

Postgraduate Application Form



Semerkina, Miss Maria

Course

MASt in Astrophysics (MASAS)

Department

Institute of Astronomy

Course start date

01 Oct 2024 (MT 2024)

Date submitted

18 Nov 2023

Mode of study

Full Time

PUF

No

Academic History

Sep 2020 - Aug 2024
(Not yet obtained)

Bachelor of Science in Theoretical Physics (School of Physics) - All or mostly full-time

Unknown

University College Dublin (Ireland)

Immigration

Nationality

Ireland (1st)

Country of birth

Ireland

Currently ordinarily resident

Ireland

Country of birth is ordinary residence since birth

Yes

Estimated fee status

Home Provisional - EU settlement scheme status to be verified

Visa

Not required

Language

Not required

Scholarships

Apply for funding

Yes

Apply for Cambridge Trust

Yes

Apply for Gates Cambridge

Yes

* Document not uploaded at the point of submission
** Other university

Curriculum Vitae

Uploaded

Career Goals

736/1000 chars

As a child I had a lot of questions and curiosities about how our world worked. Studying physics was the answer to all my questions, until I found questions that couldn't be answered yet. This is why I am pursuing research in theoretical physics as a career in the future. On the completion of a Masters course and a PhD, I would like to find a faculty position in a university where I can pursue research and lecturing.

Along with this primary career goal, I also plan to pursue physics outreach activities in the future where I can empower young women to pursue an education in physics. As a woman in physics it has been my dream to contribute to the effort to reduce the gender imbalance in fields such as physics and mathematics.

Additional Information to Support Application

459/1000 chars

Growing up in a small town in Ireland it was hard to imagine I would be able to afford an opportunity in studying in the capital of Ireland. Once I moved to Dublin to study theoretical physics, I realised quickly that I would need to work part time along with my coursework. I have been balancing a part time job, my coursework and extra curricular activities and persevering to achieve an academic award and an award for my extra curricular activities in UCD.

Course Specific Questions

Core - statement of interest	My undergraduate study in theoretical physics at an undergraduate level has been one of the most rewarding experiences of my life. It has allowed me to foster an insatiable curiosity and creative side which I use to think about problems in physics. During my time in University College Dublin, I have been able to learn about topics such as quantum mechanics, fluid dynamics, particle physics, and theoretical astrophysics. Theoretical astrophysics is a large part of the research project I am currently working on during my final year. The project work involves modelling the ejection of stellar envelopes in failed supernovae. This project encapsulates a section of theoretical astrophysics that I hope to pursue in the future through research. The Cambridge MASt in Astrophysics will allow me to take the next step in fostering my numerical, and problem solving abilities to study theoretical astrophysics in more depth. Courses such as "Astrophysical Fluid Dynamics with Dr R. Rafikov", "Relativistic Astrophysics and Cosmology with Dr S. Tacchella" and "Structure and Evolution of Stars with Prof. C.A. Tout" are just some of the major course choices that would be an integral part of my interest in theoretical astrophysics.
Core - reasons for applying	My reason for applying to the MASt in Astrophysics in the University of Cambridge is due to the amazing opportunities the University provides and due to its research groups. The Astrophysical Dynamics group in Cambridge works on topics such as astrophysical fluid dynamics and the dynamics of astrophysical discs, planetary formation and evolution. This is a field of theoretical astrophysics that is extremely interesting to me and because this is the type of research I would like to pursue, the University of Cambridge would be the ideal University for my future. Additionally one of the fundamental reasons I love learning is that it is a challenge. It is challenging to change your way of thinking and way of processing information. The University of Cambridge is known for its challenging courses and this is extremely appealing.
Astronomy - Extra Materials WP	Uploaded

Application Information

Academic Awards			
UCD Advantage Award	Award for participating in Co-Curricular activities in UCD.	30 Apr 2023	
BSc (Theoretical Physics) Stage 3 Scholarship	Competitive award is based on exceptional academic achievement.	30 Nov 2022	£430.00

Employment History			
Aug 2022 -	Temporary Executive Assistant	University College Dublin (<i>Dublin, Ireland</i>)	
Jun 2023 - Aug 2023	Theoretical Physics Research Internship	Dublin Institute of Advanced Studies (<i>Dublin, Ireland</i>)	
Jun 2022 - Sep 2022	STEM Education Outreach Internship	School of Physics (<i>Dublin, Ireland</i>)	
May 2022 - May 2023	Chairperson of the UCD Physics Society	University College Dublin (UCD) Physics Society (<i>Dublin, Ireland</i>)	

Other Applications Made

Theoretical Physics	Department of Physics	University of Oxford (<i>United Kingdom</i>)
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Personal Information

Identifying Information

Full name

Semerkina, Miss Maria

Date of birth

11 Apr 2003

Previous name

Legal gender

Female

Contact

Email

mariasemerkina@gmail.com

Phone

+353851223432 (1st)

Skype address

Home address

43 Cluain Aoibheann, Shannon, Co. Clare, Shannon, Clare, V14 PW90, Ireland

Contact address

64 Milltown Avenue, Mount Saint Annes, Dublin, Dublin, D06NX46, Ireland

Valid until

06 Aug 2024

Valid until

Dependants

Partner

WILL NOT bring partner

Child

WILL NOT bring children

Disability

Disability

No

Further information

Adjustment for Interview

Adjustment required

No

Details

College Preferences

College

No College preference

Current Membership

College

Not College member

Visa Requirement

Not required

Study Visas

Visa not entered

Funding Application

Cambridge Trust

Here is a list of CT awards that you would like to be considered

Cambridge Masters Studentship

In my third year of studies (2022/23) I received an award "BSc (Theoretical Physics) Stage 3 Scholarship" based on exceptional academic achievement, which only one other classmate achieved in the cohort of theoretical physics.

Cambridge Trust Scholarship (postgraduate)

In my third year of studies (2022/23) I received an award "BSc (Theoretical Physics) Stage 3 Scholarship" based on exceptional academic achievement, which only one other classmate achieved in the cohort of theoretical physics.

Gates Cambridge Scholarships (Overseas)

Apply for Gates Cambridge

Yes

US citizen

No

Research proposal

Personal Statement

2433/3000 chars

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Harding Scholarship

Mastercard Foundation

UKRI

Department Funding

College Funding

Based on the information you have provided, you are eligible to apply for these awards.

Girton Joyce Biddle Scholarship

You have applied for Girton Joyce Biddle Scholarship

Sheepshanks Studentship in Astronomy

You have applied for Sheepshanks Studentship in Astronomy

Wolfson College & Rowan Williams Cambridge Studentship

Separate application form
To be considered for this studentship, applicants should complete and return a separate application form to the Trust, which has been designed to assist the Trust in the identification of eligible candidates. The Rowan Williams Cambridge Studentship application form is available at <https://www.cambridgetrust.org/our-scholarships/highlighted-scholarships/rowan-williams-cambridge-studentship>.
Notes for applicants:
The Rowan Williams Cambridge Studentships are not available for courses offered by the Institute of Continuing Education, premium rate courses offered by the Judge Business School (including MBA, MFin, EMBA etc.) or for courses where the fees are charged at the higher Clinical rate.
Selection panels will assess applications taking regard of the severity of barriers faced to pursuing higher education at the University of Cambridge.

Your Funding

Funding Sources

	Details	Date of decision	Tenure years	Amount per year
Scholarship/grant	The George Moore Scholarship program in Ireland plans to shortlist candidates after interviews in March and April . The award ceremony will be held in June 2024. By April the candidates which have received the funding will be notified.	31 Mar 2024	1	
Total available				£0.00

Declaration

The information you have provided forms the legal basis of your application to the University of Cambridge. We reserve the right to refuse admission in the event of any misrepresentation by you. Submission of an application does not imply an offer of admission.

- The University of Cambridge, the Cambridge Colleges, the Gates Cambridge Trust and the Cambridge Commonwealth, European and International Trust (and their collaborators) will use your personal information for the purpose of processing your applications for admission and funding and deciding whether to offer you a place for the course you have applied for. For further information on the use of your personal information during the application process, please see [How we use your personal information \(for applicants\)](#).
- I certify that all the information given in this application is complete and accurate. I also understand that if I have given false or misleading information, the University of Cambridge will not admit me as a Postgraduate student and may take legal action against me.
- I certify that I am the original and sole author of all work submitted as part of this application, except where clearly indicated otherwise.
- I understand that if my application is unsuccessful, the papers relating to it will be destroyed and cannot be returned.

I confirm that I have read, understand and agree to the above declarations.



STATEMENT OF RESULTS

Academic Year: 2021/2022
Student Number: 20372036
Name: Maria Semerkina
Programme: Bachelor of Science
Major(s): Mathematical, Physical & Geological Sciences
Science
Specialisation in Physics with Astronomy & Space Science
Specialisation in Theoretical Physics

Results

Stage	Status	Stage GPA	Award	Award Description	Award GPA
Stage 2	COMPLETE	3.97	N/A	N/A	N/A

Module Details

Semester	Module	Grade	Credits	Stage	Grade Point
Spring Trimester					
ACM20060	Oscillations and Waves	A+	5.0	S2	4.2
ACM20150	Vector Integral & Differential Calculus	A+	5.0	S2	4.2
PHYC20040	Exploring the Solar System	A-	5.0	S2	3.8
PHYC20060	Methods for Physicists	A-	5.0	S2	3.8
PHYC20090	Electronics and Devices	A+	5.0	S2	4.2
STAT10060	Statistical Modelling	B+	5.0	S2	3.6
	<i>Semester GPA</i>	3.97			
Autumn Trimester					
ACM20030	Computational Science	A+	5.0	S2	4.2
ACM20050	Classical Mech. & Special Rel.	A	5.0	S2	4.0
MATH20060	Calculus of Several Variables	A-	5.0	S2	3.8
PHYC20020	Introductory Quantum Mechanics	A-	5.0	S2	3.8
PHYC20100	Thermo & Stat Physics	A	5.0	S2	4.0
STAT10050	Practical Statistics	A	5.0	S2	4.0
	<i>Semester GPA</i>	3.97			

UCD Scholarships and Awards

BSc (Theoretical Physics) Stage 3 Scholarship

Academic Session

Awarded for 2021/2022 Academic Session

Signed

Professor Barbara Dooley

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Tierney Building
University College Dublin
Belfield, Dublin 4, Ireland
T: +353 1 716 1555
www.ucd.ie/askus

Cláríann UCD**Deasc na Mac Léinn & Taifid na Mac Léinn**

An Coláiste Ollscoile, Baile Átha Cliath
Belfield, Baile Átha Cliath 4, Éire

Registrar and Deputy President

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Student/Staff ID: 20372036 & Document ID: F31A68A9464F5DBB



Appendix of Definitions and Guides

Module Grade Scales

(R) after a letter grade indicates a Grade Point is capped because of a repeat module or retaken assessment

		Grades
Standard	Excellent	A+, A, A-
	Very Good	B+, B, B-
	Good	C+, C, C-
	Acceptable	D+, D, D-
	Fail	E, F+, F, F-, G
	No Grade	NG
	No Merit	NM
Non Standard	Audit. No Credit Awarded	AU
	Distinction	DS
	Pass	P
	Pass by Compensation	PC
	Non Module Credits	XG
	No Work	NW
	Withdrawn (Future sittings may or may not have the grade point capped - see Regulations)	W
	Withdrawn (Future sittings are not capped - see Regulations)	WN
	Incomplete	I, IX, IP, IA, IM
	Absent	ABS

GPA Definition

GPA: Grade Point Average

The GPA is the weighted average of the grade-points awarded for the final successful attempt at those modules which have been completed and passed to satisfy the credit requirements of the programme, where the grade-point for each module is weighted by the credit value of the module. The GPA Range is 0 - 4.2

Stages and Credits

A student will progress through a programme in stages. Completion of each stage normally requires the successful accumulation of credits specified for each programme.

The stage GPA includes all passed modules to date for the stage.

Programme specifications define the credit requirements of each stage of a programme, and will specify the range of modules which must, or may, be taken in order to satisfy these credit requirements.

1 Credit is equivalent to 1 ECTS credit and is associated with 20-25 hours of learning.

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For further information, see UCD's Academic Regulations, available at:

https://hub.ucd.ie/usis/!W_HU_MENU.P_PUBLISH?p_tag=GD-DOCLAND&ID=123



STATEMENT OF RESULTS

Academic Year: 2020/2021
Student Number: 20372036
Name: Maria Semerkina
Programme: Bachelor of Science
Major(s): Mathematical, Physical & Geological Sciences
Specialisation in Physics

Results

Stage	Status	Stage GPA	Award	Award Description	Award GPA
Stage 1	COMPLETE	3.83	N/A	N/A	N/A

Module Details

Semester	Module	Grade	Credits	Stage	Grade Point
Spring Trimester					
ACM10060	Applications of Differential Equations	A+	5.0	S1	4.2
COMP10020	Introduction to Programming II	B+	5.0	S1	3.6
MATH10340	Linear Algebra in the Mathematical and Physical Sciences	A	5.0	S1	4.0
PHYC10080	Frontiers of Physics	A-	5.0	S1	3.8
PHYC10250	Thermal Physics and Materials	A-	5.0	S1	3.8
<i>Semester GPA 3.88</i>					
Autumn Trimester					
ACM10080	Applied Maths: Mechanics and Methods	A-	5.0	S1	3.8
COMP10010	Introduction to Programming I	A-	5.0	S1	3.8
MATH10350	Calculus in the Mathematical and Physical Sciences	B-	5.0	S1	3.2
PHYC10050	Astronomy & Space Science	B+	5.0	S1	3.6
PHYC10210	Quanta, Particles & Relativity	A+	5.0	S1	4.2
PHYC20080	Fields, Waves and Light	A	5.0	S1	4.0
SCI10010	Principles of Scientific Enquiry	A	5.0	S1	4.0
<i>Semester GPA 3.80</i>					

Signed

Professor Barbara Dooley
Registrar and Deputy President



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	Fail	E, F+, F, F-, G
	No Grade	NG
	No Merit	NM
Non Standard	Audit. No Credit Awarded	AU
	Distinction	DS
	Pass	P
	Pass by Compensation	PC
	Non Module Credits	XG
	No Work	NW
	Withdrawn (Future sittings may or may not have the grade point capped - see Regulations)	W
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Stages and Credits

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An Coláiste Ollscoile, Baile Átha Cliath
Belfield, Baile Átha Cliath 4, Éire

Certificate of Attendance for 2023/2024

64 Milltown Avenue,
Mount Saint Annes
Dublin
Dublin 6

Date 29 Oct 2023

This is to certify that Maria Semerkina (Student ID 20372036) born 11 Apr 2003
with, as of this date, a recorded permanent address of

43 Cluain Aoibheann, Shannon, , Co Clare
and a recorded term address of

64 Milltown Avenue,, Mount Saint Annes, Dublin, Dublin 6
is or has been registered and in attendance at this University for the following academic sessions

Registered full time for 2023/2024 to the Fourth Year of a Four year Bachelor of Science (BSc) programme and
majoring in Theoretical Physics

Term dates for: 2023/2024

Autumn Trimester from 11/09/2023 to 31/12/2023, Spring Trimester from 17/01/2024 to 31/05/2024, Summer Trimester
from 16/05/2024 to 31/08/2024

Registered full time for 2022/2023 to the Third Year of a Four year Bachelor of Science (BSc) programme and
majoring in Theoretical Physics

Registered full time for 2021/2022 to the Second Year of a Four year Bachelor of Science (BSc) programme and
majoring in Science

Registered full time for 2020/2021 to the First Year of a Four year Bachelor of Science (BSc) programme and
majoring in Mathematical, Physical & Geological Sciences

Teaching in UCD is through the medium of English

Use link below to review term and other key dates
<http://www.ucd.ie/students/keydates.htm>

Signed

Professor Barbara Dooley
Registrar/Deputy President

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STATEMENT OF RESULTS

Academic Year: 2022/2023
Student Number: 20372036
Name: Maria Semerkina
Programme: Bachelor of Science
Major(s): Mathematical, Physical & Geological Sciences
Science
Theoretical Physics

Results

Stage	Status	Stage GPA	Award	Award Description	Award GPA
Stage 3	COMPLETE	3.92	N/A	N/A	N/A

Module Details

Semester	Module	Grade	Credits	Stage	Grade Point
Spring Trimester					
ACM30200	Mathematical Fluid Dynamics I	A+	5.0	S3	4.2
ACM30210	Foundations of Quantum Mechanics	A	5.0	S3	4.0
MATH30040	Functions of One Complex Variable	B+	5.0	S3	3.6
PHYC30070	Electromagnetism	B+	5.0	S3	3.6
PHYC30090	Nuclear Physics	B	5.0	S3	3.4
PHYC30320	Advanced Laboratory for Theoretical Physics I	A	10.0	S3	4.0
	<i>Semester GPA</i>	<i>3.83</i>			
Autumn Trimester					
ACM30010	Analytical Mechanics	A+	5.0	S3	4.2
ACM30220	Partial Differential Equations	A	5.0	S3	4.0
PHYC30030	Quantum Mechanics	A	5.0	S3	4.0
PHYC30050	Condensed Matter Physics	A	5.0	S3	4.0
STAT40800	Data Prog with Python (online)	A	5.0	S3	4.0
	<i>Semester GPA</i>	<i>4.04</i>			

Signed

Professor Barbara Dooley
Registrar and Deputy President

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Academic reference for Miss Maria Semerkina

MASt in Astrophysics

Referee Details

Name	Dr Morgan Fraser	Job title	Lecturer/Assistant Professor
Email	morgan.fraser@ucd.ie	Department	School of Physics
Phone		Institution	University College Dublin
Relationship	Supervisor for final year project	City	Dublin
Known for	Two years	Country	Ireland

Reference

Academic ranking	The best performance in their year Approx 20 final year Theoretical Physics students
Student potential	Outstandingly original/creative/independent of thought
Course suitability	Exceptionally Suitable

Reference provided as uploaded file. Please see the next page.



UCD School of Physics

University College Dublin,
L.M.I. Main Building,
Beech Hill Road,
Dublin 4, Ireland.
D04 P7W1

Scoil na Fisice UCD

An Coláiste Ollscoile Baile Átha Cliath,
Príomhfhoirgneamh L.M.I.,
Bóthar Chnoc na Feá,
Baile Átha Cliath 4, Éire.
D04 P7W1

T + 353 1 716 2210

www.ucd.ie/physics

27th Nov 2023

Dear application committee,

I am writing in strong support of Maria Semerkina's application for a place on the MAST Astrophysics course at the Institute of Astronomy, Cambridge.

I am presently one of the supervisors for Maria's final year undergraduate project, which she is working on as part of her studies at University College Dublin. Maria has chosen a challenging project, namely a theoretical and computational investigation of shocks in failed supernovae. Her work on the project thus far has been truly excellent - in the first few weeks of the project (which she is working on alongside the rest of her lecture courses), she re-derived the Sedov solution for a shock travelling through a star, and written code to implement this both analytically and numerically. From this work, it is evident that Maria is an exceptionally talented student, with excellent mathematical, computational and physical skills. Indeed I would rate her as one of the strongest students in her cohort.

Further evidence for Maria's qualities can be seen in her track record of securing competitive internships. In 2023 alone, Maria was offered internships in both the School of Physics at UCD, and also at the Dublin Institute for Advanced Studies. She declined the internship at UCD in order to go to DIAS, and I believe that this demonstrates her strong interest in broadening her knowledge, and gaining exposure to new fields.

Besides her academic abilities, Maria has been consistently enthusiastic: interested in the project, hard working and motivated, and has demonstrated the creativity and discipline that is needed for post-graduate study. I believe that Maria would benefit tremendously from spending time at the IoA, in particular through broadening her knowledge and gaining exposure to a wide range of astrophysics research. This would be especially valuable in allowing her to focus down her research interests when she applies for PhD positions (as she intends to do in the future).

Finally, having spent time at the IoA as a post-doc myself, and contributed to the supervision of Part III projects, I can confidently state that Maria compares very favourably to the students there. I also note that I would be very happy to supervise Maria for either MSc or PhD in my own group, if she were so interested.

Regards,

Morgan Fraser,
Assistant Professor

Academic reference for Miss Maria Semerkina

MASt in Astrophysics

Referee Details

Name	Professor Peter Duffy	Job title	Professor
Email	peter.duffy@ucd.ie	Department	School of Physics
Phone		Institution	University College Dublin
Relationship	Lecturer/Supervisor	City	Dublin
Known for	September 2020 to present	Country	Ireland

Reference

Academic ranking	Among the top 5% in year (i.e., in the top 2 if the group size was 40) Cohort of 500 students per year in the undergraduate Science programme
Student potential	Outstandingly original/creative/independent of thought
Course suitability	Exceptionally Suitable

Reference provided as uploaded file. Please see the next page.



UCD School of Physics

UCD Science Centre – North,
University College Dublin,
Belfield, Dublin 4, Ireland.

T + 353 1 716 2232
F + 353 1 283 7275

Scoil na Fisice UCD

Ionad Eolaíochta UCD – Thuaidh,
An Coláiste Ollscoile Baile Átha Cliath,
Belfield, Baile Átha Cliath 4, Éire.

www.ucd.ie/physics

December 1st 2023

Reference for Ms Maria Semerkina

Dear Sir/Madam,

It is a pleasure to provide a reference for Maria Semerkina whom I have known since 2020 when she entered UCD as a first year undergraduate student in the Science programme. Since then, she has taken my modules in Special Relativity, Mathematical Methods and Theoretical Astrophysics. I co-supervise her final year research project, and I expect that she will graduate with a very strong first-class honours degree in Theoretical Physics in 2024.

From the outset of her time at UCD Maria has stood out academically as an exceptional student and doing everything since then to deliver on that early promise. Her interaction with academic staff displays a very sharp analytic mind with the deep and natural intuition for her subject necessary for a future career in research. Her current work on her final year research project is arguably the best that I have been privileged to supervise. In recent years I have served as undergraduate dean for all students in the College of Science. It is in the context of the five hundred students that we admit each year at UCD Science that I would comfortably place Maria in the top 5% for her academic achievements and future promise across that entire programme.

Maria was selected by her peers to lead the Physics Society as Auditor for the 2022/23 academic year. During that time, coming out of the height of the pandemic and its devastating effect on student life, Maria's leadership was instrumental in reviving a vibrant student life in the School of Physics. She is held in the highest regard by faculty and her fellow students for this singular achievement. Maria served as a Peer Mentor in second year to incoming first years and completed an important internship in the School during the summer of 2022 working on an initiative for primary school education. She successfully completed an academic internship in DIAS during the summer of 2023.

While in her second year, I learned through a colleague that Maria had a part-time job as a cleaner in the university and is now employed part-time on the student-desk for administration. Maria has never mentioned her part-time work to me, nor I to her. In her academic and student life, as I am sure is the case with many students, one would never know the extent of the hard work, determination and tenacity that has got her to where she is now.

Academically gifted, a proven leader among her peers, an incredible work ethic and modest to a fault; this exceptional young woman is among our best and brightest. I recommend her to you without hesitation and with complete enthusiasm.

Sincerely,

Professor Peter Duffy (UCD School of Physics)

We thank you for your time spent taking this survey.
Your response has been recorded.

Below is a summary of your responses

[Download PDF](#)

Institute of Astronomy

Important: please read before continuing

In this form, you will be asked a series of questions to help us gather information about your **previous** university study. The questions relate to your previous study, not the course that you are currently applying to. Depending on department procedures, relevant contextual data may have a small impact on some funding opportunities, so if your application is eligible for University funding, we encourage you to fill in this form.

You will be given the opportunity to tell us about any events or circumstances that have had an impact on your education, and limited your ability to perform in your studies. **You do not need to provide personal or detailed information about these circumstances**, we only ask you give details of the **impact** that they have had on your studies.

Please only provide the information that you are asked for in the form, and leave the text box blank if you cannot/ do not wish to respond. You should only provide information in the form if you feel comfortable to do so. Your application will not be disadvantaged if you choose not to respond to the questions, and your academic merit will be assessed based on the information you provide in other parts of the application. Once you have completed this form, you will need to download a PDF copy of your answers to upload to the [applicant portal](#). You will be given the option to download the PDF at end of the form, and you will also receive a copy by email. This

the PDF at end of the form, and you will also receive a copy by email. This will be sent to you as soon as the form is submitted.

Your first name:

Maria

Your surname:

Semerkina

Your email address:

mariasemerkina@gmail.com

Confirm your email address:

mariasemerkina@gmail.com

The following questions relate to your experience of studying at undergraduate/ bachelor's level.

Your undergraduate/ bachelor's institution:

University College Dublin

Did you undertake your degree full-time or part-time?

☒ **Full-time**

☐ Part-time (for any part of the degree)

When choosing your university, were there any factors other than grades that you felt limited your choice of institution?

e.g. not being able to live away from home, financial considerations, concerns about fitting in

I was one of the youngest people that graduated in my secondary school in Ireland and I am still one of the youngest people in my year in University. Due to my young age, a lot of opportunities abroad were limited so I needed to stay in Ireland. Attending a University in Dublin while I was from County Clare was extremely challenging due to financial reasons but I was still able to attend University in Dublin so I am privileged due to this. Only a handful of students attended university in Dublin the year I finished my Leaving Certificate.

Characters remaining: 456

Did you have any essential regular commitments that impacted the extent to which you could dedicate yourself to your studies? If so, please explain the impact of this on your studies.

e.g. caring responsibilities, being a single parent or guardian, employment during studies

Since I am from a small town in Clare called Shannon, I needed to work part time while studying in Dublin. I had a part time job as a cleaner my first in-person university year. I would wake up at five in the morning and clean the university before attending my classes during the week. It definitely impacted my studies as I had a considerably small amount of sleep each day however I still managed to achieve amazing grades. The year after, my third year of studies I also worked part time in a job I managed to find on campus in the Registry Office. I have been working at this job since and will continue to work until the end of my degree.

Characters remaining: 356

Did you experience any serious disruption to your studies that prevented you from studying for at least 3 months over the course of a year? If so, please explain the impact of this on your studies. It is not necessary to provide details about the nature of the disruption.

e.g. illness, bereavement

Characters remaining: 1000

The following questions relate to your previous experience of university study at all levels (undergraduate and/or postgraduate).

Some students get off to a slower start than others in their studies, and later show an upward progression in their marks.

Were there any circumstances that you feel initially inhibited your academic performance? If so, please provide details of the impact on your studies, and the change in circumstances that allowed you to improve your performance.

This impact on my initial studies came from adjusting to the balance of living away from home and coursework. While you live away from home there is an adjustment period and learning how to take care of your home, buying groceries, scheduling cleaning, a part time job and coursework was difficult. Many of my classmates who lived at home did not have the burdens of a part time job or living away from home and learning to balance these things took time.

Characters remaining: 545

Please use the space below to let us know about anything else that has had an impact on your studies or educational pathway. You might like to explain any incomplete qualifications or course changes.

I had mental health issues that needed to be addressed through a therapist in the second semester of my third year. Although this impacted my ability to study I still tried to work through this period. I had met with a therapist from January 2023 until the August of this 2023. Again I had studied this entire period however it had massively impacted the quality of my studies.

Characters remaining: 624

MARIA SEMERKINA

Milltown, Co. Dublin ♦ +353 85 1223432

mariasemerкина@gmail.com ♦ [Linkedin](#) ♦ [Github](#)

I am an ambitious final year theoretical physics student in University College Dublin with a strong interest in theoretical astrophysics. I have channeled my passion through various internships and scientific outreach activities. In the future I plan to pursue a PhD after a Masters degree and I aspire to become a researcher. I love physics because it can describe the world around us through numerical and mathematical concepts.

EDUCATION

BSc in Theoretical Physics, University College Dublin

September 2020 - May 2024

Expected to graduate with a First Class Honours Degree

Most Recent GPA: 3.92/4.20

Awards Achieved :

BSc (Theoretical Physics) Stage 3 Scholarship, UCD Advantage Award

Ongoing Relevant Coursework:

PHYC40570: Physics Demonstrating and Tutoring

ACM40010: Electrodynamics & Gauge Theory

ACM40070: Math Fluid Dynamics II

PHYC40080: High Energy Particle Physics

ACM40750: General Relativity & Black Holes

PHYC40360: Theoretical Astrophysics

PHYC40900 Theoretical Physics Project: Modelling the ejection of stellar envelopes in failed supernovae

Relevant Coursework Completed:

- | | |
|-------------------------------------------------------------|----------------------------|
| • PHYC30030 "Quantum Mechanics" | <i>Grade Achieved : A</i> |
| • ACM20060 "Oscillations and Waves" | <i>Grade Achieved : A+</i> |
| • ACM20030 "Computational Science" | <i>Grade Achieved : A+</i> |
| • ACM30220 "Partial Differential Equations" | <i>Grade Achieved : A</i> |
| • ACM30200 "Mathematical Fluid Dynamics I" | <i>Grade Achieved : A</i> |
| • PHYC30320 "Advanced Laboratory for Theoretical Physics I" | <i>Grade Achieved : A</i> |

INTERNSHIP EXPERIENCE

Physics Research Internship

June 2023 - August 2023

Dublin Institute of Advanced Studies

- Worked on a project with a supervisor involving the study of how fundamental parameters affect our universe and creating information regarding this subject accessible to people outside of physics
- Created code for simulating the potential changes in the Cosmic Microwave Background (CMB) if fundamental constants in the early universe were varied
- The simulations and media created will be used for public outreach on a website in development

- Developed research, simulation, public speaking, and team working skills within this role

Educational Physics Communication Internship

June 2022 - September 2022

University College Dublin

- Responsible for creating and developing a suitable sub-project communicating a Physics concept in line with the National Primary Level Science Curriculum
- Worked as part of a team with an editor and letterer developing the story and drawing it digitally through Procreate
- Developed independent working skills, diligence, and flexibility

EXTRA-CURRICULAR WORK

Chairperson of the UCD Physics Society

May 2022 - May 2023

University College Dublin

- Led the UCD Physics Society consisting of 250 societal members and 11 committee members, raised over 1000 euro for charity and partnered with national organisations such as Astronomy Ireland
- Communicated with relevant external and internal organisations for events and administrative work
- Developed leadership, public speaking, and teamworking skills within this role

Temporary Executive Assistant

Aug 2022 - Present

University College Dublin Registry

- Advise and help students at the UCD student desk with questions about their fees and coursework.
- Worked as part of a team and independently to solve students' problems
- Developed confidence, teamworking, and verbal communication skills

Peer Mentor

Aug 2021 - May 2022

University College Dublin

- Advised and counselled first years as part of the Peer Mentor Program in UCD.
- Guided my assigned group of students around the University campus and offered guidance and support throughout the year
- Developed interpersonal and communication skills within this leadership role

TECHNICAL SKILLS

Computer Languages

Python, Julia, R

Laboratory Skills

Numerical Simulations, Data Analysis, Numerical Integration

Software & Tools

LaTeX, Microsoft Excel, Microsoft Word, Mathematica, Github

Languages

English (Proficient), Russian (Proficient), French (Basic), Irish (Basic)

Gates Cambridge reference for Miss Maria Semerkina

MASt in Astrophysics

Referee Details

Name	Professor Emma Sokell	Job title	Professor, Head Of School of Physics
Email	emma.sokell@ucd.ie	Department	School of Physics
Phone		Institution	University College Dublin
Relationship	Lecturer/Faculty Member	City	Dublin
Known for	Since Autumn 2021	Country	Ireland

Reference

Gates ranking	Top 5% - Outstanding	Gates group	All students I have ever taught
Gates group size	800		

Reference provided as uploaded file. Please see the next page.



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An Coláiste Ollscoile Baile Átha
Cliath,
Belfield, Baile Átha Cliath 4, Éire.

www.ucd.ie/physics

December 5th 2023

Academic/Character Reference: Maria Semerkina

I have known Maria since she entered the second year of her four-year programme in Theoretical Physics at UCD in September 2021. Theoretical Physics students at UCD take a mixture of Physics, Applied & Computational Mathematics and Mathematics modules during the final two-years of their programme, which is widely understood to be the most mathematically challenging of the physics programmes available to undergraduates at UCD. Whilst I did not teach Maria in her second year, she was deeply involved in the organisation of the UCD Physics Student Society and I first got to know her in that capacity.

I taught Maria during the last academic year (2022/23), as I am module coordinate for one of two Physics core, third-year autumn term lecture modules of her programme (Quantum Mechanics) and I am also involved in the advanced laboratory components of all year 3 and 4 physics programmes at UCD. The structure of the advanced physics laboratory courses at UCD requires students to undertake a predetermined number of mostly, individual projects each year, at a pace largely dictated by the student. On completion of each experimental project the student produces a report on the work and discusses their work with a staff member. The UCD advanced labs have been proven to be excellent preparation for postgraduate programmes, the laboratory is designed to foster independent research skills including data analysis and critical thinking. Students are also responsible for managing their work to ensure that they get the required number of experiments completed in the time available and are assessed on their written and oral communication ability. They must present, as part of a team, to the whole cohort of third and fourth-year laboratory students. Maria coped very well with the transition to the environment and expectations of the advanced laboratories and achieved an A grade in her third-year laboratory module, with an associated Grade Point (GP) of 4.0/4.2.

Maria is an engaged and extremely motivated student who in my experience has a good grasp of the physics she has encountered. Since entering UCD, Maria has had a consistently excellent academic record. Last year, her grade point average (GPA) was 3.92/4.2 well above the threshold for a first-class degree (3.68/4.2). This built upon a second-year performance of 3.97/4.2 and a first year GPA of 3.83/4.2. Maria has comfortably achieved a good first-class honour every year and there is no reason why this performance will not continue. Consequently, I am confident that Maria will graduate with a very good first-class award when she completes her programme of study in May 2024. Maria was awarded a UCD scholarship for academic excellence for her top performance in modules related to the theoretical physics programme (Maths, Applied Maths and Physics) in her second year.

Maria is applying for a Masters in Astrophysics because she is deeply committed to pursuing further study in Theoretical Astrophysics, with the intention of continuing onto doctoral studies. It is currently her ambition to subsequently become a researcher. This commitment and her interest in the broad area is evidenced by her choice of optional modules this year, which

include Theoretical Astrophysics, General Relativity & Black Holes and General Relativity and Gravitational Waves. In addition to selecting these courses Maria secured an internship at the Dublin Institute of Advanced Studies (DIAS) last summer. In my experience these internships are only offered to top students, who are internationally competitive. During her internship she worked on simulations relating to the Cosmic Microwave Background and studied how fundamental parameters affect our universe.

Another aspect of the DIAS internship involved the development of outreach materials to make the science accessible to people outside of the field. Within the Physics context, Maria has further underlined her commitment to improving the lives of others by acting as a class-representative. This role requires that students represent their classmates in staff-student meetings, held once a trimester, and act as an additional communication channel between faculty and students. Maria takes representative responsibilities seriously and is careful to present the views of the class as accurately as possible. During her second year she volunteered to act as a peer mentor to advise first-years on aspects of academic and more general student life at UCD.

As mentioned above, Maria has been very actively involved in the UCD Physics Society and has demonstrated her capacity for leadership by taking on the role of Chairperson last year (May 2022-May 2023). The society has been very active over the last few years, organising a range of events, including trips to CERN, participation in physics-based competitions, information events for physics students, lectures and hosting a national Physics society event.

In summary, I have no hesitation in very strongly recommending Maria for postgraduate study. She is a student who has an excellent academic record and who also has developed a strong set of life skills. Her non-academic activities at UCD have allowed her to develop in areas including teamworking, flexibility, communicating and leadership skills. I have no doubt that Maria is an excellent candidate for the Masters in Astrophysics at Cambridge and will make the most of the opportunity presented by the Gates Scholarship to pursue her ambition to become a researcher in theoretical astrophysics.

Yours faithfully

A handwritten signature in dark ink, appearing to read 'E. Sokell', with a stylized flourish at the end.

Emma Sokell, Professor, Head of School, School of Physics, UCD