Arts on 20 June 2024

Overall result for the degree of Bachelor of Arts: Class II, division 1
For information on how the overall degree result is calculated please refer to website
https://www.camdata.admin.cam.ac.uk/degree-classes

EASTER TERM 2022
Mathematical Tripos, Part IA
Result : Class II, division 1
Overall Mark : 65/100

The examination included the following components:	Result
1 : Paper 1	*
2 : Paper 2	*
3 : Paper 3	*
4 : Paper 4	*

Grade Boundaries:	Result
Class I/Class II, division i	70
Class II, division i/Class II, division ii	60
Class II, division ii/Class III	50
Class III/Fail	40
The examinations for the Mathematical Tripos cover all subjects in combined papers and are not modular. It is not possible to give comparable marks for individual subjects. The transcript percentage is calculated by suitable scaling from the overall merit mark total: it represents the student's achievement across all subjects taken in the relevant year.	

EASTER TERM 2023
Mathematical Tripos, Part IB
Result : Class II, division 2
Overall Mark : 54/100

The examination included the following components:	Result
CP : Computational Project	*
1 : Paper 1	*
2 : Paper 2	*
3 : Paper 3	*
4 : Paper 4	*

Grade Boundaries:	Result
Class I/Class II, division i	70
Class II, division i/Class II, division ii	60
Class II, division ii/Class III	50
Class III	40
The examinations for the Mathematical Tripos cover all subjects in combined papers and are not modular. It is not possible to give comparable marks for individual subjects. The transcript percentage is calculated by suitable scaling from the overall merit mark total: it represents the student's achievement across all subjects taken in the relevant year.	

EASTER TERM 2024
Mathematical Tripos, Part II
Result : Class II, division 1
Overall Mark : 63/100

The examination included the following components:	Result
CP : Computational Project	*
1 : Paper 1	*
2 : Paper 2	*
3 : Paper 3	*
4 : Paper 4	*

Grade Boundaries:	Result
Class I/Class II, division i	70
Class II, division i/Class II, division ii	60
Class II, division ii/Class III	50
Class III	40
The examinations for the Mathematical Tripos cover all subjects in combined papers and are not modular. It is not possible to give comparable marks for individual subjects. The transcript percentage is calculated by suitable scaling from the overall merit mark total: it represents the student's achievement across all subjects taken in the relevant year.	

CERTIFICATION OF THE DOCUMENT

Signature

Date: 17-September-2024
Title of Office: Registrary

FURTHER INFORMATION

For further information please refer to the programme specification at
http://www.admin.cam.ac.uk/univ/camdata/archive.html
Where available, this will contain information on:

- Access Requirements
- Professional Status
- Programme Requirements
- Grading Schemes and Degree Classification
- Access to further study

INFORMATION ON THE NATIONAL HIGHER EDUCATION SYSTEM

Programme specifications as found on : http://www.admin.cam.ac.uk/univ/camdata/archive.html for all courses include an indication of the level of the course in the context of the *Framework for Higher Education Qualification in England, Wales and Northern Ireland* , published by the Quality Assurance Agency (QAA).Full descriptors of the levels of the *Framework* can be viewed on the QAA website : *http://www.qaa.ac.uk/quality-code*

I am yet to receive any official transcript from the University of Sheffield as I am yet to undertake any exams, however I have attached my offer letter in the Degree Certificate section to confirm I am indeed an MSc student there.

University of Sheffield | School of Mathematical and Physical Sciences

Dr Frazer Jarvis
Reader in Pure Mathematics
School of Mathematical and Physical Sciences
University of Sheffield
Sheffield S3 7RH

January 6th 2025

Telephone: +44 (0) 1142223845
Email: a.f.jarvis@sheffield.ac.uk

Dear Sir/Madam,

Rhys Lewis has asked me to write a reference for his PhD applications, which I am very happy to do.

However, I should add that I am not yet particularly well acquainted with Rhys, as I will now explain. Rhys graduated from Cambridge in 2024, and has started an MSc in Sheffield (essentially the same as the fourth year of our MMath degree, but with an extra dissertation). As part of his MSc, and in preparation for his dissertation, he is doing some "directed reading", a 15-credit chunk of work in an area of his choice; he has opted to learn some more algebraic number theory, under my supervision, and we have so far met on three occasions, for just over an hour each time. We have decided to learn some theory of elliptic curves, initially from Silverman's "The Arithmetic of Elliptic Curves", but, by itself, this is quite a difficult introduction to the subject, and we have also been making use of the book "Rational Points on Elliptic Curves" by Silverman and Tate. We had a session discussing p-adic numbers as well, as preparation for discussing reduction of (rational) elliptic curves. His background seems competent, but someone applying from within Part III at Cambridge would surely be better equipped, as our fourth year has been weakened over the last few years. He is taking substantial (30-credit, year-long) modules on Algebra (commutative algebra and algebraic geometry) and Algebraic Topology, as well as shorter (15-credit, 1-semester) courses on Functional Analysis (last semester) and Further Topics in Number Theory (next semester). The MSc is completed with the Directed Reading module and a Research Skills module, both worth 15 credits, and then a dissertation, supervised by my colleague Neil Dummigan, on "Kummer's work on Fermat's Last Theorem".

As yet, I haven't asked him for any written work as part of the Directed Reading module: there will be some writing of theory, and some solutions to questions set from Silverman and Silverman-Tate, and I should see the first of this work at our next meeting, later this month.

In summary, I have met him for about three hours in total, and I hadn't set any work that I can refer to in this reference. So my acquaintance with him is fairly slight! Nevertheless, he has shown understanding and interest in the area at our meetings.

He has sent me some written work from his time as an undergraduate in Cambridge, however. This work consists of LaTeX write-ups of computer projects on: primality testing (33pp.), factorisation using continued fractions (32pp.), the Galois groups of polynomials (54pp.), and permutation groups (25pp.). These typically contain a few pages of text, followed by computer program listings (in MATLAB) and results. It is hard for me to judge Rhys on the basis of these reports: his LaTeX is pretty good; he has clearly learned a good amount of mathematics for a 3-year course; his MATLAB looks decent, although specialist programs like PARI and SAGE would have much of what he has programmed built in, and working faster. His writing seems good, although he sometimes doesn't make all of his notation explicit before using it, but maybe this was defined in a project brief that I haven't seen. Perhaps the most useful write-up is the one on Galois groups of polynomials, which confirms a good understanding of field theory, Galois theory and permutations.

I can certainly understand why he wished to use a referee from Sheffield, since that is where he is currently studying, and I can confirm his current situation. However, although I'm quite impressed by him so far, in view of my lack of acquaintance with him, you should probably place more weight on his references from Cambridge for the application.

Yours sincerely,
Frazer Jarvis

David Tong
Professor of Theoretical Physics
Fellow of Trinity College

UNIVERSITY OF CAMBRIDGE

Department of Applied Mathematics
and Theoretical Physics

3rd January 2025

Dear Colleague,

This is a reference letter for Rhys Lewis who is applying for the mathematics PhD programme in your department.

Rhys recently finished his three year mathematics degree at the University of Cambridge. I got to know him particularly well in his first two years as I was his "director of studies", a sort of academic mentor position. I also supervised him throughout the first and second year. This means that I sat down with him and another student for an hour at a time, working through various problems. It's an intense process and I got to know Rhys's strengths and weaknesses well.

In Rhys's case these strengths and weaknesses are pretty clear cut. He loves pure maths and he's very good at it. But he really doesn't like applied maths and he especially dislikes theoretical physics (my own speciality!). It's not uncommon for students to have a preference for one area of maths over another, but I've never a case quite as stark as with Rhys. Which wasn't to say that supervisions were unpleasant: he's a lovely guy and he wanted to learn. It's just theoretical physics really wasn't his cup of tea.

In contrast, his supervisors for the pure courses had only good things to say about him. He was quick and genuinely able.

This split maths-personality showed in his exams. We make our undergrads do a broad spectrum of courses in both the first and second years. He got a first in his first year, but only a 2.2 in his second year. He was disappointed and I was surprised. But he turned things around in his final year when he could focus on the courses that he enjoyed most, coming out with a decent 2.1.

Rhys is now doing a masters at the University of Sheffield. I will leave others to describe how he is faring there. But my impression is that he's engaged and smart and hard-working and would make an excellent PhD student.

Sincerely Yours,
David Tong

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