

I wonder if...?

11 PhD Students
11 Great Impacts



Minute Thesis

Finalist Summaries



UNIVERSITY
of York

RESEARCH
EXCELLENCE



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3MT® **THREE
MINUTE
THESIS**
FOUNDED BY THE UNIVERSITY OF QUEENSLAND



**Graduate
Students'
Association**
UNIVERSITY OF YORK

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Introduction

Welcome to the 2020 3MT[®] (Three Minute Thesis) competition at the University of York!

3MT[®] is a competition developed by the University of Queensland, Australia. Its success has led to the establishment of local and national competitions in several countries. Today, eleven University of York research students have just three minutes to communicate their research and its impact to you – the audience – and our judging panel. Communicating to different audiences is important for researchers as it helps to demonstrate the contribution that research makes to wider society and the economy.

Competition rules

Participants:

- A single static PowerPoint slide is permitted. No slide transitions, animations or 'movement' of any description are allowed. The slide is to be presented from the beginning of the oration.
- No additional electronic media (e.g. sound and video files) are permitted.
- No additional props (e.g. costumes, musical instruments, laboratory equipment) are permitted.
- Presentations are limited to 3 minutes maximum and competitors exceeding 3 minutes are disqualified.
- Presentations are to be spoken word (e.g. no poems, raps or songs).
- Presentations are to commence from the stage.
- Presentations are considered to have commenced when a presenter starts their presentation through either movement or speech.
- The decision of the adjudicating panel is final.

Audience:

- No unwanted audience participation
- Mobiles off
- Be ready to vote for your favourite!

Prizes

First prize - iPad

Second prize - £150 Amazon voucher

Third prize - £75 Amazon voucher

People's Choice - £50 Amazon Voucher

The organisers

The Research Excellence Training Team (RETT) work on behalf of the York Graduate Research School to organise this annual event as a showcase of PhD talent. The RET Team are committed to providing a supportive, stimulating and structured framework in which research students, research staff, and those who support them, can improve the conduct of research and develop their professional skills and career profile. We are always looking for collaborators in the form of organisations and individuals who can support our work. If you, or your organisation, are interested in helping us to develop our programme of skills training or are able to offer opportunities for our researchers, please contact us at rett@york.ac.uk

This booklet was designed by the Graduate Students' Association. The GSA is the primary representative of Postgraduate Students at the University of York, providing events, community building, independent academic advice and support, and much more. You can find out more by visiting: <https://www.yorkgsa.org/>

Judging criteria

At every level of the competition each competitor is assessed on the two judging criteria listed below. Each criterion is equally weighted and has an emphasis on audience reaction.

Comprehension and content

- Did the presentation provide an understanding of the background and significance to the research question being addressed, while explaining terminology and avoiding jargon?
- Did the presentation clearly describe the impact and/or results of the research, including conclusions and outcomes?
- Did the presentation follow a clear and logical sequence?
- Was the thesis topic, research significance, results/impact and outcomes communicated in language appropriate to a non-specialist audience?
- Did the presenter spend adequate time on each element of their presentation - or did they elaborate for too long on one aspect or was the presentation rushed?

Engagement and communication

- Engagement and communication
- Did the oration make the audience want to know more?
- Was the presenter careful not to trivialise or generalise their research?
- Did the presenter convey enthusiasm for their research?
- Did the presenter capture and maintain their audience's attention?
- Did the speaker have sufficient stage presence, eye contact and vocal range; maintain a steady pace, and have a confident stance?
- Did the PowerPoint slide enhance the presentation - was it clear, legible, and concise?

Judging panel

Professor Dr Michael Quante

Vice-Rector for Internationalisation and Knowledge Transfer, University of Munster

Professor Matthias Ruth

Pro-Vice-Chancellor Research, University of York

William Trickey

York 3MT winner 2019 and 3MT National Finalist

Ellen Howells

Communications Consultant at the National Trust

Professor Leo Kohler

Professor in the Department of Anatomy and Embryology, University of Maastricht, Netherlands & Wynand Wijnen Education Prize winner 2020

Professor Tom Stoneham

Dean of the York Graduate Research School, University of York

Dr Karen Clegg

Director of the Research Excellence Training Team, University of York (Chair)

Acknowledgements

The Research Excellence Training Team (RETT) at the University of York would like to thank the following people for their involvement and support with this event: Greg Dyke, all the members of the Judging Panel, the GSA (Graduate School Association), Vitae, The Festival of Ideas team, and, of course, our audience.



Katie West

The “Junk” revolution

For many years scientists have focused their research on understanding how proteins work, because of this the majority of drugs currently available act on proteins. However, proteins only represent ~ 2% of our DNA. Emerging evidence shows that the other 98% of our DNA, known as non-coding/“junk” DNA is mutated in diseases such as cancer. My PhD is focused on understanding how non-coding DNA works in our immune system, and how we can use this knowledge to combat parasite infections. My research shows that noncoding DNA is essential for making T cells, the star players of our immune system, function properly. In our lab, we have found that we can control the outcome of a fight between parasite and the immune system, simply by changing this so-called “junk” DNA in T cells. This research amongst others is essential in laying the foundations for making new non-coding DNA drugs.

Katie is a second year PhD student in the Department of Biology at the University of York. Her research is focused on understanding the role of noncoding DNA in our immune system. She is particularly interested in how noncoding DNA affects T cell function.



Rhian Addison

Indoor Spaces for Outdoor Minds: Landscape Artists’ Studios in London

Understanding how and where an artwork was created allows the viewer to relate to the artist and changes their experience of the work. It is natural to assume that landscapes are painted in the countryside, but in the late eighteenth and early nineteenth centuries they were painted in studios. My research explores the irony that rural landscapes were being painted in urban London, the outside world being created inside the limits of a room. What was this space like for landscape artists? Where were their studios situated in London? How did the artists adapt their studios for landscape painting, and how did their studios impact the creation of the landscape painting? Using technologies which are new to history of art, my research exposes an underappreciated artistic community and will change how we present British landscape paintings in art galleries.

For the last eight years Rhian has been a curator of British art, including Curator of Historic Art at The Whitworth and Assistant Curator at Watts Gallery – Artists’ Village. Rhian’s fascination with art stems from understanding how artists create their work and their environment in order to make the work more relatable and human to the viewer. Rhian is currently a collaborative PhD student between Tate Britain and University of York, funded by the Arts and Humanities Research Council (AHRC).



Robert Davies

Building Suns on Earth: Solving the Turbulence

By heating up gas fuel to very, very high temperatures, we can recreate the conditions at the centre of the Sun. Doing so offers the promise of virtually limitless, low-carbon electricity production – but not without its challenges! For example, the fuel is so hot it must be kept away from any physical surfaces. This can be achieved using powerful magnets to levitate and trap the gas in a so-called “magnetic bottle”, away from the walls of the container. Unfortunately, the extreme conditions in the gas causes strange and poorly-understood turbulent behaviour; this causes the gas to leak out of the magnetic bottle and damage the container walls. I am using powerful computer simulations to understand and model the turbulence – the hope is that, by understanding the physics behind this exotic behaviour, we can harness the Sun’s energy on Earth as a clean, safe solution for the production of electricity.

Bob Davies is in the 2nd year of his PhD, which is part of the Centre for Doctoral Training (CDT) Fusion Energy programme. His research focus is the theoretical study of turbulence in magnetically confined fusion plasmas. When he isn’t simulating plasmas, Bob can be found hiking, climbing or dancing.



Zainab Kidwai

Can we catch it before it is Cancer?

Oral cancer is a major public health concern particularly in South Asian countries due to the consumption of a variety of smokeless tobacco products which contain many cancer-causing chemicals. In low-income countries like India, Pakistan and Bangladesh which are home to approximately 232 million smokeless tobacco users, it is one of the most fatal cancers. Shortage of dental manpower and lack of accessibility and affordability of dental services are the two main issues leading to its late detection and high death rate. Through my research, I aim to tackle these issues by developing a low-cost method of detecting early signs of oral cancer in a non-clinical setting. The feasibility of this method will be tested out by training lay health workers in India to perform oral screening in tobacco users. If successful, my research has the potential for tremendous economic and healthcare impact in these low-income communities.

Zainab is a second year PhD student at the Department of Health Sciences. With a background in dentistry, she is on a mission to reduce the prevalence of oral cancer in the world. Through her research, she aims to influence the lives of millions of tobacco users in low middle-income countries who are at risk of getting this deadly disease.



Alexander Setchfield

Crop waste to bug grub: feeding the future with insects.

Global food security occurs when all people have sufficient access to safe and nutritious food in a way our planet can sustain. This is an ever-increasing challenge as our population continues to grow with unprecedented speed. As a result, meat and fish consumption is rising, which poses increasing demand on our main source of livestock feed – soybean. However soybean production is unsustainable and insufficient, so we must find 'greener' additional feedstocks. My research explores one such candidate: transforming agricultural crop waste into food for insect larvae which could then be farmed as environmentally-friendly livestock feed. Crop waste exists in huge quantities and contains valuable sugars ideal for insect larvae to feed upon. However these sugars are locked up inside complex structures, preventing larvae access. By using microbiology as a tool, I aim to overcome this problem, enabling crop waste to be repurposed – from waste to protein.

Alexander is a second year BBSRC CASE PhD student in Mechanistic Biology, working in the Centre for Novel Agricultural Products at the University of York in collaboration with Fera Science Ltd. His research uses microbiology and insect biotechnology to transform agricultural crop waste into livestock feed. Away from the lab bench, Alexander co-runs EatBugs! Outreach which promotes to the general public the sustainability of insects as a food source. He is also a classic car and historic motorsport enthusiast.



Silvia Soncin

Diet at 79 AD Herculaneum: a metabolic approach

Our food preferences are a cultural inheritance from thousands of years ago and they keep adapting influenced by the world we live in. With my PhD, I am exploring diet in 79 AD Herculaneum, a vibrant Roman town located in the Bay of Naples, Italy. My research approach is based on the analysis of specific chemical signatures, the isotopes, from molecules preserved in the human skeletons recovered from Herculaneum. By following the metabolic pathways in the human body for the interpretation of the data, I am revealing that individuals in 79 AD Herculaneum could afford a significant amount of generally expensive items. This can be explained by the political, economic and environmental scenario of the Bay of Naples in the first century AD. The study of ancient human dietary habits is essential not only to know more about past societies, but also to better understand our own.

Silvia is in her third year of PhD in Archaeology. She specialised in the study of ancient biomolecules and she is particularly interested in the analysis of stable isotopes of amino acids to explore dietary habits of past human societies.



Rosamund Portus

Extinction Studies: Imagining a World without Bees

Most people today have heard the news that bees are dying. Over the previous decade the potential loss of bees has captured the public imagination, becoming a familiar and newsworthy topic. Accordingly, the bee decline has seen significant attention from contemporary environmental creative practitioners: the topic has been engaged with in novels, performances, works of fine art, and more. My research examines the stories of creative practitioners whose work is inspired by bees, exploring what their experiences reveal about how we have imagined, responded to, and challenged the bee decline. I further explore the role of creativity in shaping extinction crises. My investigations demonstrate that how people construct meaning around the loss of nonhuman species – by which I mean, how people choose to narrate, engage with, and take action over threats to nonhuman species – is rooted in the wider social circumstances and cultural values associated with said species.

Rosamund is a third year PhD student studying environmental humanities. Her research concentrates on the decline of bees, exploring how and why this process of loss has been narrated, responded to, and challenged through creativity. She is interested in exploring the crucial role that human histories, cultures, and values play in current and ongoing extinction events.



Joe Horsey

Uncovering Documentary's Metaphors

My PhD research focuses on the role that metaphor plays in how documentaries translate the real world into what we see on-screen. While we typically think of documentaries as factual and serious, we often think of a metaphor as something poetic or decorative. Documentary is defined by its special connection to truth, and a metaphor is, by definition, a false statement. The two seem incompatible. By analysing the films of some of the world's most influential and important non-fiction filmmakers, my research shows that metaphor fundamentally shapes what we understand as "documentary". The enormous popularity of streaming services like Netflix has brought the documentary genre into a golden age, and brought its cultural influence to a new height. At a time where what we know as truth is under a particular strain, understanding how documentaries communicate meaning through metaphor is more pertinent than ever.

Joe is a PhD candidate in the department of Theatre, Film, Television and Interactive Media at the University of York. His research interests surround documentary film, particularly its ever-shifting mercurial form, its artistry, and its capacity to render the real world at its most visceral. He enjoys teaching and working on experimental film projects. The cinema is his happy place.



Justin Lo

Your voice, ta voix? Comparing voices across languages.

The human voice says a lot about the speaker, but it is not always a straightforward task to tell whether two voices come from the same person. It becomes even more challenging if the voices that we have to compare are speaking in different languages, which can easily happen when the speakers involved are bilingual. For forensic phoneticians who approach this task by analysing voice and speech characteristics, it is crucial to understand the effects of accounting for bilingual speakers and communities on their analysis. In my research, I look at acoustic and phonetic features commonly used by forensic experts and conduct experiments on a database of bilingual speakers to test their reliability if we have to compare voices in two languages. This work can inform forensic practitioners and enable them to provide fair and reliable expert opinion to the court on voice evidence.

Justin Lo is a third year PhD Candidate in Linguistics. His research interests lie primarily in forensic phonetics, bilingualism and the intersection of the two areas. His current research focuses on methodological and practical issues in forensic voice comparison involving bilingual speakers.



Katey Valentine

The hidden microbial world of our plastic waste

Plastic waste scattered across our beaches and riverbanks has become an all too familiar sight. Despite our increased awareness of the harm that plastic can cause to natural wildlife, millions of tonnes of mismanaged plastic waste continues to enter the environment each year, plaguing our waterways. When this plastic enters rivers and the ocean, thousands of tiny natural microbes like bacteria and algae, attach to its surface and form a distinct biological layer over the plastic. Understanding these plastic-associated microbes is important for tackling plastic pollution and understanding exactly how it might be harming our aquatic wildlife, however there are considerable gaps in our knowledge. My research is focused on exploring the specific types of microbes that attach to plastic in UK rivers and investigating how the presence of these microbes might enhance or reduce the harmful effects of plastic on freshwater animals.

Katey is a second year PhD student at the University of York. As a marine biology graduate, she has a broad interest in the health of our world's oceans and rivers and her current work is focused on understanding the complex interactions between plastic waste and aquatic microbial communities. She enjoys communicating her research with wider audiences to spread awareness and to cultivate excitement and appreciation of our natural world.



Rui Qi Choo

Music to your ears, words to mine

How do children learn languages with 'musical' qualities? In Mandarin, for example, this music, known in linguistics as tone, makes same-sounding words mean different things. Words in Mandarin are made up of syllables that can be said in four possible tones – do children listen out more for syllables or tones then? To find out I played a 'say-the-nonsense-word-you-hear' game with a mix of easy and difficult syllables and tones with 2-year-olds learning Mandarin. Nonsense words containing both easy syllables and easy tones were said the best, as expected, but those with easy tones were said more accurately regardless of whether the syllables were easy or difficult. This suggests that children can attune to the 'musical' characteristics if it is an important trait in the language, adding to literature that covers predominantly non-tone Indo-European languages. The music in tone-languages gives rise to meaning, it is more than just a melody.

Rui Qi is in her third year of pursuing a PhD in Applied Linguistics in the Departments of Education and Language and Linguistic Science. She is interested in child language acquisition, specifically bilingual children learning Mandarin and English. She likes improv comedy and pole exercise, and dabbles in baking, doodling and calligraphy when she's not chipping away at her research data.



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