CLAREITY SYMPOSIUM

Featuring Keynotes by:
Prof. Paul Fletcher & Dr Patricia Fara

Thursday, March 14, 2024
10.30am-19:00pm

Gillespie Centre, Memorial Court
Clare College

All are welcome. Free refreshments and lunch served throughout the day.

Clareity Symposium

Thursday 14th March, 2024

10.00 **Registration opens**, Garden room, Gillespie Centre (Tea and coffee)

10.30 **Welcome** by Gaël Kemp (Clareity President)

Opening address by the Master, Riley Auditorium

Session 1: 10.40-11.25

Chair: Dr Mark Smith, Clare College Dean

10.40-10.55 Emma Gleave

The President's Hat: Debating Societies, the Classics and Charleston's Free People of Colour

10.55-11.10 Anmol Arora

Predicting your blood pressure using machine learning algorithms trained on synthetic data

11.10-11.25 Priyanka Beta

How do we ensure long-term resilience in Bridge Infrastructure?: Learnings and Recommendations

Session 2: 11.30-12.15

Chair: Dr Jane Rempel, Clare College Fellow

11.30-11.45 Alexey Izosimov

Measure Time in a Socialist Manner: Exploring Soviet Temporality through Heritage Perspectives

11.45-12.00 Samantha Hodder

Chum: Using education through storytelling to help children during their cancer journey

12.00-12.15 Adelaide Brooks

Una lingua non mia': Language and Trauma in the Non-Native Italian Texts of Holocaust Survivor Edith Bruck and Auschwitz Guard's Daughter Helga Schneider

12.15-12.55 **Keynote lecture** by Prof. Paul Fletcher, Clare College Fellow

Using Games and VR to manage our Physiological Responses to Stress

12.55-13.40 **Sandwich lunch break**, Garden Room

Session 3: 13.40-14.25

Chair: Dr Dora Cano Ramirez, CRA representative

13.40-13.55 Arsham Nejad Kourki

Transitions in structural complexity: A new approach to the history of life on Earth

13.55-14.10 Jacob Low

Deuterium metabolic imaging - a novel imaging technique to differentiate between glioblastoma metabolic subtypes and to detect early response to chemoradiotherapy

14.10-14.25 Johanna Schoenecker

Burning Giants: Sequoia Trees in an Era of Megafires in the Sierra Nevada Mountains of California

Session 4: 14.30-15.15

Chair: Dr William Wood, CRA representative

14.30-14.45 Rosie Ward

Visualizing California's Solar Installations: Environmental, Physical, and Economic Determinants of Adoption through Time

14.45-15.00 George Poole

How to stop worrying and learn to love solving PDEs

15.00-15.15 Caitlan Onabanjo

The relationship between heat shock protein capacity and client proteins during ageing and proteostasis collapse

15.15-15.30 **Tea Break**, Garden Room

Session 5: 15.30-16.15

Chair: Dr Patricia Fara, Clare College Fellow

15.30-15.45 Shamsher S. Bhangal

German Historicism and the National Project after Bismarck, 1890-1927

15.45-16.00 Mary Skuodas

The Spectrum of Biological Sex and the Importance of Queering Science

16.00-16.15 Mia Da Costa

Magnus Hirschfield: Queer and Trans Advocacy in Weimar Germany

16.20-17.00 **Keynote lecture** by Dr Patricia Fara, Clare College Fellow

Life after Gravity: Isaac Newton's London Career

17.00-17.15 **Tea Break**, Garden Room

Session 6: 17.15-18.00

Chair: Prof. Aylmer Johnson, Clare College Fellow

17.15-17.30 Ellie Williams

Exploring disease through time and space

17.30-17.45 Aliya Abdukadir Ali

Dynamics of Power: Unveiling Early Islam through Prosopography

17.45-18.00 Alexandra Leonzini

NK-Pop: The 'Other' Hallyu

Session 7: 18.05-18.50

Chair: Gaël Kemp, Clareity President

18.05-18.20 Aniska Bitomsky

A missed opportunity for renewables? Energy discourses in Germany's parliament post the Russian invasion of Ukraine

18.20-18.35 Capucine Mamak

Capturing energy from the Sun

18.35-18.50 Shalom Henderson

A case-series comparison of semantic control in the logopenic variant primary progressive aphasia and Alzheimer's disease

18.50-19.00 **Closing of the Symposium**

by Prof. Jacqueline Tasioulas (Senior Tutor) and Gaël Kemp (Clareity President)

19.00-19.45 **Wine reception**, River Room Cafe (Everybody welcome)

19.45 - **Dinner** for Speakers and Chairs, Small Hall

Abstracts

Session 1

The President's Hat: Debating Societies, the Classics and Charleston's Free People of Colour

Emma Gleave

The President's hat was an important signal in Charleston's Clionian Debating Society. Their minute's record that the debate on May 11, 1853, "was well sustained on both sides with great enthusiasm, & was only concluded by that most unpleasant of all obstacles on certain occasions, "the President's hat" warning us, that the sands of time had slipped from under us & we could plead no more." Time was a key consideration for the Society's free Black members as they were subject to Charleston's nightly curfew, unlike their White counterparts. Despite challenging political conditions, they managed to run a thriving debating society from 1847 to 1858. Unusually, the minutes have survived and have recently been discovered. In my presentation, I will examine Charleston's debating societies, particularly their discussions on classical topics and their use of classical rhetorical skills. First, I argue that the Clionian Debating Society's primary objective was that of education, which they used for a social purpose, to subvert society's expectations of them and to resist limitations placed on their ambitions. The Clionian members were more assiduous in their debating than their peers, the White College of Charleston students. This contradicts the impression given by scholars that only White men and a few White women were interested in the classics. My second argument is that the debates and business of the Clionian Debating Society may have been used for covert acts of resistance. For example, they corresponded with Bishop Daniel Payne, an avowed and vocal abolitionist. The extant minutes for Charleston's free Black and White debating societies provide a unique opportunity to compare and contrast the use of the classics in oratory and debating questions by Charleston's dominant White class and the city's marginalised free people of colour on the eve of the Civil War.

Predicting your blood pressure using machine learning algorithms trained on synthetic data

Anmol Arora

The potential for synthetic data to act as a replacement for real data in research has attracted attention in recent months due to the prospect of increasing access to data and overcoming data privacy concerns when sharing data. The field of generative artificial intelligence and synthetic data is still early in its development, with a research gap evidencing that synthetic data can adequately be used to train algorithms that can be used on real data. This study compares the performance of a series machine learning models trained on real data and synthetic data, based on the National Diet and Nutrition Survey (NDNS). The aim of the study was to develop machine learning models to predict a patient's blood pressure based on simple non-invasive questions and to see whether similar results could be achieved by training on synthetic data. Synthetic datasets demonstrated a high degree of fidelity with the real dataset. There was no significant difference between the performance of models trained on real, synthetic or combined datasets. This indicates that synthetic data was capable of training equally accurate machine learning models as real data.

How do we ensure long-term resilience in Bridge Infrastructure?: Learnings and Recommendations

Priyanka Beta

Bridges are vital for economic growth and have recently been recognized for their strategic importance, especially in ensuring the safety and mobility of people and goods during disasters. Research has reduced the casualties in bridge failures, yet the frequency of these incidents and their evolving causes remain a significant concern. The absence of a uniform investigation protocol, akin to the aviation sector's for air-crash inquiries, limits the ability to learn from past failures. The scarcity of quantitative data for thorough analysis and the lack of international knowledge exchange further exacerbate the issue, leading to repeated failures with similar causes. In developing countries, failures often result from inadequate maintenance, while in developed nations, climate change poses a major threat.

This study underscores the urgent need for a holistic strategy to boost bridge disaster resilience, proposing the establishment of standardized case study methodologies, a comprehensive database of bridge failures, and central laboratories to identify and address root causes. It emphasizes the importance of collaboration among researchers, academic institutions, and both national and international organizations to formulate and implement effective solutions. A key recommendation is forming a coalition to develop the necessary frameworks and tools for enhancing bridge resilience, accompanied by a preliminary list of global stakeholders in bridge resilience that requires further expansion. This approach aims to foster a more resilient infrastructure capable of withstanding both natural and man-made challenges, thereby safeguarding lives and ensuring the continuity of critical services in times of crisis.

Session 2

Measure Time in a Socialist Manner: Exploring Soviet Temporality through Heritage Perspectives

Alexey Izosimov

As is well known, Marxism-Leninism was a progressive concept that envisaged a movement towards communism. In the early stages, the ideology of communist Russia implied a complete rejection of the past. The proletarian poet Mayakovsky proposed removing the classic of Russian poetry Pushkin from the "ship of modernity." History ceased to be taught in schools and universities, monuments to tsars were replaced with abstract compositions, and churches were repurposed as planetariums. The future-oriented state quickly encountered difficulties when the Revolution remained in the past and the leader of communism, Vladimir Lenin, died. A country with a future-oriented ideology has its own past. The process of reconciliation with the past began. Constructivist architecture of lines and forms was replaced by Stalinist neoclassicism and historicism. Lenin's mausoleum, initially made of perishable wood, was rebuilt in marble. After Stalin's death, a compromise form of relationship with the past was established. The state once again strove for the future; however, various forms of preserving and nurturing the past were encouraged, such as heritage protection. However, at the level of ordinary people, a more complex regime of temporality was established. Belief in a communist future and sincere futurism coexisted with reverence for the past. How could optimistic progressivism and nostalgia for the past coexist? I believe the answer lies in the cyclical concept of time. For a number of social groups, which will be discussed in my talk, the past could exist in the present. Speaking about the builders of ancient Orthodox cathedrals, touristic guides compared them to the builders of communism. In my talk, I will discuss the change in regimes of temporality and shifts in attitudes towards the past in Soviet Russia.

Chum: Using education through storytelling to help children during their cancer journey

Samantha Hodder

Cancer is the leading cause of death in children, let's make their treatment journey less frightening through education.

How would you tell a child they have cancer? The uncertainty following a cancer diagnosis is overwhelming for any individual; however, this time is particularly confusing for children. Explaining cancer to a child is incredibly challenging. It is an intricate disease with complex biology/treatment regimes. This uncertainty fuels anxiety, and as a result most children are incredibly overwhelmed and uncooperative during their treatment courses. Long-term, children with chronic health conditions (e.g. cancer) are twice as likely during early adolescence to report mental health problems (e.g. depression) as their healthier peers.

Our adaptive platform uses stories and games to educate children (2 - 12 yrs) with cancer about their specific cancer's biology and the treatments they are receiving. This app enables children to learn about their diagnosis at their own pace and in a safe environment, while encouraging helpful conversations between children and parents about their treatment and the disease. The platform's mindfulness environment also encompasses age appropriate medication exercises to guide patients through stressful moments.

Una lingua non mia': Language and Trauma in the Non-Native Italian Texts of Holocaust Survivor Edith Bruck and Auschwitz Guard's Daughter Helga Schneider

Adelaide Brooks

This presentation will address some of the reasons Hungarian concentration camp survivor Edith Bruck bore witness to her trauma in Italian, rejecting her native language Hungarian and why Helga Schneider, the German daughter of an Auschwitz guard, abandoned her native tongue German for Italian. It will concentrate on psycholinguistic reasons Bruck made this choice and how she experiences both of her main languages (Hungarian, her native language, and Italian) emotionally, as well as on Schneider's rejection of German as a rejection of her mother and her childhood trauma in wartime Berlin with an abusive stepmother.

Keynote

Using Games and VR to manage our Physiological Responses to Stress

Prof. Paul Fletcher

Treatments in Psychiatry and psychology face a major challenge: They frequently involve the acquisition and consolidation of new cognitive skills and strategies, which in turn demands a high degree of consistent engagement on the part of the patient. Games offer an enormous repertoire of measures and tailored learning opportunities that could contribute powerfully in meeting both of this challenge. Moreover, in linking gameplay to online bodily measurements (e.g. cardiovascular indices of stress) it becomes possible to provide therapeutic tools at the brain-body interface which is an exciting new field of research and treatment. Implementing such approaches in VR offers an engaging and compelling therapeutic tool that can be made widely available and is potentially more attractive to people who might otherwise find mental health treatments tedious or stigmatising.

I will explore these possibilities in relation to attempts to understand and tackle stress. I suggest that combining clinical science with gameplay has much to offer but will face important challenges.

Session 3

Transitions in structural complexity: A new approach to the history of life on earth

Arsham Nejad Kourki

The history of life on Earth is increasingly seen as having gone through a series of major evolutionary transitions (METs), and the MET framework has been instrumental in helping us identify and make sense of large-scale trends and patterns as well as rare and impactful events in evolutionary history since its inception in 1995. In recent years, different researchers have proposed different ways of defining, understanding, identifying, and explaining METs in a multiplication of approaches under this general rubric. Of particular note is the so-called ETI approach, standing for evolutionary transitions in individuality, which focuses on the evolution of new units of selection: the first cells, the first eukaryotic cells, multicellular organisms, and eusocial colonies. However, this approach leaves a gap in our understanding of the evolution of units of organisation that are not units of selection, such as organelles and organs, despite inherent similarities. Here, I offer a new approach that I call transitions in structural complexity (TSC), which attempts to fill this gap by drawing attention to changes in interdependence between units in a collective as a fundamental evolutionary shift that periodically results in the emergence of new units of organisation, including units that are, and units that are not, also units of selection. Using a wide array of examples, I describe the core explanatory tools of TSC, namely the evolutionary processes of modularisation, subfunctionalisation, integration, and deletion, demonstrating that they operate across life's hierarchy. I conclude by highlighting the importance of this approach in facilitating a renewal of interest in and relevance of structural, unificatory, theoretical, and comparative approaches in biology.

Deuterium metabolic imaging - a novel imaging technique to differentiate between glioblastoma metabolic subtypes and to detect early response to chemoradiotherapy

Jacob Low

Glioblastoma is the most aggressive form of primary brain cancer in adults. Recently, metabolic subtypes of glioblastoma have been described and different subtypes may be associated with an improved prognosis and treatment sensitivity. Deuterium metabolic imaging (DMI) is a novel metabolic imaging technique that can interrogate metabolism in patients. Here, we apply DMI measurements of [6,6'-2H2]glucose metabolism in patient-derived xenografts (PDXs) of glioblastoma to determine if DMI can distinguish between metabolic subtypes and detect early treatment response in vivo. We first characterised the metabolic phenotypes of four different GBM PDXs using a Seahorse Bioscience XF96 analyser and deuterium MRS measurements of extracellular media extracts of cells incubated with 10mM of [6,6'-2H2]glucose. DMI was then performed with a 7T preclinical MRI scanner with a 14-mm diameter 2H transmit-receive surface coil. Baseline DMI was obtained prior to intravenous administration of 2g/kg [6,6'-2H2]glucose. Animals then received a 4-day regime of oral temozolomide and radiotherapy delivered via a SARRP device. Post-treatment, DMI was repeated within 24 hours of completion of treatment. Representative glycolytic (A11, U87) and mitochondrial (S2, AT5) subtypes were identified. In vivo DMI with [6,6'-2H2]glucose showed similar concentrations of 2H-labelled glucose in all four tumour models ($p=0.64$). However, the glycolytic subtypes showed higher concentrations of 2H-labelled lactate than the mitochondrial subtypes (A11 vs S2, A11 vs AT5; $p<0.05$) (U87 vs S2, U87 vs AT5; $p<0.05$) and normal appearing brain tissue ($p<0.01$) whereas the mitochondrial subtypes showed more glutamate/glutamine labelling (S2 vs A11, S2 vs U87; $p<0.05$) (AT5 vs A11, AT5 vs U87; $p<0.05$), a surrogate for mitochondrial activity, than the glycolytic subtypes and normal appearing brain ($p<0.01$). DMI detected response to chemoradiation within 24 hours of completion of treatment. In conclusion, we show that DMI has the potential to identify metabolic subtypes of glioblastoma and detect early response to chemoradiation.

Burning Giants: Sequoia Trees in an Era of Megafires in the Sierra Nevada Mountains of California

Johanna Schoenecker

Giant Sequoias, which are native only to the western slopes of the Sierra Nevada mountain range in California, are the largest trees in the world and thus store significant amounts of carbon. These tree giants possess many traits that make them well adapted to wildfire and over centuries, they have experienced a competitive advantage through frequent, low severity fire. However, changing fire regimes in California have lead to more, larger, and more severe fires in the study region, leading to unprecedented mortality rates of Sequoias. Especially exceptionally large wildfires termed 'megafires' threaten the trees. We have used an approach combining field surveys and remote sensing data to explore how Sierra Nevada conifer forests were affected by megafires, and what potential recovery trajectories could looks like. We also tried to identify areas in the region that could be at risk of experiencing permanent transitions to a different ecosystem type, which might have a reduced carbon storage capacity compared to the pre-fire vegetation type.

Session 4

Visualizing California's Solar Installations: Environmental, Physical, and Economic Determinants of Adoption through Time

Rosie Ward

In December 2022, one in every nine Californian homes had solar panels (U.S. Census Bureau, 2020). Of the many government policies spurring this adoption, net metering policies were particularly influential. From 1995 until April 2023, these programs provided solar customers with a retail electricity rate credit for any excess solar energy they generated (Ladisch & Hagood, 2017, p. 2). However, in April 2023, net metering changed for the vast majority of Californians. Instead of receiving the retail rate for each unit of energy exported, new solar customers receive an “avoided cost” rate which is worth, on average, only 20 percent of retail rates (Thoubboron, 2023). Importantly, individuals who installed solar before April 2023 were grandfathered into full retail rate net metering programs for 20 years, and this has potentially stark implications for income equality. Through maps of Californian solar installations, I try to elucidate whether income has been a historical determinant of solar adoption and, in doing so, shed light on the equity implications of California’s net metering policy change. Specifically, I map annual zip code level solar installations from 2000 to 2022 on top of three base layers: median household income, the percentage of roofs in a zip code suitable for solar installations, and global horizontal irradiance (GHI).

There is no clear relationship between solar installation levels and either GHI or residential rooftop solar suitability in any of my maps. However, there is a clear visual relationship between zip code level median household income and the percentage of housing units with solar. Furthermore, it appears that the relationship between income and solar installation levels has weakened over time. These results suggest that California slashed solar compensation at a time when solar is finally affordable for, and being adopted in higher numbers by, individuals in areas with lower household incomes.

How to stop worrying and learn to love solving PDEs

George Poole

Partial differential equations (PDEs) are ubiquitous in science and engineering, yet in the vast majority of cases exact solutions cannot be found. Fortunately, a combination of numerical methods and computing power gets the next best thing: an approximate solution. Modern software libraries provide researchers increasingly intuitive and flexible ways to feed their PDEs into a solver, then process and display their results. In this talk I will discuss and demonstrate code that I have written to explore time-dependent PDEs, especially those governing fluid flow. Expect pretty pictures, curious animations and the occasional SyntaxError.

The relationship between heat shock protein capacity and client proteins during ageing and proteostasis collapse

Caitlan Onabanjo

As we age, various characteristics or 'hallmarks' of ageing become prevalent, which include a loss of proteostasis. Loss of proteostasis, or proteostasis collapse, is characterised by a breakdown in the balance between protein synthesis, folding, and degradation. Understanding the mechanisms underpinning proteostasis collapse and its interaction with other hallmarks of ageing such as epigenetic modification and genomic instability, which are implicated in diseases including Alzheimer's and Parkinson's, remain to be fully understood. Heat shock protein 90 (HSP90) is a highly abundant molecular chaperone central to maintaining proteostasis. HSP90 is required to stabilise a variety of client proteins, such as AGO2, which has an essential role in regulation of the epigenomic landscape via transposon ('jumping') gene silencing. Interestingly, it is generally thought that HSP90 capacity in supporting client protein conformation, becomes impaired with age, but this has yet to be accurately quantitated in vivo, across diverse tissue types and between the sexes. The subsequent functional consequences on HSP90 client proteins also remains elusive. We propose that HSP90 capacity does become limiting with proteostasis collapse, and as a consequence, HSP90 client protein, AGO2 becomes functionally impaired leading to mobilisation of transposons. To test our hypotheses, we have generated and validated quantitative HSP90 capacity reporters. We have also established an association between proteostasis collapse and de-repression of transposons in vivo. We find that in a Drosophila ribosomopathy model, a family of diseases that result in proteostasis collapse, and pharmacological perturbation of proteostasis drive an increase in transposon expression. This indicates that the function of HSP90 client protein, AGO2, may become dysregulated with proteostasis collapse, such that transposon silencing is no longer maintained. These preliminary findings could corroborate HSP90-directed interplay between hallmarks of ageing, proteostasis collapse and epigenetic modifications.

Session 5

German Historicism and the National Project after Bismarck, 1890-1927

Shamsher S. Bhangal

An attempt to write the history of the battle between cosmopolitan and nationalist thought in Germany between 1890 and 1927.

The Spectrum of Biological Sex and the Importance of Queering Science

Mary Skuodas

A short introduction to and discussion of the "biological binary" surrounding sex. A journey back to 1830 for a queer interpretation of Darwin's research for Selection in Relation to Sex and how queer ecology could change the seemingly empirical face of science.

Magnus Hirschfield: Queer and Trans Advocacy in Weimar Germany

Mia Da Costa

A historical profile of Magnus Hirschfeld, exploring his thesis on sexuality, involvement in political and legal advocacy, scientific research, brief film cameo, controversies and life after escaping Nazi Germany.

Keynote

Life after Gravity: Isaac Newton's London Career

Dr Patricia Fara

For the last thirty years of his life, Isaac Newton lived in London and ran the Royal Mint as well as the Royal Society. Formerly a reclusive scholar at Cambridge, now he moved in aristocratic circles, exerted political influence and became very rich. Through exploring a painting by William Hogarth that is packed with Newtonian references, I describe aspects of Newton's life and fame that usually receive little attention. Taking the picture as my cue, I reintegrate him into a metropolitan world where men and women benefited from global trading based on slavery.

Session 6

Exploring disease through time and space

Ellie Williams

We can quantify what's going on in our bodies in lots of ways, some of which include looking at the amount of different genes and proteins found in different organs, what metabolites (things like lactic acid) are found at high intensities and what genetic mutations we are born with as well as the ones we accumulate through our lives. I look at how we can bring together these different types of measurements as well as how they vary within individual organs to understand disease progression and how patients respond to treatments (sometimes very badly).

Dynamics of Power: Unveiling Early Islam through Prosopography

Aliya Abdukadir Ali

This research delves into the early socio-political development of Islam, focusing on the caliphates of ʿUthmān b. ʿAffān and ʿAlī b. Abī Ṭālib from 24-44 AH/644 to 661 CE. Employing prosopography as a methodological approach, the study examines biographical and genealogical data to unravel the intricate networks of power during this pivotal period. By analysing diverse sources such as al-Ṭabarī, al-Balādhurī, Ibn Saʿd, al-Zubayrī, Ibn Khayyāṭ, and Ibn Ḥabīb, alongside later texts, the research navigates through the spurious nature of historical records written approximately 150 years after the events occurred. Shedding light on the shifting dynamics of leadership and governance, the study highlights ʿUthmān's preference for Quraysh appointments and strategic marital choices, contrasting with ʿAlī's approach and distinct leadership style. Through this investigation, the research offers a nuanced understanding of early Islamic history and its enduring relevance in contemporary discourse.

NK-Pop: The 'Other' Hallyu

Alexandra Leonzini

Hallyu, also known as the Korean Wave, is a neologism used to describe the rapid growth of global interest in South Korean cultural products since the 1980s. Heavily supported by the South Korean government, K-Pop idols in particular have become key agents of the nation's soft power politics, with groups such as BTS, Blackpink, and TWICE consistently featured among the top streamed artists on Spotify and YouTube over the past decade, leading to an explosion on interest in South Korea in general. As such, the total value South Korea's cultural exports is estimated to be over $12.5 billion USD today, have doubled from $5.1 billion in 2016 to $10.3 billion in 2019 alone.

The rapid success of South Korea's soft power politics has not gone ignored by their neighbour to the north, the Democratic People's Republic of Korea, however. Having been engaged in a bitter battle against the South for global support and UN recognition since the mid-1940s, North Korea has since begun to emulate elements of the South's approach to musical diplomacy in attempts to rehabilitate its international image and present a 'new face' to the world in the Kim Jong Un era. This presentation

will detail these efforts, presenting key characteristics of North Korea's brand of Hallyu, and focusing on the nation's use of the internet to promote its own "pop" ensembles to global audiences.

Session 7

A missed opportunity for renewables? Energy discourses in Germany's parliament post the Russian invasion of Ukraine

Aniska Bitomsky

This talk will illustrate how the different political parties in the German parliament used the Russian war on Ukraine in their discursive strategies to advance their party-specific energy discourses. Germany is often seen as a pioneer of a successful renewable energy transition with the political campaign of the "Energiewende" being perceived as the dominant driver of energy policy. Yet carbon-intensive energy sources still appear to be 'locked-in' in energy discourses, maintaining a fossil-fuel reliant status quo. The external shock of the Russian war on Ukraine could have been a discursive turning point allowing Germany to transition out of a carbon lock-in. The talk will discuss the results of a mixed-method analysis of parliamentary transcripts to show why this transition did not happen.

Capturing energy from the Sun

Capucine Mamak

The world is currently facing an immense challenge in efforts to prevent the worst effects of climate change becoming a reality. Greenhouse gas emissions must be significantly reduced to meet the target of maximum 1.5 % global warming. The leading cause of these emissions is the burning of fossil fuels so researching replacement energy sources is of vital importance to reduce climate change. Solar energy is the most plentiful source of renewable energy meaning there is great interest in developing better technologies which can harness this. This talk will discuss the theory behind solar power and some exciting new technologies which are rising to provide solar power to more people.

A case-series comparison of semantic control in the logopenic variant primary progressive aphasia and Alzheimer's disease

Shalom Henderson

Semantic cognition is thought to require both semantic representation, also referred to as conceptual knowledge, and semantic control – our ability to flexibly access and manipulate meaningful information to focus on the aspects of a concept that are relevant to a particular context or task. Prior investigations have contrasted the prominent semantic representation loss in semantic dementia (SD) versus semantic control deficits in post-stroke semantic aphasia (SA). Despite having shared (i) focal damage in the left temporoparietal and inferior frontal regions and (ii) neuropsychological profiles with SA, namely executive and language impairments, no studies to date have investigated whether individuals diagnosed with logopenic variant of primary progressive aphasia (lvPPA) present with semantic control deficits. This is the first study to address these limitations by directly comparing 12 individuals diagnosed with lvPPA, 12 with typical, amnestic Alzheimer's disease (AD), and 12 age-matched healthy controls on a battery of verbal and non-verbal semantic tests, as well as basic language, memory, and executive functioning tests. All participants underwent T1-weighted structural MRI of the brain. Behavioural results showed that, similar to previously reported SA patients, individuals with lvPPA exhibit the characteristic features of a semantic control deficit: (i) they showed impairments in tests that require greater semantic demand (e.g., semantic association knowledge test more than straightforward word-picture matching); (ii) only lvPPA patients showed strong correlations between semantic and executive tests; (iii) an effect of item familiarity was not found in lvPPA patients; and (iv) both lvPPA and AD patients benefited from phonemic cueing on the Boston Naming Test. Using semantic cognition and multiple demand parcellations, we examined the associations between semantic and domain-general region of interests (ROIs) and principal component analysis (PCA) generated component scores. The results of Bayesian linear regressions with total intracranial volume

and age as covariates revealed the strongest evidence for the relationship between PC 1 “semantic” scores and grey matter volumes in the left posterior fusiform (BF = 27.81), parahippocampal (BF = 10.53), and inferior temporal gyri (BF = 7.02). These results are highly consistent with previous neuroimaging findings and present important implications about the role of the posterior ventrolateral temporal cortex in semantic control.