

Personal details

Personal details

First / given name Miriam
Second given name
Third given name
Surname/family name Ní Chobhthaigh
Date of birth 18 September 1998
Preferred first/given name Miriam
Previous surname
Country of birth United Kingdom
Legal nationality Irish
Dual nationality
Country of residence Germany
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 BT93 5EZ
Address Line 1 24 Mac Nean Park
Address Line 2
City Belcoo
County Fermanagh
Telephone 02866386327

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? No
Country United Kingdom
Postcode BT93 5EZ
Address Line 1 24 Mac Nean Park
Address Line 2
City Belcoo
County Fermanagh
Telephone 02866386327

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
Universitat Regensburg	Master's Degree (PG) EU	Academic Qualification	Mathematics	Predicted	2.3	01/Oct/2022	01/Jul/2024
Universiteit Leiden	Master's Degree (PG) EU	Academic Qualification	Mathematics	Predicted	2.3	01/Sep/2020	01/Jul/2024
Queens University of Belfast, UK	First degree BA/BSC etc	Academic Qualification	Mathematics	Actual	79	01/Sep/2017	01/Jun/2020

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
Job title and main duties
Full time/Part time
Date of Appointment
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? Yes
Please type your personal statement in the box

Research proposal

Research proposal

Proposed supervisor 1 Céline Maistret

Proposed supervisor 1 Alice Pozzi

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 Massimo

Surname Bertolini

Position Professor of Mathematics

Institution/Company Duisburg-Essen University

Email address massimo.bertolini@uni-due.de

Country Germany

Referee 2

Do you have a second reference to upload? No

Type of reference Academic

Referee title Professor

Forename Martin

Surname Mathieu

Position Professor of Pure Mathematics

Institution/Company Queen's University Belfast

Email address M.M@qub.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

Documents

Document type	File name
Degree certificate	degreecertificate.pdf
Personal statement	Personal_statement-1.pdf
Transcript	QUB_TS_ADREC.pdf
Curriculum vitae	CV_Miriam_Ni_Chobhthaigh_2023_Long-9.pdf
Transcript	Transcript Masters ii.pdf
Research proposal	Research_Proposal-1.pdf
Transcript	Transcript Masters ii.pdf

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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.

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- 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.

Curriculum Vitae

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18th September 1998

Birthplace
Nationality

Enniskillen, Northern Ireland
Irish

Currently a masters student of the University of Regensburg and Leiden University, working on my thesis in Duisburg-Essen University under the supervision of Prof. Massimo Bertolini. My master degree will be obtained from the cross European ALGANT program.

Education

University of Duisburg-Essen	Essen, Germany
Visiting student, Mathematics	winter semester 2023
Master thesis title: <i>Finding large Selmer ranks of elliptic curves over dihedral extensions of number fields</i>	
University of Regensburg	Regensburg, Germany
Current MS., Mathematics student, ALGANT program	2022-2023
Leiden University	Leiden, Netherlands
Current MS., Mathematics student, ALGANT program	2020-2022
Queen's University Belfast	Belfast, United Kingdom
BSc., Mathematics first class honours degree (79/100)	2017-2020
Portora Royal Grammar School	Enniskillen, Northern Ireland
A-levels A*A*A in Mathematics, Further Mathematics and Physics respectively	2017
top 5% in UK	

Scholarships/Awards

from the ALGANT Consortium	2020-2022
Merit-based Scholarship for Excellence of Studies with a tuition fee waiver of 2000€ and 500€ pm	
from the School of Mathematics and Physics, Queen's University	2020
Award for excellence or distinguished performance in Pure Mathematics judged by the Mathematics Board of Examiners, awarded with a certificate and £150.	

Languages

English (native) Irish (partial fluency) German (basic)

Experience

One-on-one mathematics tutor on MyTutor	2019-current
I play the piano and violin at a grade 8 level. I have been a member in the various orchestras as a violinist;	
Regensburg Symphony Orchestra	2022-2023
Haags Studenten Symfonie Orkest Valerius	2021-2022
Queen's University Symphony Orchestra	2017-2020

Research interests

Number theory, arithmetic geometry, elliptic curves, Selmer groups, Galois cohomology, local class field theory

Graduate Courses Completed

Local Class field Theory and Formal Modules	Regensburg
Riemann Surfaces	Regensburg
Algebraic Number Theory	Regensburg
Algebraic Topology	Regensburg
Algebraic Geometry 1	Leiden
Elliptic Curves	Leiden
Commutative Algebra	Leiden
Algebraic Curves	Leiden

Graduate Seminars

Research seminar on Euler systems	Essen
Seminar on Number Theory: Elliptic Curves	Essen
RTG seminar	Essen
Research seminar Algebraic Geometry	Essen
Oberseminar Winter Term 2023/24	Essen

Graded Graduate Seminars

Zeta and L-functions	Regensburg
PhD seminar on Modular Forms and Representations	Regensburg
PhD seminar on Galois Cohomology and Poitou-Tate Duality	Regensburg
PhD seminar on Sheaves, Manifolds and Cohomology	Regensburg

Conferences Attended

ITCAG Workshop Bielefeld, Germany	November 27-28, 2023
Spring school in Arithmetic Statistics CIRM, France	May 8 – 12, 2023
DIAMANT Symposium Leiden, Netherlands	November 24– 25, 2022
Virtual ICM Online	July 6–14, 2022
Virtual HLF Online	September 21- 25, 2020
Irish Mathematical Society General Annual Conference NUI Galway	September 5-6, 2019

Grants/Financial support

From the ITCAG Workshop organisers, Bielefeld	2023
From the Spring school in Arithmetic Statistics organisers, CIRM	2023
From the ICM Sectional Workshop organisers, Zurich	2022
From the Irish Mathematical Society	2022
<i>Kovalevskaya Grant for Young Researchers to attend ICM</i>	

THE
QUEEN'S
UNIVERSITY
OF BELFAST



It is hereby certified that
Miriam Ní Chobhthaigh
was admitted to the Degree of
Bachelor of Science

with
First Class Honours
in
Mathematics

on the eighth day of July 2020

Professor Ian Greer
President and Vice-Chancellor

Personal statement

Miriam Ní Chobhthaigh

I am a masters student of the European ALGANT program, studying at Leiden University and the University of Regensburg. Presently, I am also a visiting student at the University of Duisburg-Essen, working on my master's thesis under the supervision of Professor Massimo Bertolini. My current area of research is arithmetic geometry, with my thesis focused on finding lower bounds for Selmer ranks of elliptic curves over dihedral extensions of number fields.

I first came across Selmer groups while studying general Kummer theory in the course 'Local class field theory and formal modules' in Regensburg. Searching online, I found notes with a subsection on Kummer theory for elliptic curves, and the notions of Selmer groups and the Tate-Shafarevich group. I was simultaneously attending the seminar, 'Galois cohomology and Poitou-Tate duality', and became curious in understanding a cohomological approach to questions in arithmetic geometry. The course 'Elliptic curves' in Leiden, piqued my interest for the subject, so upon discovering the connection between these areas, I became inspired with a potent interest and enthusiasm to explore the topic further.

Deciding that I would like to pursue research in the area, I reached out to Professor Bertolini with regard to my master thesis topic, and am now living in Essen working on Mazur and Rubin's paper, 'Finding large Selmer rank via an arithmetic theory of local constants'. I am thoroughly enjoying researching Selmer groups and local cohomological invariants and am very eager to pursue a PhD in a similar topic.

To this end, I reached out to Dr. Céline Maistret and Dr. Alice Pozzi, in Bristol University and we discussed the potential for a project related to my own interests.

Recently, I attended the ITCAG workshop on "Iwasawa theory and cohomology of arithmetic groups" in Germany. It was a two day research-heavy event, where young researchers were able to present their current work and informally discuss ideas together. I was given the opportunity to network, engage in stimulating discussions with experts of this field and be exposed to new ideas related to Selmer groups.

The courses I have taken for my master degree requirements from both universities have varied in style, demand, content and contact hours, pushing me to be well-armed for encountering new problems with a variety of solving-problem techniques, thinking in different degrees of abstraction and an unwavering ability to push through the unknown.

This multifaceted and multilayered approach to the study of mathematics cultivated in me by my years of experience within a number of departments and institutions throughout Europe leaves me ideally suited and equipped not only to manage the demanding and dynamic task of PhD study, but to thrive on the non-linear and creatively demanding aspect of it that many candidates are often troubled by.

In closing, I hope to have elucidated to you not only my personal motivations and interest in undertaking a PhD, but has also substantiated my suitability and potential as a candidate. I feel strongly that not only with my varied academic background, but also my exposure to the forefront of research and proactive approach to personal development have thoroughly prepared me for the rigours of PhD work. I believe a project in Bristol University holds great promise for both conceptual progress and tangible results.

Research Proposal

Miriam Ní Chobhthaigh

My proposed research is in arithmetic geometry, with a focus on Selmer groups. In particular, my interests lie in two settings, Selmer groups of elliptic curves over number fields and Selmer groups of Jacobians of hyperelliptic curves.

Contents

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1 Research background

In 1962 Cassels published an article [1] containing the definition of a Selmer group by forming a connection between the abelian structure of points of a curve of genus 1 over a field and the Mordell-Weil theorem. The relation between the Selmer group, $\text{Sel}(A/K)$ of a curve A over a field K and the Tate-Šafarevič group $\text{III}(A/K)$ is also outlined in the paper.

It is known that the Selmer group is finite and implies the weak Mordell-Weil theorem, which states the subgroup $A(K)/mA(K)$ is finite for some $m \in \mathbb{N}$, yet computing this group effectively has been a major question of the 20th century mathematics.

The procedure for computing if the Mordell-Weil subgroup is trivial depends on a prime p with $\text{III}_p(A/K)$ the p -part of $\text{III}(A/K)$ a finite group. Under the assumption that the Tate-Šafarevič conjecture holds, then for every prime p such that the p -component of $\text{III}(A/K)$ is finite. For an abelian variety A over a number field K , the famous Birch Swinnerton-Dyer conjecture predicts

$$\text{rk}(A/K) = \text{ord}_{s=1} L(A/K, s)$$

where $\text{rk}(A/K)$ is the algebraic rank of A/K and $\text{ord}_{s=1} L(A/K, s)$ is the order of vanishing of the L -function of A/K evaluated at $s = 1$.

Another prediction is that the completed L -function of A/K satisfies a functional equation centered around $s = 1$, whose sign ± 1 is the global root number of A/K

$$L(A/K, s) = \pm L(A/K, 2 - s).$$

The global root number predicts the parity of $\text{ord}_{s=1} L(A/K, s)$. Thus combining these results, one has the Parity Conjecture

Conjecture 1.1. (Parity Conjecture) For every A be an abelian variety over a number field K ,

$$(-1)^{\text{rk}(A/K)} = \pm w_{A/K}$$

where $w_{A/K}$ is the global root number of A/K .

In other words, the $w_{A/K}$ is $+1$ or -1 depending on whether $\text{rk}(A/K)$ is even or odd, respectively.

In 1989 Greenberg generalised the notion of Selmer groups to that of p -adic Galois representations [2]. It was then discovered that the global root number is defined as a product of local root numbers which can be computed using local Galois representations of A/K . This development offers a way to compute the parity of $\text{rk}(A/K)$.

Currently, I am a visiting student at Duisburg-Essen University in the ALGANT program (Leiden-Regensburg), working on my master thesis under supervision of Professor Massimo Bertolini. My research is based on Mazur and Rubin's paper [3].

Setting the scene, let E be an elliptic curve over a number field k , K/k a quadratic extension of number fields and K'/K an abelian extension where K' is a dihedral extension of k , i.e., a Galois extension with the Galois group being a dihedral group. The Mordell-Weil group $E(K')$ of E over K' is the group of K' -rational

points on E .

The Selmer group $\text{Sel}(E/K')$ of E over K' is defined as a subgroup of $H^1(K', E)$ which satisfies local conditions. We use the conventional notation $H^1(K', E) := H^1(\text{Gal}(K'/K), E)$. The pro- p -Selmer group is the inverse limit of

$$\mathcal{S}_p(E/K') := \varprojlim_p \text{Sel}_{p^n}(E/K')$$

the p -Selmer groups $\text{Sel}_p(E/K')$ defined by sending $\zeta \in H^1(K', E[p])$ to 0 in $H^1(K'_v, E)[p]$ for finitely many primes v over K' where E has bad reduction, $v \mid p$ and for archimedean places.

For a character map $\chi : \text{Gal}(K'/K) \rightarrow \overline{\mathbb{Q}}^\times$ and $E(K')$ a finitely generated abelian group, the χ -component of the $\text{Gal}(K'/K)$ -representation space $E(K') \otimes \overline{\mathbb{Q}}$ is defined as

$$E(K')^\chi := \{P \in E(K') \otimes_{\mathbb{Z}} \mathbb{Z}_p \mid \gamma P = \chi(\gamma)P \quad \forall \gamma \in \text{Gal}(K'/K)\}.$$

The parity conjecture has been proven in certain cases to be true under the assumption that the Tate-Šafarevič conjecture holds, using the p -parity conjecture. The p^∞ -Tate-Šafarevič group of A/K can be written as

$$\text{III}_{p^\infty}(A/K) \simeq (\mathbb{Q}_p/\mathbb{Z}_p)^{\delta_p} \times F$$

where F is a finite group and δ_p is a local constant which is non-negative.

The p^∞ -Selmer rank is denoted as $\text{rk}S_{p^\infty}(A/K)$, and using the definition of the p^∞ -Tate-Šafarevič group of A/K is,

$$\text{rk}S_{p^\infty}(A/K) = \text{rk}S(A/K) + \delta_p.$$

If we assume Tate-Šafarevič conjecture to be true for A/K , then one has the local invariants $\delta_p = 0$ for all p and thus

$$\text{rk}S_{p^\infty}(A/K) = \text{rk}S(A/K)$$

for all p , this produces the p -parity conjecture [6].

Conjecture 1.2. (p -parity conjecture) For every abelian variety A over a number field K , and for all primes p ,

$$(-1)^{\text{rk}S_{p^\infty}(A/K)} = w_{A/K}.$$

Mazur and Rubin's paper [3] gives an algebraic approach to proving unconditional parity statements for the corresponding pro- p -Selmer groups $\mathcal{S}_p(E/K')^\chi$ of $E(K')^\chi$. One of the main results states that for K'/k under certain conditions, if $\text{corank}_{\mathbb{Z}_p} \mathcal{S}_p(E/K)$ is odd, then there is a lower bound

$$\text{corank}_{\mathbb{Z}_p} \mathcal{S}_p(E/K') \geq [K' : K]$$

where $[K' : K]$ is the degree of the extension K'/k .

It is my aim to understand and use this paper to compute Heegner points and find K' -rational points of specific elliptic curves E using a computer program.

For A and elliptic curve, the p -parity conjecture is still an open question in general. Although there are cases where it has been proven. It would be very interesting to look at a particular case in a PhD project, for example there is also the generalised p -parity conjecture. For dual abelian varieties that are polarised with local conditions, Mazur and Rubin published the paper [3], which my master thesis is based on. There are also known results for Jacobians of hyperelliptic curves that have been base-changed from a subfield of index 2 [4] and for principally polarised abelian surfaces under local conditions. [5]

2 Research questions

There has been recent progress on the $p = 2$ -parity conjecture for elliptic curves with isomorphic 2-torsion in [7]. For $f(x)$ a separable monic cubic polynomial with $f(0) \neq 0$, then for the defined elliptic curves

$$E : y^2 = f(x) \quad E' : y^2 = xf(x)$$

the conjecture has been seen to hold true for E/K if and only if it holds true for the Jacobian of E'/K , $\text{Jac}(E'/K)$. Would this still be possible for different elliptic curves not isogenous to E or E' ? If one varies p instead of only taking the case of $p = 2$, would you also get this result to still hold? Is there a generalised version of this result for abelian surfaces, given my lack of time and research on these topics, I am eager

to pursue a PhD project aimed at furthering my understanding and understanding if such questions are relevant.

For the 2-parity conjecture in the case of hyperelliptic curves, Morgan's paper [4] focuses on those with quadratic extensions. By relating the arithmetic of local constants from Mazur and Rubin's theory to such curves, can one extend this relation to developing methods of computing such local invariants? I would be interested in knowing if one could use arithmetic statistics to find examples, just as I hope to do in my master thesis using the Mazur and Rubin's paper [3].

3 Research methods and timeline

Finding effective methods to tackle such questions and cases requires some dedicated time reading papers and articles to gain a deeper insight in such areas. Attending classes or seminars will improve my understanding of new ideas whilst socialising with the members of the department and actively participating in the university.

I would like to spend more time reading up on Mazur and Rubin's arithmetic theory of local invariants and then look at local invariants for hyperelliptic curves over number fields, learn about the utility of Jacobians of curves and gain strength and knowledge in the setting for abelian surfaces.

Applying results found for specific cases, I would like to use computer programs to develop statistics that may help indicate if certain properties correlate and are able to provide intuition for further questions and hopefully find exciting new results in this area of mathematics.

References

- [1] Cassels (1962) *Arithmetic on Curves of Genus 1: III. The Tate-Šafarevič and Selmer Groups*, Proceedings of the London Mathematical Society s3-12 1 259-296
- [2] Ralph Greenberg (1989) *Iwasawa theory for p -adic representations*, Advanced Studies in Pure Math. 17, 97-137
- [3] Barry Mazur and Karl Rubin (2006) *Finding large Selmer rank via an arithmetic theory of local constants*, arXiv
- [4] Adam Morgan (2015) *2-Selmer parity for hyperelliptic curves in quadratic extensions*, arXiv:1504.01960,
- [5] T. Dokchitser, V. Dokchitser, C. Maistret, A. Morgan (2018) *Arithmetic of hyperelliptic curves over local fields*, arXiv:1808.02936
- [6] Jan Nekovář (2001) *On the parity of ranks of Selmer groups II*, Comptes Rendus de l'Acad. Sci. Paris, Serie I, 332 No. 2, 99 - 104
- [7] H. Green, C. Maistret, (2022) *2-parity conjecture for elliptic curves with isomorphic 2-torsion*, Proceedings of the Royal Society A arXiv 2110.06718

26/07/2020 22:01 PM

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Student Information

Name: Miriam Ni Chobhthaigh
DOB: 18/09/1998
Student Number: 40197265
HESA Number: 1711840839136



Official Qualification Awarded and Programme of Study

Qualified **Graduated**

Qualification Awarded: Bachelor of Science, with First Class Honours (79%) in Mathematics
Awarded By: The Queen's University of Belfast
Programme Delivered By: The Queen's University of Belfast
Organisational Unit: School of Mathematics and Physics
Course Status: Undergraduate
Language(s) of instruction: English
Language(s) of assessment: English
Professional/Statutory Body N/A
Accreditation:

Key to Exam Board Notes : (ABS) Absent, (ABSM) Absent Mitigation, (CO) Class Attend Only - No Result, (DEF) *****DO NOT USE***** (DTD) Discounted, (F) Fail, (FAL) Fail Alternative Assessment, (FAS) Fail Assigned Mark, (FSR) Failed Supplementary Regs, (FX) Fail Incomplete, (IF) Include Fail, (IFX) Include Fail Incomplete, (INC) Incomplete, (MNA) Mark Not Available, (P) Pass, (PAL) Pass Alternative Assessment, (PAS) Pass Assigned Mark, (PC1) Pass by Compensation, (PCP) Pass subject to passing Clinic, (PD) Pass with Distinction, (PH) Pass with Honours Restriction, (PM) Pass with Merit, (RF) *****DO NOT USE***** (RN) Resit as new, (RNX) Resit as New Incomplete, (U) Undefined (INTO use only), (X) Exempt

Key to Elements Failed : (c) Coursework, (ce) Coursework & Exam, (e) Exam

Key to Course Code : Subject, Catalog Number, (CAT Points)

Academic Year 2019/20

Plan Code	Description
MTH-BSC-S	BSC (S) Mathematics [Program Change 18-03-2020]
MTH-MSCI	MSCI (UM) Mathematics

Course Code	Title	Level	Mark	Result	Resit	Result
AMA3002 AUT (20)	Quantum Theory	3	74	PALe		
PMA3012 AUT (20)	Ring Theory	3	82	PALe		
PMA4003 AUT (20)	Topology	4	61	PALe		
PMA4004 SPR (20)	Integration Theory	4	84	PALe		
PMA3013 SPR (20)	Mathematical Investigations	3	84	PALc		
PMA3018 SPR (20)	Algebraic Equations	3	86	PALce		

Academic Year 2018/19

Plan Code	Description
MTH-MSCI	MSCI (UM) Mathematics

Course Code	Title	Level	Mark	Result	Resit	Result
AMA2005 SPR (20)	Fluid Mechanics	2	77	P		
PMA2002 AUT (20)	Analysis	2	89	P		
PMA2008 SPR (20)	Group Theory	2	89	P		
PMA3014 AUT (20)	Set Theory	3	71	P		
PMA2020 FYR (30)	Linear Algebra & Complex Variables	2	82	P		
AMA2008 AUT (10)	Introduction to Partial Differential Equations	2	73	P		

Academic Year 2017/18

Plan Code	Description
MTH-MSCI	MSCI (UM) Mathematics

Course Code	Title	Level	Mark	Result	Resit	Result
AMA1020 FYR (30)	Analysis and Calculus	1	80	P		
PMA1020 FYR (30)	Numbers, Vectors and Matrices	1	85	P		
SOR1020 FYR (30)	Introduction to Probability & Statistics	1	77	P		
AMA1021 SPR (10)	Mathematical Modelling	1	62	P		
PMA1021 AUT (10)	Mathematical Reasoning	1	87	P		
SOR1021 FYR (10)	Introduction to Statistical and Operational Research Methods	1	69	P		

Printed Date: 26/07/2020

*Note the Honours Classification has been calculated in accordance with the University Regulations and is not necessarily an average of the marks shown.
If a superscript appears after a mark it indicates the number of times the assessment was performed.*

*For further information please contact:
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Student Registry Services Web Site:
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Universität Regensburg

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Your ref

Our ref
(please include in any answer)
R I/5 - 2396646

Regensburg, October 27, 2023

Miriam Ni Chobhthaigh, born on September 18, 1998, in Fermanagh, has received the following results in the program Mathematics (Master of Science). The student is still eligible to take further examinations.

Description	Semester	Status	Grade	ECTS Credits *
Specialization				
Local class field theory with formal modules	SS 23	passed	4.0	
Exercise class Local class field theory with formal modules	SS 23	passed		9
Seminar Modular forms and representations (Number Theory)	SS 23	passed	1.7	4,5
Seminar Module		passed	1.0	9
Galois Cohomology and Poitou-Tate Duality	WS22/23	passed	1.0	4,5
Manifolds, sheaves and cohomology	WS22/23	passed	1.0	4,5
Global Analysis and Geometry		passed	2.8	18
Algebraic topology I	WS22/23	passed	3.0	9
Riemann surfaces	SS 23	passed	2.7	9
Exercise class Algebraic topology I	WS22/23	passed		
Exercise class Riemann surfaces	SS 23	passed		
Arithmetic Geometry		passed	2.3	18
Algebraic Geometry 1 (transfer credits: Leiden University, Leiden, Netherlands)	WS21/22	transfer credits (from other university)	2.0	9
Algebraic Geometry 1 (Übungsbetrieb) (transfer credits: Leiden University, Leiden, Netherlands)	WS21/22	transfer credits (from other university)		
Commutative Algebra (transfer credits: Leiden University, Leiden, Netherlands)	WS20/21	transfer credits (from other university)	2.7	9
Commutative Algebra (Übungsbetrieb) (transfer credits: Leiden University, Leiden, Netherlands)	WS20/21	transfer credits (from other university)		
Algebraic number theory	WS22/23	passed	3.3	9
Exercise class Algebraic number theory	WS22/23	passed		

Minor: Mathematics		passed	3.3	15
Algebraic Curves (transfer credits: Leiden University, Leiden, Netherlands)	WS21/22	transfer credits (from other university)	3.0	6
Algebraic Curves (Übungsbetrieb) (transfer credits: Leiden University, Leiden, Netherlands)	WS21/22	transfer credits (from other university)		
Elliptic Curves (transfer credits: Leiden University, Leiden, Netherlands)	SS 22	transfer credits (from other university)	3.7	9
Elliptic Curves (Übungsbetrieb) (transfer credits: Leiden University, Leiden, Netherlands)	SS 22	transfer credits (from other university)		

Credits for all successfully completed courses: 73,5

Credits for all successfully completed modules/units: 60

Grading Scale:

1.0 - 1.5 = very good; 1.6 - 2.5 = good; 2.6 - 3.5 = satisfactory; 3.6 - 4.0 = sufficient; > 4.0 = not sufficient

*** Legal note:**

ECTS credits are allocated only with the successful completion of a module. This overview contains not only modules that have already been completed but also individual results for courses in modules that have not yet been completed. Credits listed for such individual course are provisional and provided for your information only.

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Our ref

(please include in any answer)

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**QUEEN'S
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5 January 2024

Letter of recommendation for Miriam Ní Chobhthaigh

To whom it may concern

This is a letter of support for Ms Miriam Ní Chobhthaigh's application to the PhD programme at the University of Bristol.

I have known Ms Ní Chobhthaigh since September 2017, when she enrolled on the MSci pathway in the School of Mathematics and Physics which is our more prestigious and demanding 4-year programme. Over the first three years, I followed her development with interest since she was among our brightest students. In the first year, I taught her the modules "Mathematical Reasoning" as well as "Mathematical Modelling" in both of which she excelled. In the second-year course "Complex Analysis", which seemed to be one of her favourite topics, she achieved 82/100 which was the fourth highest mark (out of 140 students, the highest mark was 85/100).

During all of her undergraduate studies, Ms Ní Chobhthaigh stood out as one of those (few) with a true hunger for learning and understanding a subject at university level and an urge to go beyond the normal curriculum. At Level 2 she already took the Level 3 module "Set Theory", at Level 3, she again chose two Level 4 modules, "Topology" and "Integration Theory". In a project in which students were asked to explore alternative proofs of Tychonoff's theorem she resurrected Tychonoff's original proof from 1929 which requires some cardinal arithmetic.

I believe that it was my course on Galois Theory which sent her on her way to pursue research Mathematics as she really enjoyed the interplay between algebraic and geometric ideas. Shortly after that, she decided not to complete the full four years at Queen's University but rather finish with a BSc and continue her studies elsewhere with a Master's degree. She finished with a very good first class BSc honours degree in 2020.

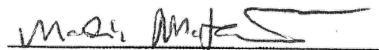
In September 2020, Ms Ní Chobhthaigh started the prestigious ALGANT Masters programme at the University of Leiden. For the next two years, she studied a wide variety of topics which, in particular, enhanced her background in Geometry and Number Theory. She adapted well to the new environment though it must have been hard during the time of the Covid pandemic.

The ALGANT consortium consists of nine universities in six different countries, and it is expected of the students to pursue their studies in more than one of these universities. In the academic year 2022/23, Ms Ní Chobhthaigh thus moved to Regensburg in Germany, once again entering a new educational environment. There she engaged in a large number of courses and seminars which eventually fuelled her interest in Arithmetic Geometry. As she couldn't find a suitable supervisor on this topic in Regensburg, she meanwhile moved on to Duisburg–Essen (another ALGANT university) where she is presently working on a Masters thesis with Prof. Massimo Bertolini.

I am still in regular contact with Ms Ní Chobhthaigh and we talk about her mathematical development and her career expectations. She appears to be keen to do her PhD in an English-speaking environment, having been on the European continent for almost four years by now. She found this time very stimulating, engaged in numerous mathematical discussions with very different people, also took part in several workshops, for instance in France, and had been awarded a Kovalevskaya Grant for Young Researchers to attend the ICM in St. Petersburg on selection by the Irish Mathematical Society. (Obviously the ICM was cancelled.) She seems to develop particularly well in a communal environment and, I therefore believe that the setting at the University of Bristol is ideal for her next steps into research Mathematics.

I can recommend Ms Ní Chobhthaigh wholeheartedly.

Yours sincerely,

A handwritten signature in dark ink, appearing to read 'Martin Mathieu', written over a horizontal line.

Professor Martin Mathieu, MRIA