

Postgraduate Application Form

UNIVERSITY OF CAMBRIDGE
Postgraduate Admissions Office

Van den bussche, Mr Benedict

Course

MASt in Astrophysics (MASAS)

Department

Institute of Astronomy

Course start date

01 Oct 2024 (MT 2024)

Date submitted

03 Dec 2023

Mode of study

Full Time

PUF

No

Academic History

Sep 2021 - Jul 2024
(Not yet obtained)

Bachelor of Science in Mathematics and Physics (Mathematics and Physics) - All or mostly full-time4.05Ecole Polytechnique (France)

Sep 2023 - Dec 2023
(Not yet obtained)

Exchange Semester in Physics and Mathematics (Arts and Science) - All or mostly full-timeUnknownUniversity of Toronto (Canada)

Immigration

Nationality

France (1st), Belgium (2nd)

Country of birth

Netherlands

Currently ordinarily resident

France

Country of birth is ordinary residence since birth

No

Ordinarily resident in the last five years

EU

Estimated fee status

Overseas

Visa

Required

Visa type

I do not currently have a UK visa

Language

Type

TOEFL (Taken on 27 Jul 2022)

Reference No

4411807226583122

Score

L: 29.0 R: 30.0 W: 27.0 S: 28.0 T: 114

Document

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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

953/1000 chars

From an early age, intrigued by astrophysics, I had considered becoming a researcher, but it was not until I experienced what that does or does not mean that I decided to pursue a career in academia. Fascinated by discovery, desiring to understand the smaller parts' influence on the collective, and interested in physics, I pursued two exciting research internships. Contrastingly, I also did one in trading where I appreciated the teamwork, drive for efficiency, and coding but my academic curiosity, incredible mentors, and research experiences convinced me to go into academia.

Captivated by my internships' study of high energy astrophysics and galaxy evolution and enthralled by Jo Dunkley's "Our Universe: an astronomer's Guide", I have been driven to research in astrophysics. My experiences and courses have also led me to focus on theoretical approaches to the field while not losing sight of observational data to guide me in my pursuits.

Additional Information to Support Application

0/1000 chars

Course Specific Questions

Core - statement of interest

Combining scales, disciplines, and time, I find astrophysics to be the most fascinating field. It was after a fundamental exposure to scientific investigation, collaboration, and independent decision-making in microfluidics, that I was drawn to astrophysics. I was curious how we could understand large distant phenomena from the light that reached us. I thus joined Mathieu de Naurois to work on the inter-calibration of the HESS telescope array using a novel UAV-based technique. I could distinguish the drone trajectory with a precision of 20 cm at 1 km. To improve this, I coded trajectory, timing, and chi-squared plots for cosmic events in addition to the ones for drone events. This led to a better distinction between event types increasing by 10% the number of successful runs on which I could run statistics. Intrigued by the use of gamma-ray bursts as tracers of star formation, I then followed courses on stars and high-energy physics during my semester abroad at the University of Toronto. Now, wishing to dive even deeper into star formation rates in galaxy clusters, I will be probing with Professor Gary Mamon this winter the possible reversal of color segregation at high redshifts for my bachelor thesis. Consequently, I seek to specialize in astrophysics at the graduate level. My rigorous mathematics and physics education complemented by my previous research experiences have confidently prepared and led me to apply to Cambridge's MAST in astrophysics.

Core - reasons for applying

My prime motivation to join Cambridge is my fascination for astrophysics and discovery. Through the master, I hope to strengthen my foundations in physics while developing my research skills. I believe Cambridge's rigorous mathematical approach with numerous theoretical or specialist courses such as "Cosmology" or "Formation of Structure in the Universe" will also best equip me with the tools necessary to engage in unique and insightful research. I further value the opportunity to engage in an enriching research project to improve my experimental skills and specialize. Cambridge's access to the best research in the world such as Prof. Roberto Maiolino's work on galaxy quenching mechanisms and black hole's feedback on galaxies also inspires me to join the program. Reading Prof. Dave Green's investigation of supernova remnants, I also appreciate the other fascinating topics I can

Astronomy - Extra Materials WP

study. Embarking on this journey at Cambridge is highly compelling and will propel me towards my goals.

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Application Information

Academic Awards

No awards entered

Employment History		
Feb 2023 - Jun 2023	Research Intern	Leprince-Ringuet Laboratory Ecole Polytechnique (<i>Palaiseau, France</i>)
Jun 2022 - Jul 2022	Research Intern	Hydrodynamics Laboratory Ecole Polytechnique (<i>Palaiseau, France</i>)
Dec 2023 - Mar 2024	Research Intern	Paris Astrophysics Institute (<i>Paris, France</i>)
Jun 2023 - Aug 2023	Linear rates trading intern	Credit Agricole Corporate and Investment Bank (<i>Montrouge, France</i>)
Dec 2021 - Mar 2024	Ski Instructor	Davos Swiss Federal Ski School (<i>Davos, Switzerland</i>)

Other Applications Made

Astrophysics	Astronomy	Harvard (<i>United States</i>)
Astrophysics	Paris Observatory	Paris Sciences et Lettres (<i>France</i>)
Astrophysics	Astrophysics	Columbia (<i>United States</i>)
Astrophysics	Physics	Berkeley (<i>United States</i>)

Personal Information

Identifying Information

Full name

Van den bussche, Mr Benedict

Date of birth

03 Sep 2003

Previous name

Legal gender

Male

Contact

Email

benedict.van-den-bussche@polytechnique.edu

Phone

+33782880227 (1st)

Skype address

Home address

Same as contact address

Contact address

8 Rue le Sueur, Paris, Paris, 75116, France

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

No College preference

Current Membership

College

Not College member

Visa Requirement

Visa type

I do not currently have a UK visa

Study Visas

Visa not entered

Funding Application

Cambridge Trust

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

Cambridge Trust Scholarship (postgraduate)
I am a dual citizen from Belgium and France applying to the astrophysics master of advanced studies.

Gates Cambridge Scholarships (Overseas)

Apply for Gates Cambridge

US citizen

Research proposal

Yes

No

Personal Statement

2828/3000 chars

Growing up across Europe speaking three languages, I found myself at the intersection of multiple cultures. I developed a capacity to empathize with others, create links between people, rally different groups around ideas, and see problems in a different light through my multicultural identity and upbringing. While I first used these skills in high school to garner votes in student council elections or for my MUN debating league resolutions, they came to be of even greater use in college as a bachelor ambassador welcoming new students. Indeed, with a group of 8 other students, we led the last two years' initiatives to integrate the newly admitted cohorts into the Ecole Polytechnique community, acting as their first bachelor mentors. This experience like that of being event manager for the volunteering and rock dancing committee has helped improve my leadership skills. Transmitting my passion for physics through these various roles has also helped inspire me to engage in more outreach during my semester abroad at the University of Toronto such as through Astro Tours. One of the first lessons I tell my bachelor mentees is not to hesitate to collaborate and reach out for mutual aid to both peers and professors. Coming to Cambridge, I strive to continue doing so with people from all backgrounds, learning from their experiences and sharing my unique perspective. I believe a pioneer in science must lead not just through original research but also through their communications, collaborations, and values. Being a bachelor ambassador, participating in speech and debate contests, and attending colloquia in physics all prepared and inspired me to become a better researcher. My research interest grew from a curiosity about the workings of our universe. Freshman year, during weekly meetings at the Hydrodynamics laboratory, I was reminded how much I enjoy learning about various fields. Discovering rocket dynamics, rowing aerodynamics, and later astrophysics, I wanted to learn more, thus continuing my schooling came naturally. Through my rigorous education and various research experiences I was led to, and confidently prepared for, graduate coursework in astrophysics at Cambridge. The MAST will allow me to specialize in astrophysics, strengthen my foundations in mathematical physics, and interact with the best researchers in the world preparing me very well for doctoral school and later a career in academia. By funding my education and being a Gates Scholar, the scholarship will enable me to thrive in the MAST and further widen my opportunities through its gala or alumni network. Personally, it will also help me give back to the community even more during my free time. I know that together the astrophysics MAST and the Gates Cambridge scholarship will propel me towards my goals.

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

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.

BEFORE MOBILITY**General information**

Last name and first name of student : Van den bussche Benedict	Email : benedict.van-den-bussche@polytechnique.edu
Sending institution : Ecole Polytechnique	Country : France
Receiving institution : University of Toronto	Country : Canada
Planned study period (DD/MM/YYYY) : 07/09/2023	Field of study : Physics

Courses to be attended

Table A states the courses to be attended at the Receiving Institution and the number of ECTS credits (or equivalent) to be awarded up successful completion.

Table A : Courses to be attended at the Receiving Institution			
Course unit code (if any) and title (as indicated in the course catalogue of the Receiving Institution)			(ECTS) credits
	AST221 – Stars and Planets		6
	Syllabus link:	http://www.astro.utoronto.ca/~wu/AST221/Syllabus.html	
	PHY489H1 F Introduction to High Energy Physics		6
	Syllabus link:	https://artsci.calendar.utoronto.ca/course/phy489h1	
	MAT334H1 F Complex Variables		6
	Syllabus link:	https://artsci.calendar.utoronto.ca/course/mat334h1	
	PHY456H1 F Quantum Mechanics II		6
	Syllabus link:	https://www.physics.utoronto.ca/undergraduate/undergraduate-courses/quantum-mechanics-ii/	
13 ECTS (others)	STA220H1 The Practice of Statistics I		6
	Syllabus link:	https://artsci.calendar.utoronto.ca/course/sta220h1	
	Syllabus link :		
	Syllabus link:		
	Syllabus link:		
TOTAL			30



Changes

Changes to the courses listed in Table A have to be approved by e-mail or signature by the student, the responsible person in the Sending Institution and the responsible person in the Receiving Institution. Any changes should be clearly documented as an annex to this Learning Agreement (e.g e-mail exchange, new Learning Agreement, list of courses delivered by the Receiving Institution) and should be done as early as possible after the beginning of the semester.

Commitment

All parties must sign the Learning Agreement before the start of the mobility. It is not compulsory to circulate a paper document to collect original signatures. Scanned copies of signatures or digital signatures may be accepted, depending on the national legislation or institutional regulations.

The purpose of the Learning Agreement is to provide a transparent and efficient preparation of the study period abroad and to ensure that the student will receive recognition in his/her degree for the courses successfully completed abroad. By signing this document, the student, the Sending Institution and the Receiving Institution confirm that they approve the Learning Agreement and that they will comply with all the arrangements agreed by all parties.

	Name and signature	Date
Student		Oct. 5, 2023
Mobility Advisor for Mathematics (if applicable)	OK Mathematics	22/08/2023
Mobility Advisor for other major	OK Physics	29/09/2023
Responsible person at the Receiving Institution	Lynne Wan, Learning Abroad Coordinator Student Exchange Program Centre for International Experience University of Toronto 	Oct. 3, 2023

TRANSCRIPT **RELEVÉ DE NOTES**

Year 1 (Semester 1)
Année 1 (Semestre 1)

Student's Name / Nom de l'étudiant Benedict Van Den Bussche
Date and place of birth September 3, 2003 - Netherlands
Date et lieu de naissance 03 septembre 2003 - Pays-Bas
Student's number / N° INE 090644491GK
Academic Year / Année scolaire 2021/2022
Degree Program Bachelor of Science - (Double Major declared in Year 2)
Programme Bachelor en sciences - (Double spécialité choisie en année 2)

Course Number Code de cours	Course Name Nom de cours	Letter Grade Note littérale	ECTS
CSE101	Computer Programming	A+	5
ECO101	Introduction to Economics	A+	5
HSS102	Geopolitics of Cyberspace	A+	2
LAB101	Maths in Practice Calculus	A-	1
LAB102	How to Write Mathematics	A-	2
LAB103	Discovery labs	A	2
LAN301GER	Advanced German	A+	2
MAA101	Linear Algebra	A	5
MAA102	Introduction to Analysis	A	5
PHY101	Physics I: Mechanics and Heat	A+	5
SPOFAL	Sports	A+	1

ECTS obtained / Total ECTS
ECTS obtenus / Total des ECTS

35 / 35

GPA 4.15
Cumulative GPA 4.15



TRANSCRIPT **RELEVÉ DE NOTES**

Year 1 (Semester 2)
Année 1 (Semestre 2)

Student's Name / Nom de l'étudiant Benedict Van Den Bussche
Date and place of birth September 3, 2003 - Netherlands
Date et lieu de naissance 03 septembre 2003 - Pays-Bas
Student's number / N° INE 090644491GK
Academic Year / Année scolaire 2021/2022
Degree Program Bachelor of Science - (Double Major declared in Year 2)
Programme Bachelor en sciences - (Double spécialité choisie en année 2)

Course Number Code de cours	Course Name Nom de cours	Letter Grade Note littérale	ECTS
CSE102	Computer Programming	A+	5
LAB151	Maths in Practice: Vector and Fourier Analysis	A	2
LAN302GER	Advanced German	A+	2
MAA103	Discrete Mathematics	A	5
MAA105	Integral and Differential Calculus	A+	5
PDV103	Meeting Professionals	pass/validé	2
PHY104	Physics II: Electromagnetism and Light	A+	5
PHY106	Beginner s Physics Lab II	A	2
PHY107	Applied Physics	A+	3
SPOSP	Sports	A+	1

ECTS obtained / Total ECTS
ECTS obtenus / Total des ECTS

32 / 32

GPA 4.21
Cumulative GPA 4.18



TRANSCRIPT
RELEVÉ DE NOTES

Year 2 (Semester 3)
Année 2 (Semestre 3)

Student's Name / Nom de l'étudiant Benedict Van Den Bussche
Date and place of birth September 3, 2003 - Netherlands
Date et lieu de naissance 03 septembre 2003 - Pays-Bas
Student's number / N° INE 090644491GK
Academic Year / Année scolaire 2022/2023
Degree Program Bachelor of Science - S3 - Mathematics & Physics Double Major
Programme Bachelor en sciences - S3 - Double spécialité Mathématiques et Physique

Course Number Code de cours	Course Name Nom de cours	Letter Grade Note littérale	ECTS
CSE201	Object-oriented Programming in C++	A	5
EPLAN471ALL	Advanced German	A	2
HSS213	Tech and Law	A+	2
MAA201	Algèbre linéaire 2	A	5
MAA202	Topology and Multivariable Calculus	A	5
MAA203	Introduction to Probability	A-	3
PHY201	Classical Mechanics	A	5
PHY202	Wave Optics and Radiation	A	5
PHY203	Advanced Lab I	A	3
SPOFAL	Sports	A+	1

ECTS obtained / Total ECTS
ECTS obtenus / Total des ECTS

36 / 36

GPA 4.00
Cumulative GPA 4.11



TRANSCRIPT
RELEVÉ DE NOTES

Year 2 (Semester 4)
Année 2 (Semestre 4)

Student's Name / Nom de l'étudiant Benedict Van Den Bussche
Date and place of birth September 3, 2003 - Netherlands
Date et lieu de naissance 03 septembre 2003 - Pays-Bas
Student's number / N° INE 090644491GK
Academic Year / Année scolaire 2022/2023
Degree Program Bachelor of Science - S4 - Mathematics & Physics Double Major
Programme Bachelor en sciences - S4 - Double spécialité Mathématiques et Physique

Course Number Code de cours	Course Name Nom de cours	Letter Grade Note littérale	ECTS
EPLAN463fALL	Literatur - B2	A+	2
LAB251	LAB251 - PRL	A	3
MAA206	Euclidean and Hermitian Spaces	A	5
MAA207	Series of Functions, Differential Equations	B+	5
PDV203	Speech Contest	A+	2
PHY204	Classical Electrodynamics	A+	5
PHY205	Introduction to Quantum Physics	B	5
PHY206	Waves in Fluids, with illustrations from geophysics	A+	3
PHY207	Advanced Lab II	A	3
SPOSP	Sports	A+	1

ECTS obtained / Total ECTS
ECTS obtenus / Total des ECTS

34 / 34

GPA 3.86
Cumulative GPA 4.05



Chrystelle Legrand
Bachelor Program Director / Directrice déléguée du programme Bachelor
Ecole polytechnique Route de Saclay, Palaiseau, France 91128



Established in 1794, École Polytechnique is regularly ranked as France's first science and technology university awarding Bachelor, Master, and PhD level diplomas, and among the first institutions worldwide for employability and internationalization.

École Polytechnique's Bachelor of Science is a highly selective three-year program taught entirely in English to students coming from around the world. After a first year offering a core program in Mathematics, Computer Science, Economics and Physics, it leads to a double major in Mathematics & Computer Science, Mathematics & Economics or Mathematics & Physics. The program is extremely intense with an average of 30 hours per week in class. The course content is compact and prepares students to successfully continue graduate studies in either of their majors.

Admission to École Polytechnique's Bachelor Program is very competitive and students are of the highest academic level in STEM subjects. This Program is accredited by the French Ministry of Higher Education, Research and Innovation to award a "grade de licence", which is the official undergraduate degree in French higher education. This accreditation makes our students eligible for Master and graduate level programs, both in France and abroad.

Transcript Guide

The transcript is the student's official academic record. It includes course codes and names, letter grades received, Grade Point Average/Cumulative Grade Point Average, and ECTS credits obtained.

Course Codes

Course codes are alphanumeric and range from 100- to 300-level courses; first-year courses are typically indicated with a 100-level code, second-year courses with a 200-level code, and third year courses with a 300-level code.

As of the 2018-2019 academic year, language classes were re-coded: beginner courses were coded at the 100-level, intermediate courses at the 200-level, and advanced/culture courses at the 300-level.

ECTS Credits

École Polytechnique's Bachelor Program consists of six semesters over the course of which at least 180 ECTS credits must be obtained, with two semesters per academic year and an average of 14 weeks of courses per semester. The final year includes a research-based internship as the foundation for the Bachelor Thesis.

Each semester allows students to obtain at least 30 credits and a maximum of 36 credits. ECTS credits are awarded to each course, and are awarded only to courses in which a student receives a minimum grade of D or better.

When a student does not receive ECTS credits for a course given his/her poor academic performance, s/he may take a remedial exam. When a student passes a remedial exam, s/he can only receive a maximum grade of D; remedial passes are noted with an asterisk adjacent to the grade and include the following transcript notation: *Remedial course completion*.

Internships are not awarded ECTS credits.

Grade Point Averages (GPA)

GPA's are based on a 4.0 scale as follows:

A+	4.3
A	4.0
A-	3.7
B+	3.3
B	3.0
B-	2.7
C	2.0
D	1.0
E	0
F	0

GPA's are calculated each semester, and from Semesters 2 to 6, transcripts also contain a cumulative GPA. Only courses that are attributed ECTS credits are included in the GPA and cumulative GPA. The calculation of the GPA and cumulative GPA are weighted; that is, each course's contribution to the GPA is proportional to the number of ECTS credits it is assigned.

Grades ranging from A+ to D are passing grades, which allow students to receive ECTS credits.

As of the Spring Semester of the 2017-2018 academic year, Personal Development courses are no longer attributed letter grades, as their evaluation is assessed by a pass/fail.

Supplementary courses

Students are eligible to take (a) supplementary course(s) which would cause them to surpass the semestrial 36-credit limit. Only certain courses can be designated "supplementary courses" for the students. Supplementary courses are optional and are awarded ECTS credits; however, the ECTS credits obtained through the completion of such courses do not count towards the credits required for graduation or progression from one year to another. Furthermore, the grades obtained in supplementary courses do not count towards calculating the student's GPA. They appear on the transcript with the following notation: *Supplementary course*.

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:

Benedict

Q3. Your surname:

Van den bussche

Q16. Your email address:

benedict.van-den-bussche@polytechnique.edu

Q17. Confirm your email address:

benedict.van-den-bussche@polytechnique.edu

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

Q6. Your undergraduate/ bachelor's institution:

Ecole Polytechnique

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

- Full-time

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

N/A

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.

N/A

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.

Despite experiencing the loss of my grandfather in the middle of the exam period of the second semester of my second year, I came out with an overall GPA of 3.86 that semester. I have moreover chosen to follow and work doubly as hard in Quantum Mechanics 2 this autumn 2023 semester to further demonstrate my aptitude in the subject.

Embedded Data:

N/A

Benedict Van den bussche

Paris, France | benedict.van-den-bussche@polytechnique.edu | +33782880227 | [LinkedIn](#)

Franco-Belgian student, born in the Netherlands, studying not only physics and mathematics but also interested in Computer Science. Passionate about astrophysics, I wish to discover and participate in the world of research to better understand the evolution of galaxies.

EDUCATION

-
- | | |
|---|---------------------------------------|
| École Polytechnique | September 2021 - June 2024 |
| <ul style="list-style-type: none">□ Bachelor of Science in Mathematics and Physics with courses in Computer Science□ Cumulative GPA: 4.05 | |
| University of Toronto | September 2023 - December 2023 |
| <ul style="list-style-type: none">□ Exchange Semester - Quantum Physics 2, Astrophysics, High Energy Physics, Statistics, Complex Analysis□ Activities: Astronomy Tours, Astro on Tap, Astronomy & Physics Union | |
| Lycée International de Saint Germain en Laye | September 2018 - June 2021 |
| <ul style="list-style-type: none">□ American Section, OIB, "Mention" Very Good with the "Jury's Felicitations" | |

RESEARCH EXPERIENCE

-
- | | |
|---|----------------------------------|
| <ul style="list-style-type: none">□ Research Assistant - Paris Astrophysics Institute<ul style="list-style-type: none">○ Advisor: Professor Gary Mamon○ Probing the possible reversal of color segregation at high redshifts with Hyper Supreme Cam images with Prof. Gary Mamon as part of my Bachelor thesis○ Skills: Astrophysics, Python, Statistics | January 2024 - March 2024 |
| <ul style="list-style-type: none">□ Research Assistant - Leprince Ringuet Laboratory<ul style="list-style-type: none">○ Advisor: Professor Mathieu de Naurois○ Intercalibration of the 4 High Energy Stereoscopic System (HESS) Atmospheric Cherenkov Telescopes and analysis of the atmospheric effects on the detection of gamma rays under Prof. Mathieu de Naurois○ Skills: High Energy Astrophysics, C++, Root, Data Analysis, Statistics | February 2023 - June 2023 |
| <ul style="list-style-type: none">□ Research Intern - LadhyX Hydrodynamics Laboratory<ul style="list-style-type: none">○ Advisor: Professor Gabriel Amselem○ Studied the flows surrounding swimming micro-organisms in a microfluidic channel with Taha Laroussi under Prof. Gabriel Amselem○ Skills: Microfluidics, Python, Image Analysis, Computer Aided Design (3D Printing), Laboratory skills | June 2022 - July 2022 |

PROFESSIONAL EXPERIENCE

-
- | | |
|---|-----------------------------------|
| <ul style="list-style-type: none">□ Swiss Federal Ski Instructor, Schweizer Skischule Davos<ul style="list-style-type: none">○ Instruct skiing to skiers of all ages and follow regular technical and pedagogical training | December 2021 - March 2024 |
| <ul style="list-style-type: none">□ Assistant - Linear Rates Trading Crédit Agricole CIB<ul style="list-style-type: none">○ Assisted traders to optimize tasks, worked with Quants & IT on curve tracing and reported to management on the state of activities | June 2023 - September 2023 |
| <ul style="list-style-type: none">□ Internship at Valluet-Achache Avocats<ul style="list-style-type: none">○ Went to trials and analysed documents, helping a lawyer | July 2019 |
| <ul style="list-style-type: none">□ Internship at Samsung Artificial Intelligence research division<ul style="list-style-type: none">○ Programming Node JS, using and testing of connected objects | July 2018 |
| <ul style="list-style-type: none">□ Internship Meudon Observatory, LESIA<ul style="list-style-type: none">○ Shadowed and interviewed astrophysicists | June 2018 |

PRIZES AND DISTINCTIONS

-
- | | |
|--|------------------------|
| <ul style="list-style-type: none">□ French Mathematics Olympiads: Second Accessit | March 2019 |
| <ul style="list-style-type: none">□ Animath Contest Spring & Autumn: Accessit & Honorable mention | 2019 & 2020 |

EXTRACURRICULAR ACTIVITIES

- | | |
|---|-----------------------------------|
| <input type="checkbox"/> Bachelor Ambassador | April 2022 - June 2023 |
| <input type="checkbox"/> “Diversity and Success Pole” Ecole Polytechnique Helper | September 2022 - June 2023 |
| <input type="checkbox"/> Events Manager of the Volunteering and Rock Committee | November 2021 - June 2023 |
| <input type="checkbox"/> Physics Committee | November 2021 - June 2023 |
| <input type="checkbox"/> X-Finance and ‘X-Montagne’ Member | March 2022 - June 2023 |

SKILLS

- ☐ Languages: English (Native), French (Native), German C1 (Fluent), Chinese B1 (Intermediate), Dutch (Beginner)
- ☐ Programming Languages : Python, C++, Node JS, VBA, M-Code, Dax, Excel, Latex
- ☐ Hobbies: Theater (10+ years at Cours Florent), Trail running, Tennis, Skiing, Bikepacking

Name: Van den bussche, Benedict

Last (Family/Surname) Name, First (Given) Name Middle Name

Email: benedict.bussche@gmail.com

Gender: M

Date of Birth: September 03, 2003

Appointment Number: 4411 8072 2658 3122

Test Date: July 27, 2022



Van den bussche, Benedict
8 rue le Sueur
Paris, 75116
France

Inst. Code

Dept. Code

Country of Birth: Netherlands

Native Language: English

Test Center: STNRPFRA - Home Edition

Test Center Country: France

Security Identification

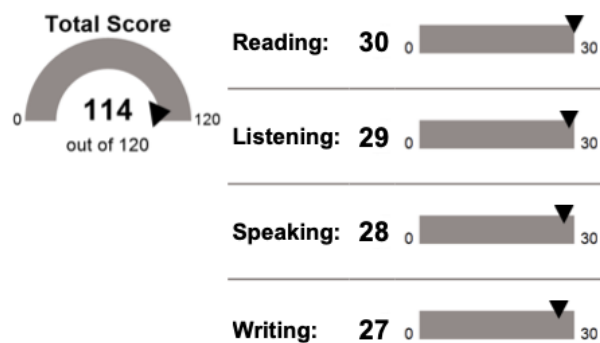
ID Type: National ID

ID No.: xxxxxxxxxxxxxxxxxxxxxx9186

Issuing Country: Belgium

THIS IS A PDF SCORE REPORT, DOWNLOADED AND PRINTED BY THE TEST TAKER.

July 27, 2022 Test Date Scores

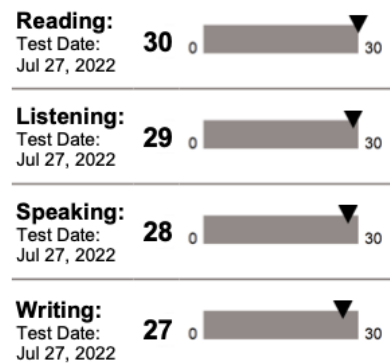


MyBest® Scores

Your highest section scores from all valid test dates, as of July 29, 2022.

Sum of Highest Section Scores

114
out of 120



A total score is not reported when one or more sections have not been administered.
Expired scores are not included in MyBest® calculations.

42-42

THIS IS A PDF SCORE REPORT, DOWNLOADED AND PRINTED BY THE TEST TAKER.

Van den bussche, Benedict

Date of Birth: September 03, 2003

Appointment Number: 4411 8072 2658 3122

Test Date: July 27, 2022

SCORE RANGES

Total Score	0–120
Reading	0–30
Advanced	24–30
High - Intermediate	18–23
Low - Intermediate	4–17
Below Low - Intermediate	0–3
Listening	0–30
Advanced	22–30
High - Intermediate	17–21
Low - Intermediate	9–16
Below Low - Intermediate	0–8
Speaking	0–30
Advanced	25–30
High - Intermediate	20–24
Low - Intermediate	16–19
Basic	10–15
Below Basic	0–9
Writing	0–30
Advanced	24–30
High - Intermediate	17–23
Low - Intermediate	13–16
Basic	7–12
Below Basic	0–6

INSTITUTION CODES

The Institutions and Department code numbers shown on the front page are the ones you selected before you took the test.

Dept.	Where the Report Was Sent
00	Admissions office for undergraduate study
01, 04-41, 43-98	Admissions office for graduate study in a field other than management (business) or law according to the codes selected when you registered
02	Admissions office of a graduate school of management (business)
03	Admissions office of a graduate school of law
42	Admissions office of a school of medicine or nursing or licensing agency
99	Institution or agency that is not a college or university

For additional information about TOEFL iBT scores, score ranges, and how to improve your skills, visit www.ets.org/toefl/ibt/scores.

IMPORTANT NOTE TO SCORE USERS: This is a PDF score report, downloaded and printed by the test taker. Therefore, ETS cannot guarantee that it has not been altered. To verify the scores on this report, please contact the TOEFL Score Verification Service at +1-800-257-9547 or +1-609-771-7100. Scores more than two years old cannot be reported or validated.

Academic reference for Mr Benedict Van den bussche

MASt in Astrophysics

Referee Details

Name	Professor Arnaud Couairon	Job title	Professor
Email	arnaud.couairon@polytechnique.edu	Department	Center for Theoretical Physics
Phone		Institution	Ecole Polytechnique
Relationship	Professor Classical Electrodynamics	City	Palaiseau
Known for	February 2022 to present	Country	France

Reference

Academic ranking	Among the top 10% in year (i.e., in the top 4 if the group size was 40) 53
Student potential	Distinctly original/creative/independent of thought
Course suitability	Exceptionally Suitable

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



Established in 1794, École Polytechnique is regularly ranked as France's first science and technology university awarding Bachelor, Master, and PhD level diplomas, and among the first institutions worldwide for employability and internationalization.

École Polytechnique's Bachelor of Science is a highly selective three-year program taught entirely in English to students coming from around the world. After a first year offering a core program in Mathematics, Computer Science, Economics and Physics, it leads to a double major in Mathematics & Computer Science, Mathematics & Economics or Mathematics & Physics. The program is extremely intense with an average of 30 hours per week in class. The course content is compact and prepares students to successfully continue graduate studies in either of their majors.

Admission to École Polytechnique's Bachelor Program is very competitive and students are of the highest academic level in STEM subjects. This Program is accredited by the French Ministry of Higher Education, Research and Innovation to award a "grade de licence", which is the official undergraduate degree in French higher education. This accreditation makes our students eligible for Master and graduate level programs, both in France and abroad.

20 November 2023

Recommendation letter for the application of **Benedict Van den busshe** to the University of Cambridge for admission to MAST in Astrophysics.

It is my pleasure to recommend Benedict Van den busshe's candidacy for admission to MAST in Astrophysics at the University of Cambridge. Benedict Van den busshe was my student during two complete semesters (S2 and S4) for the Electromagnetism and Light (1st year) and the Electrodynamics courses (2nd year) of the Bachelor program at Ecole polytechnique, France. I have therefore closely followed his progress during two years of his Bachelor as I had the opportunity to know him very well, having taught both lectures and tutorials.

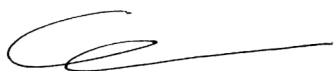
Benedict Van den busshe is an outstanding student of our bachelor program. He follows the mathematics and physics, double major bachelor program. His academic results in the courses I taught or exams I corrected were always among the best results. For the classical electrodynamics course, Benedict obtained the average grade of 18.4/20, which is immediately behind the highest grades received by three truly exceptional students in the class. Benedict belongs to the group of extremely motivated and strong students in this class. The teaching assistants and I share an excellent impression of Benedict's performance.

From discussions with Benedict, it appears clearly that he is fascinated by astrophysics, observations of distant galaxies, and the challenge raised by the connection of observations to theories in physics. While his long term goal is to become a researcher in experimental astrophysics, Benedict also plans to further develop and use his skills in computer science and data analysis. He had the opportunity to discover astrophysics during internships as well as during his semester at the University of Toronto, where he could meet inspiring astrophysicists. His wishes for the near future are oriented to deepen his knowledge of all subfields related to astrophysics.

Benedict has a very strong motivation and scientific maturity that will allow him to broaden his scientific profile during his graduate studies, as clearly shown from the fact that he actively sought research projects to complement his education at Ecole polytechnique and at the University of Toronto. Benedict also attended as many astronomy and physics events as possible. For instance, he is member of Astrotours in Toronto. Benedict already knows that after completing a PhD, he would like to work in academia and focus on research in astrophysics, teaching, and advising policy makers in science. I have no doubt that he will acquire the strongest possible expertise in astrophysics and computer science to serve this goal.

I noticed in tutorials and group works that Benedict Van den busshe is an excellent team player, but this is also illustrated by Benedict's extra-curriculum activities. Benedict is talented for organizing events and coordinating committees or teams. He knows how to break down a problem into smaller problems and how to organize efficiently a team work to solve the problem. Benedict speaks enthusiastically in public. At Ecole polytechnique, he reached almost the last round in the Speech contest. Benedict was also bachelor ambassador, helping prospective and admitted students during integration. Finally, Benedict has experience in teaching and in pedagogical methods as he is tutoring High school students in mathematics and he is a ski instructor during his holidays.

In conclusion, Benedict Van den busshe has a very high potential for pursuing a challenging program in astrophysics and planetary sciences. He showed a deep interest for a wide range of fields in science as well as for any complementary skills he could gain to prepare himself to a future scientific career in astrophysics starting with a PhD. I can certify that his skills and the experience matured during his studies at Ecole Polytechnique puts him in excellent condition to carry out with great success the MAST program in Astrophysics at the University of Cambridge. I strongly recommend Benedict Van den busshe's application.



Arnaud Couairon,
Director of Research at CNRS,
Professeur chargé de cours at the physics department of Ecole Polytechnique.

Centre de Physique Théorique, CNRS, Ecole Polytechnique
F-91128 Palaiseau, France
e-mail: arnaud.couairon@polytechnique.edu
(+33) 1 69 33 42 24

Academic reference for Mr Benedict Van den bussche

MASt in Astrophysics

Referee Details

Name	Professor Mathieu de Naurois	Job title	Professor and Research Director
Email	mathieu.de-naurois@polytechnique.edu	Department	Leprince-Ringuet Laboratory
Phone	+33169335594	Institution	Ecole Polytechnique
Relationship	Research Project Supervisor	City	Palaiseau
Known for	december 2022 to june 2023	Country	France

Reference

Academic ranking	Among the top 10% in year (i.e., in the top 4 if the group size was 40) I'm supervising directly only a handful of students per year.
Student potential	Distinctly original/creative/independent of thought
Course suitability	Very Suitable

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



Dr. Mathieu de Naurois
Research Director
Associate Professor at Ecole Polytechnique
phone: +33 1 69 33 55 97
FAX: +33 1 69 33 30 02
email: mathieu.de-naurois@polytechnique.edu, denauroi@in2p3.fr

Palaiseau, December 4th 2023

Object: Letter of Recommendation for Mr. Benedict Van den Bussche's Application to the Master of Advanced Study in Astrophysics Program at the University of Cambridge

To whom it may concern,

I am delighted to express my strong support for Mr. Benedict Van den Bussche's application to the Master of Advanced Study in Astrophysics (MASt) program at the University of Cambridge. Mr. Benedict Van den Bussche is currently a Bachelor's student at Ecole Polytechnique, Palaiseau, where I serve as an associate professor. While I have not had the pleasure of instructing Mr. Benedict Van den Bussche directly, a review of his academic transcripts indicates that he is an attentive and highly capable student.

In December 2022, Mr. Benedict Van den Bussche approached me for a laboratory research project. He became a valuable member of my research group, contributing to a project focused on the inter-calibration of telescopes within the H.E.S.S. array of telescopes for Very High Energy Gamma-Ray Astronomy. Specifically, his project involved utilizing an Unmanned Aerial Vehicle equipped with flashing LEDs to aid in the calibration process. Over the course of six months in the first semester of 2023, dedicating half a day per week, he developed new algorithms and analyzed data collected during two observation campaigns. To accomplish this, he undertook the task of learning C++ and created analysis frameworks commonly employed in the High Energy Physics community, notably utilizing the ROOT software (<http://root.cern.ch>).

Throughout the duration of the project, Mr. Benedict Van den Bussche consistently demonstrated exceptional skills and motivation. His work showcased innovative ideas, including leveraging image consistency among telescopes and precise timing to distinguish events caused by the drone from those induced by cosmic rays in the atmosphere. Despite the relatively short timeframe of the project, he acquired a comprehensive understanding of the tools and demonstrated efficiency and creativity in his work. Moreover, he consistently exhibited a profound motivation to continue pursuing high-energy astrophysics, displaying a genuine curiosity about the telescopes' operations and the astrophysical research conducted with them.

Given his evident dedication, strong motivation, and the skills he has exhibited, I wholeheartedly recommend Benedict Van den Bussche for admission to the Master of Advanced Study in Astrophysics program at the University of Cambridge. I am confident that he will approach this opportunity with seriousness, diligence, and a commitment to continuous learning. Please feel free to contact me for any additional information you may require.

Your sincerely,

Mathieu de Naurois
Research Director
Associate Professor
IN2P3 – CNRS &
École Polytechnique

Gates Cambridge reference for Mr Benedict Van den bussche

MASt in Astrophysics

Referee Details

Name	Professor Riwal Plougonven	Job title	Professor
Email	riwal.plougonven@polytechnique.edu	Department	Dynamical Meteorology Laboratory
Phone	33 1 69 33 51 90	Institution	Ecole Polytechnique
Relationship	Teacher	City	Palaiseau
Known for	11 months	Country	France

Reference

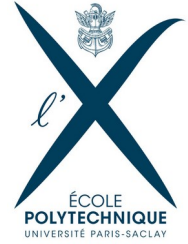
Gates ranking	Top 5% - Outstanding	Gates group	Students on a particular course/in a particular class
Gates group size	30		

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



LABORATOIRE DE MÉTÉOROLOGIE DYNAMIQUE

UMR 8539 - ÉCOLE POLYTECHNIQUE – ROUTE DE SACLAY
91128 Palaiseau Cedex, FRANCE
Secrétariat : +33 (0)1 44 32 22 21
Site Web : <http://www.lmd.jussieu.fr/>



Pr. Riwal Plougonven
tel: (+33) 1 69 33 51 90
mel: riwal.plougonven@polytechnique.edu

November 28, 2023

Object: recommendation for Benedict Van Den Bussche

Dear Sir or Madam,

I am writing to very strongly recommend Benedict Van Den Bussche for the MAST in Astrophysics at the University of Cambridge.

I have known Benedict as a student in early 2023. He has followed my course on 'waves in fluids' during his second year of Bachelor at Ecole Polytechnique, from January to March 2023. He was one of the top students in the class. There were 30 students, the group was excellent, and included a handful of very bright and enthusiastic students. During the course, Benedict stood out as one of the sharpest students, following carefully all developments, calculations and notions introduced in class, and contributing very constructively. He cared to understand, and grasped everything as far as I could tell. He was at ease to speak in discussions, but did not seek to impress or to demonstrate that he had understood. It is a pleasure to have such students, not only because he is bright and sharp, but also because his exemplary attitude contributed very positively to the atmosphere in the class. He obtained a perfect grade of 20/20 and A+ for this course.

I very strongly recommend him. He is among the brightest in his year. He is very serious and dedicated to his studies. I have had the chance to discuss his orientation with him, it was a very enjoyable discussion ; he is extremely motivated and thoughtful. I am fully confident that he will continue to perform exceptionnally well in his graduate studies, and that he will contribute very positively to the institution that he joins, in class and outside.

Sincerely yours,