Thomas Preston PhD Scholarship Programme 2018
Applicant Form

This Word document is provided to allow applicants to make an application through the online system by the deadline of **16:00 (Irish time) on 16th March 2018.** Please see the **2018 Thomas Preston Guidelines for Applicants**, available on the UCD School of Physics website for further information prior to submitting your application online. All sections of this form must be completed in full.

Eligibility

Do you have a first class or upper second-class honours bachelor's (or equivalent) degree? If examination results are not known at the time of application, the School may make a provisional offer on condition that the applicant's final grade for their bachelor's (or equivalent) degree is a first class or upper second-class honours.	
Yes	X
No	
Bachelor's degree results unknown at time of application	

If no: Do you have a master's degree?	
Yes	X
No	

Applicant Details

Name: **Lucas McConnell**

Email address: **LMHMcConnell@gmail.com**

Contact telephone number: **0897080288**

Contact address:

49 Sli Na Sruthan,
Clybaun Road,
Knocknacarra,
County Galway,
Ireland,
H91 F8W5

Please select the gender you identify with:	
Male	X
Female	
Other	

Date of birth: **19/12/1990**

ORCID ID*:* 0000-0003-4724-3

ORCID ID provides a persistent digital identifier that distinguishes you from every other researcher. If you do not currently have an ORCID ID, please register for one at www.orcid.org and provide us with your unique 16-digit identifier

What is your nationality, i.e. your passport-issuing country?

Ireland and South Africa

If you are from the Republic of Ireland or Northern Ireland, which county are you from?

County Antrim

Will you be in receipt of any additional awards during the scholarship period, e.g. scholarships, bursaries, travel grants etc.?	
Yes	
No	X

Academic Supervisor Details

Primary Academic Supervisor:

Name: **Professor Ronan McNulty**

Institution: **University College Dublin**

Email address: **ronan.mcnulty@ucd.ie**

Secondary Academic Supervisor (if applicable):

Name:

Institution:

Email address:

Referee Details

Referee 1

Name: **Sahal Yacoob**

Organisation or institution: **University of Cape Town**

Position: **Senior Lecturer**

Email address: **sahal.yacoob@uct.ac.za**

Referee 2

Name: **Andrew Hamilton**

Organisation or institution: **Quest University Canada**

Position: **Physics Sciences Tutor**

Email address: **andrew.hamilton@questu.ca**

Referee 3

Name: **Andy Buffler**

Organisation or institution: **University of Cape Town**

Position: **Head of Department**

Email address: **andy.buffler@uct.ac.za**

Academic Qualifications

Bachelor's Degree (or equivalent)

Institution: **University of Cape Town**

Graduation date:
19/12/2014

Qualification type and name:
Bachelor of Science Honours specialising in Physics

Final grade or grade point average:
Equivalent to a 2:1 (63%)

Degree results entered here must be the applicant's overall results and be verified as such on official transcript(s).

Any additional information relating to this degree or your final grade can be included here:

Max 300 words

Second Bachelor's Degree (if applicable)

Institution:

Graduation date:
dd/mm/yyyy

Qualification type and name:

Final grade or grade point average:

Degree results entered here must be the applicant's overall results and be verified as such on official transcript(s

Any additional information relating to this degree or your final grade can be included here:

Max 300 words

Master's Degree (if applicable)

Type:	
Taught	
Research	X

Institution: **University of Cape Town**

Graduation date:
15/12/2017

Qualification type and name:
Master of Science specialising in Physics

Final grade or grade point average:
Pass

Degree results entered here must be the applicant's overall results and be verified as such on official transcript(s

Any additional information relating to this degree or your final grade can be included here:

Max 300 words

Second Master's Degree (if applicable)

Type:	
Taught	
Research	

Institution:

Graduation date:
dd/mm/yyyy

Qualification type and name:

Final grade or grade point average:

Degree results entered here must be the applicant's overall results and be verified as such on official transcript(s).

Any additional information relating to this degree or your final grade can be included here:

Max 300 words

Other Education

Please provide any additional information relevant to your academic background which should include the name, location and date(s) of any training courses attended:

- CERN Non-Member State Summer Student, 2015, summer project with the LHCb collaboration.
Project Title: Optimising Event Selection for a particle angular correlation analysis at LHCb.

- Graduate of the CERN School of Computing, Sept 2015, hosted in Kavala, Greece.

- Attendance at the Bayes School, Nov. 2016, training course on Bayesian statistics, hosted in Stellenbosch, South Africa.

- Attendance at the Chris Engelbrecht Summer School, Jan. 2015, training course on LHC physics.

- Attendance at the International Workshop on Discovery Physics at the LHC, Dec. 2016, at the Kruger National Park, South Africa.

Research Achievements

Please provide any additional information regarding your research achievements to date such as publications, research awards, creation of data sets and databases, conference papers, patents, excavations, public broadcasts, stage performances, creative writing, creative productions and/or exhibitions:

Publications:
- “Using a Classical Gluon Cascade to study the Equilibration of a Gluon-Plasma”, Journal of Physics: Conference Series 645 (2015) 012013.

- “Estimation of jet-faked muon background in W-boson scattering at $\sqrt{s}$ = 13 TeV with the ATLAS detector”, South African Institute of Physics Annual Conference 2016, Conference Proceedings, ISBN: 978-0-620-77094-1

Presentations:
- Poster presentation at the South African Institute of Physics Annual Conf. held at the University of Cape Town, South Africa, June 2016.

- Presented Bachelor’s thesis, titled “Using a Classical Gluon Cascade to study the Equilibration of a Gluon-Plasma”, at High Energy Particle Physics Workshop at the University of the Witswaterand, South Africa, Feb 2015.

Work Experience

Please provide details of any relevant work experience, including tutoring/demonstrating and voluntary work, to date which should include employers' names, job titles, nature of duties and responsibilities, as well as duration of employment:

2017-present: Self-Employed Private Tutor, Galway, Ireland. Description: Provide private tuition in mathematics and physics at secondary and tertiary level. This includes some work done for the Educational Support Service at the National University of Ireland Galway (NUIG), providing tuition to students with disabilities.

2014-2017: Private Tutor at TipTop Tutors (part-time), Cape Town, South Africa. Description: Worked for a private tutoring company. Tutored mathematics and physics at secondary and tertiary level.

2014-2017: Tutor at the University of Cape Town (part-time), Cape Town, South Africa. Description: Tutored and demonstrated (experimental practicals) for first year physics courses.

2010-2013: Technical Clerk at SA Five Engineering (part-time), Cape Town, South Africa. Description: Had responsibilities equivalent to a trainee engineer and learnt basic construction work; including: grinding, cutting, and welding.

Proposed Research

Project title:

Central Exclusive Production at LHCb

Primary area:

Physics

(Particles and Fields Physics)

Keywords describing proposed research:

Particle Physics, Large Hadron Collider, CERN, LHCb, Central Exclusive Production

Please provide a lay abstract for your proposed research, which will be used to inform a non-expert audience:

The Standard Model of particle physics was developed in the latter half of the twentieth century and describes how matter is comprised of point-like particles that interact via three fundamental forces. The Standard Model has undergone stringent testing and successfully describes the fundamental structure of our universe. Some of the experimental confirmation of the Standard Model has come from the European Organisation for Nuclear Research (CERN), home to the largest and most powerful particle accelerator in the world: the Large Hadron Collider (LHC). The LHC is capable of colliding both proton pairs and pairs of heavy-ions (such as lead nuclei). Atoms are comprised of three particles: electrons, protons, and neutrons. Protons and neutrons are themselves made up of combinations of other particles, called quarks and gluons. By colliding protons at high energy at the LHC, we hope to probe the internal workings and structure of the protons. This process is akin to smashing a delicate wristwatch with a sledgehammer and then attempting to figure out how the watch

worked. The manner in which quarks and gluons interact amongst themselves is described by what is called Quantum Chromodynamics (QCD) field theory. One of the most promising approaches to investigating QCD is through what is called central exclusive production. Central exclusive production involves collisions at the LHC, in which the protons remain intact, as opposed to disintegrating which is what usually occurs. This scenario is exciting because it could represent an opportunity to search for entirely new physics phenomena, including new exotic particles.

Please provide details of your proposed research to include (a) aims, objectives and central research questions of the project, (b) how existing literature on the topic has been used to inform the proposal and (c) how the project will advance state of the art and make a contribution to existing knowledge:

The research aims are to measure the production rate of J/(Psi) and psi(2S) mesons produced in central exclusive collisions of protons and ions and, from these results, constrain the gluon distribution of the proton, measure nuclear suppression factors, and investigate saturation effects. Most LHC collisions produce hundreds of particles. However, in central exclusive production, the protons or ions emit colourless propagators that fuse to give a unique and simple experimental signature that can be predicted using perturbative Quantum Chromodynamics (QCD). At leading-order, J/(Psi) and psi(2S) mesons are produced via the exchange of a photon and a pomeron (a colourless combinatin of two gluons). When the pomeron is emitted from the proton, a measurement of charmonium production in proton-proton or proton-lead collisions directly accesses the gluon parton density function (PDF) of the proton. On the other hand, when the pomeron is emitted from the lead ion, nuclear PDFs are investigated; here, a suppression of the rate when compared to proton-proton collisions is expected due to nuclear shielding. An intriguing aspect of QCD is that gluon densities increase rapidly with decreasing fractional parton momenta, but it is expected that, at some scale, the density of gluons in the proton ‘saturates’ and QCD will exhibit a new phenomenology. This proposal probes the PDFs at fractional parton momenta down to 10^-6, where they have never been measured before, and hence, will also look for evidence of saturation.

Previous analysis published by the LHCb collaboration of data taken during the LHC’s Run 1 proton-proton collisions (with centre-of-mass energy of 7 TeV) measured cross-sections for both exclusive J/(Psi) and psi(2S) production (J.Phys. G41 (2014) 055002). These measurements were limited by knowledge of the backgrounds and the two-fold ambiguity concerning which proton the photon radiated from. The former has been addressed with the installation of a new sub-detector close to the beam-line while the latter can be resolved by looking instead at proton-ion collisions (Phys.Rev.Lett. 113 (2014) no.23, 232504). Recent theoretical work has shown how these results can be used to extract the gluon PDF (Eur.Phys.J. C76 (2016) no.11, 633), to look for saturation effects (Phys.Rev. D90 (2014) no.5, 054003), and to extract nuclear suppressions factors using lead-ion collisions (JHEP1310 (2013) 207).

The previous measurements made by my proposed Ph.D. supervisor have over 100 citations, demonstrating the importance of these results. Nonetheless, they are limited, as described above. I will perform the first measurement at LHCb using proton-lead collsions and the upgraded Run2 detector. Hence, improving precision by a factor of two, allowing for more sensitive constrains on the gluon PDF and saturation searches. My analysis of proton-lead collisions will also allow nuclear suppression factors to be extracted with a novel technique. This is relevant given that inclusive J/(Psi) production in lead-lead collisions show hints of unexpected behaviour that could be due to saturation (Phys.Lett. B734 (2014) 314-327). I will provide the first measurement of J/(Psi) production in proton-proton collisions at the highest ever collider energy (14 TeV), available after the upgraded LHC restarts data taking in 2021.

Please detail the research design and methodologies to be employed in carrying out your scholarship which should be described in sufficient detail to demonstrate your thorough understanding of the research topic:

Particle physics is the study of matter on the smallest known scale. An experimental analysis in particle physics, involves accelerating particles to high energy using accelerators, and colliding them together. The particles produced in the collision are analysed using detectors that can measure the emerging particles momenta and energies, and thus partially (or in the case of central exclusive production, totally) reconstruct the interaction.

The Large Hadron Collider (LHC) collides bunches of protons (or heavy-ions such as lead nuclei) at a rate of 40 million per second. The LHCb detector surrounds the interaction point and detects the collision remnants with each interaction producing about a megabyte of raw data. This mammoth quantity of data which would be impossible to process in its entirety even with modern electronics, however the raw data contains mostly uninteresting events that are discarded by a two-layer triggering system: a fast hardware decision followed by a slower and more sophisticated software decision. About 1PB of data is collected each year and this is stored on and analysed using the Grid, a distributed system of interconnected computing resources at each of the collaborating institutes. The luminosity, the number of the particles per centimetre squared per second, delivered to the LHCb detector is also recorded.

To measure the cross-section for exclusive J/(Psi) and Psi(2s) production, defined as the number of mesons produced in a given integrated luminosity, I must identify signal contributions, representing the physics processes of interest, and suppress undesirable background contributions from other physics processes that mimic the signal processes. I will employ a variety of analysis cuts on kinematic and other properties of the detected particles are in order to suppress backgrounds while preserving signal contributions. The idea is to isolate the signal contributions as much as practically possible. I will then develop calibration channels in order to estimate the efficiency of my selection criteria and evaluate the contamination. This process requires a full understanding of the LHCb detector and in particular, a new sub-detector consisting of scintillators in the forward region close to the beam. This is vital in order to veto non-exclusive backgrounds that occur when the colliding particles break-up, rather than remain intact. I will need to calibrate and understand the detector response in detail as this will provide a major improvement over the existing measurements.

The first measurement I will make will use proton-lead collisions. This data was collected in 2016 and awaits analysis. The second measurement I will make will use proton-proton collisions at the highest ever energy. This data will be taken in 2021 and, informed by my experience on the first measurement, I will help develop the trigger strategy and participate in the data-taking at CERN. In collaboration with theorists at Durham, Krakow and Pelotas (Brazil), I will then interpret my cross-section results in terms of the gluon PDF, saturation and nuclear effects.

Please provide a schedule to include (a) milestones and deliverables for completion of the proposed research, (b) risks that might endanger reaching these deliverables and (c) the contingency plans to be put in place in order to mitigate these risks:

(a)

Oct. 2018 - Mar. 2019: LHCb service task, necessary to qualify as an author of the LHCb collaboration.

Oct 2018 - Sep. 2019: Engagement with the relevant academic literature. Mastery of the software used by the LHCb collaboration and in particular the Grid distributed computing system. Development of data-mining algorithms to retrieve sample of exclusive events.

D1: Deliverable 1 (Sep 2019): Production of sample of exclusive events containing muons (J/(Psi) and Psi(2s) will be identified from their decays to muons.)

Oct 2019 – Sep 2020. Refinement of selection criteria using data in D1 to produce signal and calibration samples. Derivation of efficiency and purity of signal sample. Calculation of cross-section.

D2: Sep 2020. Presentation of preliminary cross-section result to the collaboration.

Oct 2020 – Mar 2021. Engage with the internal review process of the LHCb collaboration (700 physicists). Many presentations and validation plots will be requested. Once approved by the collaboration I will write the paper.

Oct 2010-Mar 2021. Based on my experience with the previous data, I will update the triggering algorithms in preparation for the 2021 running.

D3: March 2021. Paper submitted to scientific journal.

Apr 2021 – Sep. 2021: Spend six months at CERN collecting data at the highest LHC energy (14 TeV). I will be part of the 24/7 team stationed over the experimental cavern, responsible for logging data and ensuring its quality.

D4: (Oct 2022): Delivery of signal sample mined from data I took in previous six months.

Oct 2021 – Mar 2022: Cross-section measurement performed using tools I developed for previous paper. This progresses faster than previously as the tools and techniques are similar.

D5 (Mar 2022): Paper using 14 TeV data submitted to journal.

Mar 2022-Sep 2022. Complete thesis using material of my two published papers.

D6 Sep 2022. Thesis submitted.

(b):

There are no risks with the first phase as the data has already been taken and is ready for analysis. There is however a risk that the LHC might have a delay in starting its new run in 2021.

(c): If the delay to the LHC startup is less than 6 months, much of the analysis and thesis writing (scheduled for the last year of the Ph.D) can proceed in advance. The analysis can be developed using 13 TeV data that was taken in 2016 and 2017. Once the (delayed) 14 TeV arrives, it will take about 3 months to develop the calibrations for it and update the 13 TeV results with the new data.

If the delay to the LHC startup is in excess of 6 months, then the 13 TeV data analysis will be completed and reported in the thesis. There is a small loss of sensitivity for the PDFs and search for saturation due to the lower centre-of-mass energy. On the other hand, the time freed up by not collecting the 14 TeV data can be used to make a deeper theoretical study using a combination of the proton-lead and 13 TeV proton-proton data.

Please outline your plans for the dissemination and knowledge exchange of your research, including publications, conference attendance, poster presentations, reports and outreach activities. Details should also be provided as to how the impact of your research will be measured:

I will make two measurements during my PhD studies: the cross-sections for J/(Psi) and

psi(2s) production in proton-lead collisions and in proton-proton collisions at 14 TeV. Each will produce a paper that will be published in peer-reviewed journals (e.g. JHEP, Physics Letters.) Additionally, I will present my preliminary results at both national and international conferences, by giving oral presentations in person and contributing conference proceedings for publication.

There will be many opportunities for knowledge exchange during my studies. Because the LHCb collaboration consists of 750 physicists, communication within this community is vital for success, both to inform me of the latest calibrations and understanding of the data and for me to communicate my work to the collaboration for review and constructive criticism. I will give monthly updates on my work to a team of about 20 physicists who meet biweekly and oversee work in the area of central exclusive production. Every three months, a report on the activities of this group is made to the whole collaboration and at some point during my Ph.D. I will be expected to give this report, showing not just detailed knowledge of my work, but a broad overview of physics in this area.

When my analysis is complete I will have to write a report of about 100 pages so that my work can be assessed by senior physicists in the collaboration. I will give several oral presentations to audiences of about 100 physicists in order to defend my analysis, answer questions and follow-up any queries or make cross-checks that are requested. When this is complete, I will write the paper which must undergo intensive internal peer-review before it is released to the journal.

In Ireland, I will present a poster at the annual Institute of Physics (IOP) conference. I will also help organise and give presentations at the annual International Particle Physics Masterclass for Secondary School students. In March each year, school children are invited to UCD to analyse LHC data for a day and this ‘Day as a Particle Physicist’ include a videoconference discussion with their peers in other countries.

I enjoy communicating science and have acted as a tutor in the past. I also participated in a particle physics outreach workshop in 2015 aimed at Secondary School students. I hope to be able to engage in the public communication of science during my studies, through school visits, public talks, and media activity, since news stories coming from CERN often require local comment and interpretation.

The impact of my research will be measured from the citations that my papers attract and the invitations I receive to conferences and workshops. My public outreach can be assessed through the number of people I come in contact with and influence during the masterclasses, school visits, or media interviews.

Please outline your reasons for choosing your proposed academic supervisor(s):

I researched experimental particle physics researchers based at Irish universities and my proposed supervisor, Professor Ronan McNulty, stood out with an extensive list of peer-reviewed publications. He has also played important roles on the LHCb experiment setting up the sub-group responsible for Electroweak Physics and founding the group that works on Central Exclusive Production. He is a member of the LHCb Collaboration Board, the highest level of management that oversees the running of the LHCb collaboration, and is thus in a position to look out for my interests and that of the group in Ireland. He is also a member of the LHC-wide Working Group on Forward Physics and Diffraction, that is defining the physics programme in this area for the LHC. Consequently, I know that the project he has suggested is important, valued by the international community, and will result in many citations and exposure for me and my work. He has also organised many international conferences in the area of Central Exclusive Physics and Diffraction and will ensure that my work attracts the attention it deserves when it is completed.

I emailed Professor McNulty about the possibility of undertaking a PhD under his supervision. He has been very engaging and informative on both the details of possible

projects and funding opportunities. One project in particular on Central Exclusive Production at the Large Hadron Collider (LHC), piqued my interest as a young researcher as it may aid in the discovery of exotic particles such as tetraquarks, glueballs, or entirely new physics phenomena such as saturation.

Career Training and Development Plan

Please provide a career training and development plan which addresses the following:

- What are your career goals and how would this scholarship help you to achieve them?
- How will you go about acquiring the expert knowledge and transferable skills necessary for your professional development, e.g. technical skills, communication skills, analytical skills?
- How would this scholarship enable you to gain skills relevant to employment outside the traditional academic sector?

I'm eager to pursue a PhD programme because I've really enjoyed working on my MSc with the ATLAS experiment and my CERN Summer Student project with the LHCb collaboration and wish to continue being involved in particle physics research. Undertaking a PhD is the best way for me to develop as a researcher and receiving a Thomas Preston Scholarship would enable me to do this.

As a particle physics PhD student, I will need to gain expertise in a variety of fields, including: programming, statistics, data analysis, and specialised particle physics knowledge. I obtained some degree of mastery of these skills during my time as a particle physics MSc student. I will continue to learn and master such skills as a PhD student. The LHCb collaboration provides comprehensive guided tutorials and support, available to its members using its specialised analysis software. Detailed understanding of both the proposed research topic, as well as an in-depth understanding of the working of the LHCb detector itself can be obtained through available scientific literature. All PhD students working as part of the LHCb collaboration are required to undertake a suitable service task. These tasks involve contributing the upkeep or development of the LHCb detector or its associated software. In completing the service task, I will gain additional specialist understanding of the LHCb detector. Furthermore while at CERN, I will be able to learn from more experienced researchers, something I have previously found invaluable.

The skills I've learnt from my research involvement have broad applications both in and outside physics and I'm keen to further develop them in related aspects of physics. As a PhD student one can develop research skills like data analysis and programming but also social skills like teaching which I believe are valuable in order to be competitive in an increasingly educated job-market. Programming has become an essential skill in many disciplines and experimental particle physics helps you develop as a practical analytical programmer which I feel is more versatile than commercial programming training schemes which tend to focus more on app and web design. Data analysis is also now ubiquitous in the modern workplace and, since most of the techniques are reappropriated from physics, an experimental physics PhD programme is one of the best places to learn.

Personal, Ethical and Sex/Gender Statements

Personal Statement

Please highlight any additional information which has not been included elsewhere in the application, e.g.:

- Why do you wish to pursue a higher degree by research?
- Why have you proposed this research topic?
- Why do you feel there is a specific demand for the skill set that you wish to build?
- Why are you particularly suited to this research field?
- Which of your attributes demonstrate your capability to be a good researcher, e.g. motivation, commitment, thirst for knowledge?
- How will the proposed sresearch impact on your career path?

Physics is the most fundamental of the physical sciences with the others being varying degree applications. Physics appeals to me primarily for this reason. It explains how nature works from the smallest to the largest possible scales, providing something akin to an (almost) totalising discourse.

Particle physics in particular appeals to me for much the same reason. Within physics, particle physics uniquely gives understanding on how the universe works on the most fundamental level and I'm keen to keep being a part of research efforts to understand it. I find it really astonishing that we are able to build machines in order to detect particles that are subatomic and infer their properties and structure in great detail. As an MSc student I get a sense of accomplishment from knowing that I was in some way directly contributing to the understanding of the universe. Pursuing a PhD would allow me to continue to do this on a more involved and advanced level.

The proposed research topic of analysing central exclusive physics with the LHCb detector is truly at the cutting-edge of current human scientific understanding. Analysis of the data gathered could directly aid in the discovery of tetraquarks or hybrid mesons, glueballs, and may even lead to the discovery of new physics phenomena such as saturation. This makes it an exciting topic in-line with my own personal philosophy of trying to understand the universe on a fundamental level.

I'm a strong candidate for funding because I've already obtained a research degree in the same field. Much of the knowledge and skills I learnt in my MSc are transferable, meaning that I can quickly become productive as a researcher at PhD-level. The skills obtained in undertaking a PhD programme are scarce, even in the modern workplace. Despite this, they are increasingly widely used both in and out of academia and by funding me the Irish Research Council would be increasing the number of researchers in Ireland able to pass on such skills to younger generations. The possession of such skills, with such a wide range of applications, results in physicists often being employed in the finance and technology sector. In particular, companies specialising in software engineering, data management, and bio-technology make use of the diverse skill set gained during a physics PhD and the fact that getting a PhD is indicative of a candidates resourcefulness and willpower.

I was a tutor for first year physics courses for two years at the University of Cape Town. During which I received strong positive feedback from both my superiors and my students. At the conclusion of my PhD studies, I see myself possibly working as a teaching academic

at a university, school teacher, or in the technology section; in all of which the ability to pass on knowledge is essential. I find it rewarding when you see students finally grasping a concept they previously thought was beyond them and this is part of why I'd like to continue in academia.

Ethical Statement

Does your research involve any of the following ethical issues of special relevance?	
Informed consent	
Human embryonic stem cells	
Privacy and data protection	
Use of human biological samples and data	
Research on animals	
Research in developing countries	
Dual use (possible military/terrorist application)	
None of the above	X

Does your research proposal require approval by the relevant institutional Ethics Committee?	
Yes	
No	X

Please provide a statement detailing the careful consideration you have given to the ethical implications of the proposed research (where ethical issues may arise) and how you plan address these over the course of your scholarship:

My proposed research does not involve any of the above listed ethical issues. Particle physics is at the forefront of pioneering scientific research and is not a field motivated by application. The research does not deal with human interactions, society, or biology. For these reasons, I do not believe that any ethical issues can arise from my proposed research.

Max 500 words

Applicant Declaration

I hereby declare that I have read and accept the applicant requirements as set out on the Thomas Preston application guidelines.	
I agree	X

I confirm that the information supplied in this application is correct and recognise that should it become apparent that any of the information provided is inaccurate or unverifiable with appropriate documentation, it will result in the application automatically being deemed ineligible:	
I agree	X

I hereby declare that this application is my own work and understand that it will be subject to plagiarism checks:	
I agree	X