

Postgraduate Application Form



Prior, Ms Caterina Alice (Kitty)

Course

MASt in Astrophysics (MASAS)

Department

Institute of Astronomy

Course start date

01 Oct 2024 (MT 2024)

Date submitted

04 Dec 2023

Mode of study

Full Time

PUF

No

Academic History

Oct 2021 - Jul 2024  
(Not yet obtained)

BSc Astrophysics in Astrophysics  
(Physics) - All or mostly full-time

Unknown

Lancaster University (United Kingdom)

Immigration

Nationality

United Kingdom (1st)

Country of birth

Italy

Currently ordinarily resident

United Kingdom

Country of birth is ordinary residence since birth

No

Ordinarily resident in the last five years

UK, EU

Estimated fee status

Home

Visa

Not required

Language

Not required

Scholarships

Apply for funding

No



Curriculum Vitae

Uploaded

Career Goals

1000/1000 chars

I intend to pursue a career in Astrophysics or in a closely related area of applied science. I aim to focus my understanding into an area of expertise by engaging in practical research experiences. I am interested in specialising in fields which combine computer simulation with concepts from Astrophysics and Cosmology. This career path would allow me to apply skills gained through my experiences in programming. This has fostered my motivation to contribute to research concerning the formation of galactic clusters and individual galaxies. In the long term, I aspire to contribute to investigations which take advantage of modern technology to investigate fundamental Physics and Cosmology through simulation. This motivates my ambition to engage in projects at the forefront of scientific discovery by working in the space industry or on emerging fields of research in Astrophysics. I aspire to engage in an environment with a global research outlook where I can apply my knowledge of languages.

Additional Information to Support Application

117/1000 chars

I was granted the Lancaster University Scholarship for Academic Excellence in all of my years of study at University.

Course Specific Questions

**Core - statement of interest** My fascination in Astrophysics arose through volunteering experience at the Norman Lockyer Observatory. This prompted my ambition to make meaningful contributions through research, making the Astrophysics MASt at Cambridge appeal as the natural continuation of my studies. My eagerness to learn about Astrophysics in depth is catered for by the focused modules offered by this course, such as “The Life and Death of Galaxies” and “Astrophysical Black Holes”. These would allow me to build upon my grounding in Astrophysics whilst gaining detailed understanding. The combination of learning and research excites me as a valuable opportunity to continue developing my practical skills gained through foundational and Astrophysics laboratory modules. My independent study of Python, numerically simulating the solar system and my internship in developing a real-world simulation to generate synthetic data has revealed my passion for using computational models. I am now eager to apply my programming experience to research which develops computational models, in which the Cambridge Institute of Astrophysics engages. The opportunity to work within the diverse student community and interdisciplinary research environment at Cambridge complements my ambition for a career in an internationally collaborative setting. Having pursued my education in four different countries, I am excited by the global research outlook at Cambridge and the rich cultural exchange this offers.

**Core - reasons for applying** I am seeking to build upon my skills and experiences through practical research projects, which is why I am particularly drawn to the ongoing research in the Institute of Astronomy at Cambridge. The research interests of the Cosmology and Fundamental Physics group are particularly exciting to me as I am eager to apply my programming skills and knowledge of astrophysics to learn how theory and data may be combined to model complex physical phenomena. I would also find the prospect of engaging with galaxy formation research a valuable prospect. The focus on combining data from the Sloan Digital Sky Survey and Hubble space telescope with numerical simulation aligns closely with my interests. I have grounding in these topics through experiences in model simulation and processing of raw astrophysical data which I am eager to build upon. I would highly value the opportunity to



Astronomy - Extra Materials WP

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study from and work with leading experts and gain as much as possible from this unique Masters programme.

Application Information

Academic Awards		
Lancaster Bursary/Scholarship award	For high-achieving home undergraduate students	30 Nov 2023
Lancaster Bursary/Scholarship award	For high-achieving home undergraduate students	30 Nov 2022
Lancaster Bursary/Scholarship award	For high-achieving home undergraduate students	30 Nov 2021

Employment History	
Jul 2023 - Sep 2023    Intern	Principle One Ltd. (London, United Kingdom)

Other Applications Made

No other applications entered



Personal Information

Identifying Information

Full name

Prior, Ms Caterina Alice (Kitty)

Date of birth

27 Feb 2003

Previous name

Legal gender

Female

Contact

Email

caterinaprior@gmail.com

Phone

07897185874 (1st)

Skype address

Contact address

23 Westbourne Road, Lancaster,  
Lancashire, LA1 5DB, United  
Kingdom

Home address

Same as contact address

Valid until

Dependants

Partner

WILL NOT bring partner

Child

WILL NOT bring children

Disability

Disability

Prefer not to say

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

Not wish to apply for any funds

I have secured external funding that covers my course fees and living costs (please give details below)

Mastercard Foundation

Your Funding

Funding Sources

No funding sources entered

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.



## Record of Learning and Achievement

Name of Student	<b>Caterina Alice Prior</b>	Date of Birth	<b>27/02/2003</b>
HESA Reference	<b>2111231628333</b>		
Qualification	<b>(BSc Hons) not awarded - course not complete</b>		
Scheme of Study	<b>Physics, Astrophysics and Cosmology</b>	Period of Study	<b>01 Oct 2021 to date</b>
Degree Classification	<b>not completed</b>		

### Part I Course Modules Studied and the Grades Obtained

<u>Course</u>	<u>Credit</u>	<u>Year</u>	<u>Title</u>	<u>Grade</u>	<u>Aggregation Score</u> Out of 24
PHYS101	8.0	21/22	The Physical Universe	21.1	
PHYS102	8.0	21/22	Classical Mechanics	22.1	
PHYS103	8.0	21/22	Electric and Magnetic Fields	22.2	
PHYS104	8.0	21/22	Thermal Properties of Matter	17.6	
PHYS105	8.0	21/22	Quantum Physics	23.5	
PHYS111	8.0	21/22	Functions and differentiation	22.2	
PHYS112	8.0	21/22	Integration	22.4	
PHYS113	8.0	21/22	Series and Differential Equations	19.4	
PHYS114	8.0	21/22	Complex methods	21.3	
PHYS115	8.0	21/22	Vector Calculus	21.5	
PHYS131	8.0	21/22	Vectors and vector algebra/IT skills	21.1	
PHYS132	8.0	21/22	Basic Physics Skills / Communication Skills	20.8	
PHYS133	8.0	21/22	Oscillations and Waves/Practical laboratory I	21.1	
PHYS134	8.0	21/22	Electrical Circuits and instruments/Practical Laboratory II	20.7	
PHYS135	8.0	21/22	Optics and Optical instruments/Practical laboratory III	19.4	



## Record of Learning and Achievement

### Part II Course Modules Studied and the Grades Obtained

<u>Course</u>	<u>Credit</u>	<u>Year</u>	<u>Title</u>	<u>Grade</u>	<u>Aggregation Score</u>
					Out of 24
PHYS211	15.0	22/23	Maths I	I	21.0
PHYS213	10.0	22/23	Maths II	I	22.7
PHYS222	20.0	22/23	Electromagnetism, Waves and Optics	I	21.8
PHYS223	15.0	22/23	Quantum Mechanics	I	22.1
PHYS232	10.0	22/23	Relativity, Nuclei and Particles	I	20.3
PHYS233	10.0	22/23	Thermal Properties of Matter	I	22.7
PHYS263	10.0	22/23	Astronomy	I	22.6
PHYS265	10.0	22/23	Cosmology I	I	17.9
PHYS267	10.0	22/23	Solar System Physics	I	21.2
PHYS281	10.0	22/23	Scientific Programming and Modelling Project	I	22.1
PHYS311	10.0	23/24	Particle Physics		
PHYS313	10.0	23/24	Solid State Physics		
PHYS320	10.0	23/24	General Physics Examination Paper		
PHYS321	10.0	23/24	Atomic Physics		
PHYS322	10.0	23/24	Statistical Physics		
PHYS361	10.0	23/24	The Early Universe		
PHYS362	10.0	23/24	Astrophysics II		
PHYS363	10.0	23/24	Astrophysics Laboratory		
PHYS365	10.0	23/24	Stellar Structure and the Interstellar Medium		
PHYS369	20.0	23/24	Astrophysics Group Project		
PHYS389	10.0	23/24	Computer Modelling		



## Record of Learning and Achievement

Overleaf please find the transcript of results for the stated student, if you are concerned about the validity of the document or any of the details shown, please contact the Student registry of the University at the address shown below.

### Credit Level

Credit is awarded to a learner in recognition of the achievement of designated learning outcomes at a specific level and the level is an indicator of the relative complexity of learning. Credit values indicate the amount of learning expected and are expressed in UK value (CATS), however these can be assimilated to ECTS, the European Credit Transfer and Accumulation System by dividing the CATS value by two.

Undergraduate - Each year is normally equivalent to 120 CATS, year 1 is at level 4, year 2 level 5, year 3 level 6 and year 4 (where appropriate) level 7.

Postgraduate Masters Degrees are normally 180 CATS at level 6/7 with at least 120 CATS at level 7.

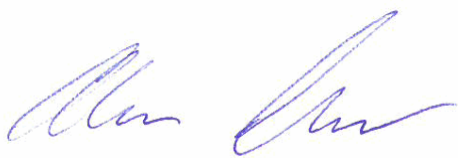
### Classification

Undergraduate - (pre 2011 student intake) Classification is based on the marks from years 2 and 3 (plus 4 where appropriate) and reflects the individual's performance across the whole degree programme. All marks are calculated based on a 100% point scale. The calculation of the classification does vary slightly between programmes although the basic calculation is that half of the marks attained are in a particular class and the average mark calculated from all contributing marks is no more than 2% below the class boundary.

Undergraduate - (2011 entry onwards) Classification is based on the marks from years 2 and 3 (plus 4 where appropriate) and reflects the individual's performance across the whole degree programme. All marks are calculated on a 24 point scale. The calculation of the classification does vary slightly between programmes although the basic calculation is based on the students overall average aggregate score.

Postgraduate - Classification reflects the individual's performance across the whole degree programme. All marks are calculated based on a 100% point scale.

Full details available in the University Regulations <https://www.lancaster.ac.uk/academic-standards-and-quality/regulations-policies-and-committees/manual-of-academic-regulations-and-procedures/>



Alison Mullan  
Student and Education Services



04/12/2023

Lancaster University  
Student and Education Services  
Lancaster University  
Lancaster, LA1 4YW, UK  
T: +44 (0) 1524 592525  
E: [ask@lancaster.ac.uk](mailto:ask@lancaster.ac.uk)  
[www.lancaster.ac.uk/ses](http://www.lancaster.ac.uk/ses)



# Academic reference for Ms Caterina Alice Prior

## MASt in Astrophysics

### Referee Details

<b>Name</b>	Dr Brooke Simmons	<b>Job title</b>	Reader in Astrophysics
<b>Email</b>	b.simmons@lancaster.ac.uk	<b>Department</b>	Physics
<b>Phone</b>		<b>Institution</b>	Lancaster University
<b>Relationship</b>	Lecturer, Project Supervisor	<b>City</b>	Lancaster
<b>Known for</b>	1 year	<b>Country</b>	United Kingdom

### Reference

<b>Academic ranking</b>	The best performance in their year Approximately 60 in the Astrophysics specialisation; 130 or so Physics students overall.
<b>Student potential</b>	Outstandingly original/creative/independent of thought
<b>Course suitability</b>	Exceptionally Suitable

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



From: Dr Brooke Simmons  
Tel: +44 (0)1524 593074  
Email: b.simmons@lancaster.ac.uk

Institute of Astronomy  
University of Cambridge  
Madingley Road  
Cambridge CB3 0HA

11 December 2023

To whom it may concern,

I am delighted to provide a reference for Kitty Prior in her application to the taught Masters programme in Astrophysics at the IoA. She has enormous potential as a future astrophysicist.

I know Kitty primarily in my capacity as an instructor in two third-year modules, “Stellar Structure and the Interstellar Medium” and the Astrophysics Group Project. She is clearly an excellent student. Even before we spoke one-on-one, her coursework stood out as exceptional among her peers in its demonstration of astrophysical understanding. I am administering coursework in the form of in-class proctored quizzes this year, so I am confident that her excellent communication and clear reasoning is her own. She has also asked insightful questions in class, during our weekly workshop sessions, and at my office hours. Kitty is one of those rare students who takes full responsibility for her own learning, and I can see this effort paying off in my module. From talking to other academics in Physics, my experience is not unique: Kitty is a top student across the board.

The Astrophysics group project gets fully going next term, so it may be most helpful to you if I briefly describe the objective of that project. Essentially, it is a 10-week research internship embedded in our curriculum. Students identify a sub-topic from among my personal expertise (broadly, galaxy evolution and supermassive black holes) that they are particularly interested in; from there, I guide them to a project that is properly scoped, has available data, and asks a topical research question. I meet twice a week with each group to keep the research moving forward. I do not know in advance what their results will be: it is authentic research experience, with a substantial literature review, and is specifically designed to set them up for the next step of a research-based path. I have very high expectations for my research groups — last year their final reports *all* received first-class marks — and I know that Kitty can exceed those expectations.

Outside of class, Kitty has shown significant initiative in approaching me for career advice, particularly on securing external internships and on Masters programmes. I find her to be a remarkably level-headed student with a clear sense of her own priorities. She has expressed a strong preference for astrophysics as a sub-field of physics, and were she to continue with the MPhys here she would only be able to take 1 five-week module in Astrophysics. I fully support her decision to apply for your programme, where she will be able to focus more on the topics which interest her most.

Yours faithfully,



Dr. Brooke Simmons  
UKRI Future Leaders Fellow  
Reader in Astrophysics



# Academic reference for Ms Caterina Alice Prior

## MASt in Astrophysics

### Referee Details

Name	Professor Jonathan Prance	Job title	Professor of Experimental Physics
Email	j.prance@lancaster.ac.uk	Department	Physics
Phone		Institution	Lancaster University
Relationship	Director of Teaching	City	Lancaster
Known for	Since October 2021	Country	United Kingdom

### Reference

Academic ranking	The best performance in their year Roughly 60 students who are on the same degree scheme and the integrated masters equivalent (same content in year 2).
Student potential	Outstandingly original/creative/independent of thought
Course suitability	Exceptionally Suitable

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



12<sup>th</sup> December 2023

**Letter of Reference for Ms Caterina Alice Prior**

To whom it may concern,

I have known Kitty for three years, since she took a first-year module that I taught in 2021. I am currently aware of her overall performance as the Director of Teaching in Physics.

Kitty has achieved consistently excellent marks in all her assessments so far. Her overall average marks in first year and second year were both in the first-class range and both over 80%. Kitty has first-class marks for every module she has completed. At the end of last year, she had the highest second-year average of all students on her degree programme (BSc Physics, Astrophysics and Cosmology).

Overall, Kitty is an outstanding student who has shown her ability to excel across a range of topics and different types of work. As well as worksheets and exams, this has included practical labs, a programming project, and presentations. Related to the MAST in Astrophysics at Cambridge, Kitty has completed modules Astronomy, Astrophysics, Cosmology, Solar System Physics and Stellar Structure. In the coming year, she will also undertake a group project on a topic in Astrophysics. I fully expect Kitty to graduate next summer with a first-class degree and I strongly recommend her to you as a candidate for postgraduate study.

Yours faithfully,



Jonathan Prance

Professor of Experimental 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:

Caterina

Your surname:

Prior

Your email address:

caterinaprior@gmail.com

Confirm your email address:

caterinaprior@gmail.com

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

Your undergraduate/ bachelor's institution:

Lancaster University

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*

No

Characters remaining: 998

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*

No

Characters remaining: 998

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*

No

Characters remaining: 998

**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.

No

Characters remaining: 998



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.

No

Characters remaining: 998

Powered by Qualtrics [↗](#)



# Caterina Alice Prior

Telephone: +44 (0) 7 897 185 874, Email: caterinaprior@gmail.com

## Education

- **Lancaster University: Physics, Astrophysics and Cosmology** Currently in the final year of a 3-year BSc Hons course. First year results: 80.7%, on track for a first. Current aggregation score: 84.3%, on track for a first.
- **International School of the Hague** Graduated from the International School of the Hague with 45/45 points in the International Baccalaureate. Higher level subjects: Physics, Mathematics (Analysis and Approaches) and Computer Science. Standard level subjects: English, German, Psychology with grades. I also completed a Astrophysics-related Extended Essay and Theory of Knowledge.

## Experience

- **Internship at Principle One Ltd (July 2023-September)** A 10 week internship at a UK Law Enforcement and National Security consultancy, working with a multidisciplinary team to generate and visualise synthetic data using Python and Elastic Search for testing, training and exploring investigative techniques.
- **LOFAR data assembly volunteer (2020-21)** Volunteering to assemble radio source data from the LOFAR telescope to identify black holes and star forming galaxies.
- **Norman Lockyer Observatory youth club (June-August 2015-2019)** Volunteering at the Norman Lockyer Observatory youth club to learn astronomy and inform visitors about telescopes during open-days.

## Projects

- **Computational Project.** A second-year computer project in Python which modelled the orbit of planets in the Solar system using numerical integration methods and predicted the next solar eclipse.
- **Extended Essay Astrophotometry Project.** A year long project of independent astrophotometric data collection to investigate the luminosity and colour fluctuations of Cepheid variable stars which obtained full marks in the International Baccalaureate.

## Languages

- **English:** Native, **German:** Fluent (C1), **Dutch:** Fluent **German:** Fluent (C1) **Dutch:** Fluent

## Skills

- **Python Elastic Search Javascript HTML and CSS**  
**Microsoft power tools L<sup>A</sup>T<sub>E</sub>X**

## Qualifications

- **C1 German qualification.** Intensive German course completed with EF language school. Certificate available.
- **Winter hiking safety course.** A course in safely moving through mountain terrain, avalanche awareness, navigational skills and use of ice axe and crampons.
- **CPR training.** Course in performing CPR and using a defibrillator. Certificate available.

## Extra-curricular activities and interests

- **Lancaster University Mountaineering Club Treasurer,** Taking responsibility for the timely and accurate payment of invoices, maintaining financial records to track the club's budget and providing the executive committee with realistic financial advice. This takes place alongside monthly outdoor climbing expeditions, lectures in climbing safety and weekly training.
- **Interest in the space industry,** Learning about the newest developments in the space industry through subscriptions to ESA (European Space Agency) and NASA newsletters and studying astrophysics and theoretical physics from authors, including Richard Feynman, Stephen Hawking, Lee Smolin and Brian Cox. I also visit observatories and space agencies such as ESA, Jodrell Bank Centre for Astrophysics, Norman Lockyer observatory and Leiden Observatory.
- **Independently learnt Python courses,** I have deepened my understanding of Python scientific programming through online courses which I am currently nearing completion on, namely the MIT Open course 'Introduction to Computer Science and programming in Python' and the LinkedIn learning course in 'Pandas essential training'.