Postgraduate Application Form

UNIVERSITY OF CAMBRIDGE
Postgraduate Admissions Office

Visser Velez, Ms Almudena

Course	MASt in Astrophysics (MASAS)	**Date submitted**	29 Oct 2023
Department	Institute of Astronomy	**Mode of study**	Full Time
Course start date	01 Oct 2024 (MT 2024)	**PUF**	No

Academic History

Sep 2023 - Jun 2024 *(Not yet obtained)*	Bachelor of Science (BSc) in Physics with Astrophysics (Physics and Astronomy) - All or mostly full-time	1st	University of Exeter (*United Kingdom*)

Immigration

Nationality	United Kingdom (1st), Spain (2nd)
Country of birth	Netherlands
Currently ordinarily resident	United Kingdom
Country of birth is ordinary residence since birth	No
Ordinarily resident in the last five years	UK
Estimated fee status	Home
Visa	Not required

Language

Not required

Scholarships

Apply for funding	Yes
Apply for Cambridge Trust	Yes
Apply for Gates Cambridge	No

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

Curriculum Vitae

Uploaded

Career Goals

498/1000 chars

As I enjoy astrophysics, I intend to further my academic studies of the field before embarking on an observational astronomy PhD with a potential view to pursuing research afterwards, as I have enjoyed my first experiences of this through two research internship projects, one of which will result in a published paper in an astronomical journal. I enjoy problem solving and scientific data analysis, and am open to exploring new opportunities once I have deepened my understanding of astrophysics.

Additional Information to Support Application

0/1000 chars

Course Specific Questions

Core - statement of interest	I have interests in astrophysics spanning from the solar system to early universe cosmology. Recent developments from the JWST are challenging current thinking in astrophysics, from finding new molecules in exoplanet atmospheres to glimpsing unexpectedly evolved young galaxies, and I would like to become equipped to tackle modern challenges in astrophysics and contribute to new findings. My interest in stars began through a module on their life cycles, and increased after undertaking two research internships, in Gothenburg and Cambridge respectively. Through these projects, I learnt about the compositions of molecular clouds that become stellar nurseries, as well as the endpoints of stars in spectacular supernovae that enrich the interstellar medium and thereby allow subsequent generations of stars to form. I am looking forward to broadening my knowledge of astrophysics by taking modules on Galaxies and Fluid Dynamics next term. I am actively involved in outreach and write about astrophysics in my university's student newspaper, having covered topics from ocean moons to dark matter to educate myself and others. I enjoy explaining the science behind the recent JWST images and have given talks at local science festivals and schools to encourage interest in astrophysics. I also coordinate the Exeter Women in Physics Network and launched our first national Science Essay Competition for sixth form girls, which encouraged students to explore physics beyond the curriculum.
Core - reasons for applying	Following two astrophysics internships on star formation and supernovae respectively, I would like to further my astrophysics knowledge through this specialised MAst course, with the view to applying for a PhD next year. Having enjoyed two months at Cambridge last summer researching distribution models of rare supernovae, I believe I would thrive in this academic environment exploring a variety of challenging astrophysical topics. My previous experiences which include a computational degree project on astrophysical fluid simulations, as well as my observational and theoretical projects, have all prepared me well for a detailed Master's thesis, and I would like to build on my current astrophysics knowledge by exploring cosmology and exoplanets. Recent developments led by Cambridge astronomers on detections of life-sustaining molecules in exoplanet atmospheres suggest this is an exciting area of astrophysics, which I would like to learn more about from those leading the field.
Astronomy - Extra Materials WP	Uploaded

Application Information

Academic Awards

Hunter Prize for Physics	Excellent academic achievement in physics	30 Jun 2020
Murray Edwards College Franklin Science Essay competition	2nd prize	30 Jun 2023

Employment History

Jul 2023 - Sep 2023	Astrophysics Summer Intern	University of Cambridge (*Cambridge, United Kingdom*)
May 2023 - Jul 2023	Astrophysics Research Intern	Chalmers University of Technology (*Gothenburg, Sweden*)

Other Applications Made

No other applications entered

Personal Information

Identifying Information

Full name	Visser Velez, Ms Almudena	**Date of birth**	01 Feb 2002
Previous name		**Legal gender**	Female

Contact

Email	a.visservelez@gmail.com	**Phone**	07480838454 (1st)
Skype address			
Contact address	8B Lansdowne Terrace, Exeter, Devon, EX24JJ, United Kingdom	**Home address**	Same as contact address
Valid until		**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	Trinity College (1st) Queens' College (2nd)

Current Membership

College	Not College member

Visa Requirement

Potentially required

Study Visas

Visa not entered

Funding Application

Cambridge Trust

You will automatically be considered by the Trust for any awards for which you are eligible.

No identified awards.

Gates Cambridge Scholarships (Overseas)

Apply for Gates Cambridge No

Personal Statement 0/3000 chars

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 ROWAN-WILLIAMS-STUDENTSHIP-APPLICATION-FORM-24-25.pdf (cambridgetrust.org)
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

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.

UNIVERSITY OF EXETER

Provisional Module Results prior to 2022/3
Almudena VISSER VELEZ

Student No: 700027303/1 **Programme:** BSc Physics with Astrophysics

Module Code	Module Title	Academic Year	Credit Value	Module Mark	Module Result
PHY2021	Electromagnetism I	2021/2	15	75%	Pass
PHY2022	Quantum Mechanics I	2021/2	15	82%	Pass
PHY2023	Thermal Physics	2021/2	15	71%	Pass
PHY2024	Condensed Matter I	2021/2	15	78%	Pass
PHY2025	Mathematics with Physical Applications	2021/2	15	75%	Pass
PHY2026	Practical Physics II	2021/2	15	78%	Pass
PHY2030	Observing the Universe	2021/2	15	73%	Pass
PHY2035	Scientific Programming in Python	2021/2	15	81%	Pass
PHY1021	Vector Mechanics	2020/1	15	67%	Pass
PHY1022	Introduction to Astrophysics	2020/1	15	68%	Pass
PHY1023	Waves and Optics	2020/1	15	78%	Pass
PHY1024	Properties of Matter	2020/1	15	69%	Pass
PHY1025	Mathematics Skills	2020/1	15	77%	Pass
PHY1026	Mathematics for Physicists	2020/1	15	79%	Pass
PHY1027	Practical Physics I	2020/1	15	89%	Pass
PHY1029	IT and Astrophysics Skills	2020/1	15	71%	Pass

Credits Passed: 240

Marks and results given above are provisional and for student feedback only. All marks are subject to ratification by final board of examiners and/or faculty.

Response Summary:

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 will be sent to you as soon as the form is submitted.

Q2. Your first name:
Almudena

Q3. Your surname:
Visser Velez

Q16. Your email address:
a.visservelez@gmail.com

Q17. Confirm your email address:
a.visservelez@gmail.com

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

Q6. Your undergraduate/ bachelor's institution:
University of Exeter

Q7. Did you undertake your degree full-time or part-time?

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

Q8. 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
As a national level swimmer, I only applied for universities which had a supportive sports programme alongside strong academics so that I could continue with my swimming as well as my studies

Q11. 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
N/A

Q12. 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

N/A

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

Q14. 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.

Owing to being assaulted as a teenager, I initially struggled with confidence in multiple areas including moving to university in my first year. Getting therapy helped improve this and my academic performance and enjoyment also improved.

Q15. 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 a medical emergency in April 2022 (my second year of university), where I was admitted to hospital with a suspected blood clot in the brain. In order to allow for more time to recover, I was permitted to switch my studies to part time in order to complete my degree in an extra year. My strong academic record from previous years contributed to being given this permission. I have now fully recovered from this health issue and used the extra time to read around my areas of academic interest.

Embedded Data:

N/A

Almudena Visser Velez

Email: a.visservelez@gmail.com
Telephone number: +44 7480838454
LinkedIn: linkedin.com/in/almudena-visser-velez

I am a Physics with Astrophysics student at the University of Exeter with interests in the interstellar medium and star formation/evolution. My biggest project to date has been a 10 week internship investigating feedback from massive stars, in particular HII regions, and its effect on star formation in a nearby molecular cloud using data from multiple radio telescopes. Additionally, I have subsequently completed a theory based internship modelling different IMFs and predicting resultant distributions of pair instability supernovae. These projects have inspired me to investigate star formation and evolution further, and I am keen to pursue an observational astrophysics PhD in one of these topics. I broaden my astrophysics knowledge outside my studies by attending public lectures, reading scientific articles and participating in stargazing trips.

I have a passion for getting more women involved in physics, and have won prizes for competitions exploring important women from history whose scientific achievements have been overlooked. Recently, I co-founded the Exeter Women in Physics Network to support women in academia and encourage more young girls to become physicists. I regularly report on astrophysics news in my university's student newspaper to share recent breakthroughs with the wider community and follow the latest astronomical discoveries.

Education

SEPTEMBER 2020 - JUNE 2024

University of Exeter, UK - *BSc Physics with Astrophysics (Honours)*

I am entering the final year of my degree. I passed all previous years with a First Class grade equivalent.

SEPTEMBER 2015 - JUNE 2020

Stephen Perse Foundation School and Sixth Form College, Cambridge, UK - *A levels and GCSEs*

- A levels in Maths (A), English literature (A*), Physics (B), AS level Further Maths (A)
- GCSEs: 10 A*/A (or equivalent), FSMQ Additional Maths (A)

Research experience

Chalmers Astrophysics & Space Science Summer (CASSUM) Research Fellowship (2023)

- Funded 10 week project in Sweden investigating stellar feedback by HII regions on the molecular cloud G32.02+0.06
- Aimed to deduce whether HII region expansion was dispersing or compressing gas cloud, and hence if star formation was being facilitated or suppressed
- Analysed observational data of 13CO and SiO emission from IRAM, JCMT and ARO telescopes
- Studied cloud kinematics, density distribution and excitation conditions of quiescent versus active gas
- Results presented at CASSUM research symposium
- Lead author for upcoming paper to be published in Astronomy & Astrophysics journal (in progress)

University of Cambridge Institute of Astronomy Summer Research Internship (2023)

- Funded 7 week research project modelling IMFs and calculating resultant distributions of pair instability supernovae
- Explored how number of supernovae observed varied with PopIII star formation efficiency and mass distribution
- Self taught introduction to cosmology
- Attended seminars on early universe research papers and talks by the Astronomer Royal, Prof. Lord Martin Rees
- Project results to be presented at Institute's internship symposium

Computational experience

Thesis project (Simulations of Astrophysical Convection)

- Numerical simulations of convection using open source Dedalus package to solve differential equations
- Aimed to investigate convection efficiency and effects of differential rotation in fluid spheres such as gas giant planets

Python / Jupyter notebooks

- Confident in Python, frequently used to aid data analysis in projects. Examples of past uses:
  - Measured ejection velocities of protostellar jets
  - plotted Lissajous figures to analyse chaos data from a resonant LCR circuit
  - Applied Scouse software to analyse multiple velocity components of a star forming cloud
  - modelled hydrogen atom by plotting spherical harmonics and surface plots of electron probability density - (90%)

Work experience

SEPTEMBER 2022 - PRESENT

Maths Circles, Exeter Maths School – *mathematics mentor*

- Weekly mentoring of secondary school children from deprived backgrounds to assist them in solving mathematical knowledge based problems with an emphasis on critical thinking and explaining detailed solutions

Pro bono/Volunteering

JANUARY 2023 - PRESENT

Exeposé, University of Exeter – *author in science section of student newspaper*

- I regularly write articles surrounding astrophysics news, so far including galaxies, exoplanets and comets

OCTOBER 2022 - PRESENT

Exeter Women in Physics Network (E.W.I.P.N.), University of Exeter – *voluntary work organising events*

- Responsible for organising networking and outreach opportunities to encourage more women into physics
- Organiser and judging panel member for the E.W.I.P.N. Science Essay Competition 2023 to inspire girls in school to explore extracurricular physics

Awards & Accomplishments

I have received numerous physics awards; both from school academic prizes and independently-entered competitions.

- Hunter Prize for Physics - Stephen Perse Sixth Form - 2020
- Findlay Prize for Valued Contribution to English Literature - Stephen Perse Sixth Form - 2020
- Franklin Society Science Essay competition - Murray Edwards College, Cambridge - 2020
- Unsung Heroes of Science Video competition, Hertford College, Oxford - 2020
- Ritangle Maths Challenge - school team captain - 2019
- Excellent Academic Achievement Certificate - Stephen Perse Senior School - 2018
- Turner Rose Bowl for Excellence in Sport - Stephen Perse Senior School - 2018
- Gold certificate in UKMT Intermediate Maths Challenge - 2018

Interests

Outside of my studies, I am a national level swimmer and have competed at both British and Dutch championships. My training schedule has given me excellent time management, teamwork and organisational skills from a young age, which I have carried through to other areas such as my studies and work. I also play the violin and sing in a choir, and have found both give me an enjoyable sense of community.

Academic reference for **Ms Almudena Visser Velez**

MASt in Astrophysics

Referee Details

Name	Dr Pablo Loren-Aguilar	**Job title**	Physics and Astronomy Director of Education, Senior Lecturer
Email	p.loren-aguilar@exeter.ac.uk	**Department**	Physics and Astronomy
Phone		**Institution**	University of Exeter
Relationship	Director Education and 3rd year tutor	**City**	Exeter
Known for	For the last two years	**Country**	United Kingdom

Reference

Academic ranking	Among the top 10% in year (i.e., in the top 4 if the group size was 40)
	About 100 students
Student potential	Outstandingly original/creative/independent of thought
Course suitability	Exceptionally Suitable

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

University of Exeter

To whom it may concern:

During the present academic year, I have the pleasure to be Almudena's academic tutor. She is an incredibly focused, dedicated, and talented student that should in my opinion, without any doubt, pursue an academic career. She is a cheerful and kind person that is always happy to accept academic advice. At the same time is independent, proactive, and inquisitive, qualities that make her a perfect PhD candidate. As Director of Education, I have also worked quite closely with Almudena, since she is one of the student representatives in our degree. Her ideas and always constructive suggestions have really helped us to improve our teaching delivery.

By examining her marks during her degree, one can see that Almudena is clearly a first-class student. It is challenging to find modules in Almudena's degree where she didn't get a first-class final mark. Marks like 84% in Nuclear and High Energy Physics, 81% in Programming in Python, 78% in Practical Physics II, 89% in Practical Physics I, or 82% in Quantum Mechanics II are a clear illustration of her potential.

For as long as she has been with us, Almudena has mentioned academia as a future career ambition, and her determination to pursue a PhD position is crystal clear. A good piece of evidence are the fantastic summer internships done during the summer period, showing her determination and compromise with her future career.

The only negative point of this reference is my sadness at not being able to offer Almudena a PhD project. I wouldn't hesitate a single second to offer her a position with me if I had the chance. I have no doubt at all that she will be a brilliant PhD candidate and will have a brilliant academic career. Hence, I emphatically recommend her for your program.

Yours sincerely,

Pablo Loren-Aguilar

Dr. Pablo Loren-Aguilar, Senior Lecturer in Astrophysics.
Director of Education of the Physics and Astronomy Program.
University of Exeter,
Faculty of Environment, Science, and Economy.
Stocker Road, Exeter, EX4 4QL, United Kingdom
Email: P.Loren-Aguilar@exeter.ac.uk
Phone: +44 01392 72 2077

Professional reference for **Ms Almudena Visser Velez**

MASt in Astrophysics

Referee Details

Name	Dr Giuliana Cosentino	**Job title**	Cosmic Origin Postdoctoral fellow
Email	giuliana.cosentino@chalmers.se	**Department**	Astronomy and Plasma Physics
Phone	+46793309676	**Institution**	Chalmers University of Technology
Relationship	Supervisor	**City**	Gothenburg
Known for	May 2023 to present	**Country**	Sweden

Reference

Academic ranking	Very Strong - Among the very best you know in your current professional life
Student potential	Distinctly original/creative/independent of thought
Course suitability	Exceptionally Suitable
Professional position	Previously a Cosmic Origins Fellow at Chalmers University of Technology, I have just started a position ad research Fellow at the European Southern Observatory (ESO) in Germany. As a Fellow, I carry on my own research activity in the Field of Star Formation and large-scale shocks in the Interstellar medium. I also devote 25% of my time to science duties at ESO that still need to be defined. As part of my work, I use radio telescopes to investigate the processes that lead to the formation of stars from molecular clouds. To do this, I use molecular line information to study the kinematics, dynamics and composition of molecular clouds in the Interstellar medium. Finally, as part of my activity, I am involved in the supervision of several students at different levels of their education i.e., from bachelor to master to PhD.

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

Dr. Giuliana Cosentino
European Southern
Observatrory, Garching bei
Munchen, Germany
Phone +49 89 320 06-1 95
giuliana.cosentino@eso.org

Dear Selection Committee,

I am Giuliana Cosentino, Research Fellow at the European Southern Observatory. It is my pleasure to write this letter in support of the application of Almudena Visser Velez for admission to MASt in Astrophysics (Michaelmas Term 2024 entry), at University of Cambridge.

I have known Almudena since May 2023 and I have been the primary supervisor of her research project, done as part of the Chalmers Astrophysics & Space Science Summer (CASSUM) Research Fellowship. As part of her work, Almudena has studied the CO gas kinematics of an Infrared Dark Cloud (IRDC) known to be interacting with multiple HII regions. The goal was to understand the effect that feedback from HII regions have on the physical, dynamical and chemical properties of IRDCs. During the project, Almudena has gained vast experience in the reduction and analysis of observational data and has become proficient in the use of python and other dedicated software for the analysis and interpretation of observational results. In addition, Almudena has demonstrated to have all the pre-knowledges necessary to perform the project in an independent and proactive way. The work carried on by Almudena will be soon submitted to A&A (draft in preparation).

By working with Almudena, I have been extremely impressed by her dedication, motivation and hard work. She has demonstrated vast interested in Star and Planet Formation and pre-knowledges that are exceptional for her level of education. She has shown a great ability to step out of her comfort zone and to be ready to explore with open mind different fields and approaches. Thanks to her extremely positive and proactive attitude, Almudena has been quickly acquiring new coding and analysis skills that she has been using to independently advance in her work. During her time within the CASSUM program, I have also been positively impressed by Almudena's time management abilities. She has been able to carry on two summer internships (the CASSUM at Chalmers and a second internship at University of Cambridge) at the same time and both very successfully. She has demonstrated great commitment and enthusiasm, despite the being involved in multiple projects at time. Finally, Almudena has shown great versatility, working both on observations (CASSUM project) and theory (Cambridge project). I believe that this ability to embrace Astronomy in its multiple topics make Almudena the perfect candidate for the Master Course and I give her my strong recommendation. I am confident that she will continue to be an excellent student thanks to her curiosity, good attitude, willing-to-learn personality, and independent work.
Should you have further questions, please contact me at your earliest convenience.

Your sincerely,
Giuliana Cosentino

Giuliana Cosentino