

# Cover Letter

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Hi,

I am applying to the remote position of machine learning engineer because it aligns with my skills and interests in a career in machine learning gained over the course of the MSci Physics with Theoretical Physics degree at the University of Nottingham and two summer projects.

My undergraduate project was detecting quantum entanglement and measuring the entropy of modelled q-bits systems using deep learning with application in quantum computing of up to 3 q-bits, and my masters project was modelling gravitationally lensed dark matter substructure with convolutional neural networks with application in preparation for detection and classification of open data sets to be released from new telescope facilities.

In the summers between my course, I was employed in a physics research group at the University of Nottingham where I was responsible for the modelling of magnetic shields with applications in MRI and MEG medical rooms or in British Geological Survey technologies, and presented the medical applications of this work at the New Scientist Live 2018 London Summer Exhibition. I was invited back for another summer, where I was responsible for modelling the detection of Eddy current distributions using optically pumped atomic magnetometers for magnetic induction tomography imaging of interest to both surveillance technologies and heart imaging, and this work has been published in a journal in collaboration with the National Physics Laboratory DOI: 10.1063/1.5145251.

During my time in Nottingham, I have also worked various temp jobs as a UCAS & open days student ambassador, demonstrator in public science outreach initiatives (e.g. presenting science at the park & traveling with an inflatable planetarium), and as a GCSE & A Level Mathematics teaching assistant for a term in a local school.

Since graduating and during the pandemic lockdowns I have been self employed as a cryptocurrency investor and miner, starting with the graphics cards that I had from the machine learning projects. After a year, the lessons learned are that the investment business is unstable even though it is safer and relatively passive on small stakes, and that the mining requires costly hardware maintenance, so I am now pursuing a more stable career.

I have enclosed my CV and transcript. If you require any additional information, please feel free to contact me.

Thank you,  
Diego

# DIEGO BOTELHO

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## EDUCATION

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### MSci Physics with Theoretical Physics

Sep 2016 – July 2020

*University of Nottingham*

- Bachelor's Project: Detecting Quantum Entanglement with Deep Learning.
- Master's Project: Modelling Gravitational Lensing with Convolutional Neural Networks.
- Nottingham Advantage Award.

### Secondary Education Diploma

Sep 2013 – July 2016

*Escola Secundária Jácome Ratton*

- Completed with 19/20 grade average studying Mathematics, Physics, Biology, Philosophy, English, and Portuguese.

## EXPERIENCE

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### Physics Research Assistant

July 2019 – Sep 2019

*University of Nottingham*

- Developed computer models of magnetic induction tomography imaging systems for medical and security applications.
- This work has been published in collaboration with NPL in an academic journal DOI: 10.1063/1.5145251.

### Mathematics Teaching Assistant

Jan 2019 – Mar 2019

*Nottingham Trent University*

- As part of the Students in Classrooms scheme, tutored pupils GCSE & A Level Mathematics in a local secondary school.
- This role involved weekly tutoring to small groups of students and assisting with large classroom management.

### Physics Research Assistant

July 2018 – Sep 2018

*University of Nottingham*

- Built computer simulations of magnetic shielding for imaging technologies of interest to the Dstl, NHS, and BGS.
- Presented the medical applications of this work at New Scientist Live 2018 in London (Summer Science Exhibition).

### Public Science Outreach

Sep 2017 – July 2020

*University of Nottingham*

- Delivered science demonstrations to a variety of age groups of the general public as part of science outreach initiatives.
- These events include the Inflativerse, Discovery Day, Festival of Science & Curiosity, Science in the Park, and others.

### Student Ambassador

Sep 2017 – July 2020

*University of Nottingham*

- Showed prospective students the university while providing guidance about the physics course structure and student life.
- UCAS days, Open days, interview days, and other welcome events in collaboration with university public outreach.

### IT Support Technician

July 2017 – Sep 2017

*Sino Consulting Ltd*

- Solved time-sensitive technical issues overnight for a music software company with clients based in different time-zones.
- Troubleshooting user problems and reporting to the software engineers in a highly communicative and timely manner.

## SKILLS

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*Driving License*

Car and motorcycle, full, clean.

*Languages*

Native Portuguese, English IELTS 8.5/9 CEFR C2.

*Software*

L<sup>A</sup>T<sub>E</sub>X, MATLAB, Python, TensorFlow, COMSOL Multiphysics, MS Office 365

## REFERENCES

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Available upon request



This Diploma Supplement follows the model developed by the European Commission, Council of Europe and UNESCO/CEPES. The purpose of the Supplement is to provide sufficient independent data to improve the international "transparency" and facilitate academic and professional recognition of qualification (diplomas, degrees, certificates, etc.). It provides a description of the nature, level, context, content and status of the studies that were pursued and successfully completed by the individual named on the original qualification to which this supplement is appended.

## 1 INFORMATION IDENTIFYING THE HOLDER OF THE QUALIFICATION

**1.1 Family name(s)** Botelho Silva Reis  
**1.2 Given name(s)** Diego Jose

**1.3 Date of Birth** 10 March 1998  
**1.4 Student ID** 14274319  
**HESA Reference** 1611554743193

## 2 INFORMATION IDENTIFYING THE QUALIFICATION

**2.1 Qualification** Master in Science with Honours  
**2.2 Programme of Study** Physics with Theoretical Physics

**2.3 Awarding Institution(s)** The University of Nottingham  
**2.4 Administering Institution(s)** The University of Nottingham, United Kingdom  
**2.5 Language of Instruction** English

## 3 INFORMATION ON THE LEVEL OF THE QUALIFICATION

**3.1 Level of Qualification** 7  
**3.3 Access Requirements** Please see overleaf

**3.2 Length of Programme** 4 year Integrated Master's

## 4 INFORMATION ON THE CONTENTS AND RESULTS GAINED

**4.1 Mode of study** Full-Time  
**4.3 Program Details**

**4.2 Programme Requirements** Please see overleaf

### 2019/20 Academic Year

Course Code	Title	Mark	1st Resit Mark	2nd Resit Mark	Credits	ECTS
PHYS 4002	Gravity	58			10	5.0
PHYS 4015	Physics Research Project	75			50	25.0
PHYS 4020	Research Techniques in Astronomy	61			20	10.0
PHYS 4029	Order, Disorder and Fluctuations	72			20	10.0
PHYS 4016	Modern Cosmology	68			20	10.0

### 2018/19 Academic Year

Course Code	Title	Mark	1st Resit Mark	2nd Resit Mark	Credits	ECTS
PHYS 3001	Atoms, Photons and Fundamental Particles	48			20	10.0
PHYS 3002	Introduction to Solid State Physics	54			20	10.0
PHYS 3004	Physics Project B	65			20	10.0
PHYS 4003	Introduction to Cosmology	53			10	5.0
PHYS 4007	Scientific Computing	36			10	5.0
PHYS 4017	Quantum Dynamics	59			10	5.0
PHYS 3015	Theory Toolbox	42			10	5.0
PHYS 4009	Extreme Astrophysics	60			10	5.0
PHYS 4013	Theoretical Elementary Particle Physics	56			10	5.0

### 2017/18 Academic Year

Course Code	Title	Mark	1st Resit Mark	2nd Resit Mark	Credits	ECTS
PHYS 2001	The Quantum World	51			20	10.0
PHYS 2002	Thermal and Statistical Physics	70			20	10.0
PHYS 2003	Classical Fields	67			20	10.0
PHYS 2004	Wave Phenomena	72			20	10.0
PHYS 3007	The Structure of Stars	71			10	5.0
PHYS 3010	Principles of Dynamics	57			10	5.0
PHYS 3011	The Structure of Galaxies	80			10	5.0
PHYS 3013	Symmetry and Action Principles in Physics	63			10	5.0

### 2016/17 Academic Year

Course Code	Title	Mark	1st Resit Mark	2nd Resit Mark	Credits	ECTS
MATH 1013	Mathematics for Physics and Astronomy	69			20	10.0
PHYS 1001	From Newton to Einstein	58			40	20.0
PHYS 1002	Introductory Experimental Physics	66			20	10.0
PHYS 1003	Frontiers in Physics	58			20	10.0
PHYS 1004	Quantitative Physics	80			10	5.0
PHYS 1005	Computing For Physical Science	75			10	5.0

**Total Credits** 480 240  
**Final Mark** 62  
**Date of Award** 24 July 2020

**4.4 Grading Scheme** Please see overleaf

**4.5 Degree Classification** Second Class, Division One

## 5 INFORMATION ON THE FUNCTION OF THE QUALIFICATION

Please see overleaf





**6 ADDITIONAL INFORMATION**

**Nottingham Advantage Award**

NAA 1104

Internships and Placements

NAA 1570

Peer Mentoring (Centralised)

The Nottingham Advantage Award is a 30 credit modular employability Award. The Award is comprised of 10 credit and 20 credit courses and 30 credits leads to achievement of the Nottingham Advantage Award.

**7 CERTIFICATION OF THE SUPPLEMENT**

**7.1 Date Diploma Supplement Issued** 10 August 2020

**7.2 Signature**

**Name**

Professor Shearer West

Dr Paul Greatrix

**7.3 Capacity**

President and Vice-Chancellor

Registrar

