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ONE BIG NIGHT, TWELVE SCIENTISTS
LIVE ON STAGE!

A fast-paced session of science, drama, genius and amazing stories of STEM*

The FameLab semi-final is returning to the Western Australian Maritime Museum on Wednesday 18 April 2018.

Sarah Lau will MC the evening and introduce some of the country's brightest minds to the stage, as they tell their science stories in three minutes and explain why their work matters to the world. Watch as these brilliant researchers deliver short sharp tales of their work in order to become the next FameLab champion.

Have you ever wondered about the nature of dark matter, or about how much meat a carnivorous plant actually eats?

Join us at this FREE event, presented by the British Council in Australia, to hear STEM researchers explain complex concepts while the clocks ticks - armed with only their wits and a few props! Jargon and PowerPoint are strictly banned.

The winner will be announced on the night and will then go on to compete at the National Final – hosted by superstar astrophysicist, Dr Alan Duffy – at the Octagon Theatre, The University of Western Australia in Perth on 10 May 2018. The Australian winner will then go on to compete at the FameLab International Finals at the Times Cheltenham Science Festival in the UK on 7 June 2018.

Helen Salmon, Director of the British Council in Australia, says, "FameLab is such a fun way to immerse yourself in our awe inspiring world. Australian Dr Nural Cokcetin (2017 Global Runner Up) said a schoolgirl told her she had no idea that she could be creative and still be a scientist! Creative scientists are at the cutting edge of Australia's innovation economy, and many of them will change our lives through their work. Come along and let them show you how."

The 2018 Western Australiasemi-finalists are:

- **Alice Mason,** The University of Western Australia: Choosing what to remember and what to forget
- **Amber Bateman,** The University of Western Australia: Reconstructing degraded soil substrates using inorganic soil amendments to improve soil quality and seedling recruitment in post-mining arid rehabilitation
- **Ben McAllister,** ARC Centre of Excellence for Engineered Quantum Systems: The organ experiment: shining a light on dark matter
- **Erchuan Zhang,** The University of Western Australia: Compare curves in highly symmetric spaces
- **Favil Singh,** Edith Cowan University: Beat the tumour with simple activity!
- **James Wong,** The University of Western Australia: Breathing while you hop: How do kangaroos do it?
- **Kunal Dhiman,** Edith Cowan University: Why Alzheimer's disease should be diagnosed early
- **Laura Skates,** The University of Western Australia: How carnivorous are carnivorous plants?
- **Majigsuren Enkhsaikhan,** The University of Western Australia: Text to knowledge

- **Nguyet (Marisa) Duong,** The University of Western Australia: Delving into the protein world of Duchenne Muscular Dystrophy (DMD)
- **Rezae Mortaza,** Curtin University: Enabling independent community mobility for individuals with autism spectrum
- **Sarah Hearne,** Curtin University: The eyes have it- how fossil skulls provide insights into ancient reef ecology

Presentations will be judged according to FameLab's 3Cs: content, clarity and charisma - by an esteemed panel of STEM experts, media professionals, and public figures.

Come along for a night that's guaranteed to be full of FameLabulous fun!

Date: Wednesday 18 April 2018

Time: 6.30 - 8.30pm. Doors open at 6.00pm for a 6.30pm start.

Location: Western Australian Maritime Museum, Peter Hughes Drive Fremantle

RSVP:https://www.eventbrite.com.au/e/famelab-2018-western-australia-semi-final-tickets-39381427911
Registrations essential via above Eventbrite link

MORE ON OUR FINALISTS FOR MEDIA:

Amber Bateman, The University of Western Australia: Reconstructing degraded soil substrates using inorganic soil amendments to improve soil quality and seedling recruitment in post-mining arid rehabilitation

Approximately 20 % of arid regions are degraded due to large-scale land-use practices, such as agriculture and mining, making the rehabilitation of these landscapes a global issue. My research seeks to improve the soil quality of degraded soils to achieve higher rates of seedling growth and survival in post-mining rehabilitation in the arid Pilbara region of Western Australia. To do this I am developing methods to reconstruct these degraded soils using native topsoil and inorganic and organic fertilisers. Currently, mining companies are using fertilisers recommended by consultants that are based off the agricultural industry. However, there is limited scientific evidence that supports the use of these fertilizers in the context of arid post-mining rehabilitation. The Pilbara is characterised by high temperatures and low annual rainfall with naturally nutrient depleted soils therefore it is crucial to develop a cost-effective method to recover these degraded soils. Throughout my project I am work alongside company rehabilitation teams to develop practical, scientifically sound methods to improve post-mining rehabilitation management. With arid zones making up 40 % of the earths land systems, conducting research with a predominantly practical application will benefit arid zone rehabilitation projects around the globe.

Ben McAllister, ARC Centre of Excellence for Engineered Quantum Systems: The organ experiment: Shining a light on dark matter

What is the nature of the dark matter that surrounds us? Is it composed of axions, a theoretical particle? How might we detect it, and what can it be used for? We have known for decades that the regular matter that we understand composes less than 1/6th of all matter in the universe, and that we are surrounded at all time by mysterious "dark" matter of unknown composition. Many believe it is composed of a particle known as the "axion", although this particle is yet to be conclusively observed. I am building an experiment to detect dark matter axions. Detection however, is only the first step. Think of what humanity has accomplished using only the small proportion of matter we understand. The potential

benefits and impacts to society of a new type of matter that is five times as abundant are staggering, and difficult to overstate. A deeper understanding of our universe invariably leads to progress in science, technology and wider society. We must always push at the boundaries of our knowledge. The nature of dark matter is one of the greatest unknowns facing the scientific world today, and as such it presents a significant opportunity for discovery and progress.

Favil Singh, Edith Cowan University: Beat the tumour with simple activity!

Prostate surgery is the main treatment for tumours that are confined within the prostate. Despite its benefits, this particular treatment is associated with many side effects particularly urinary incontinence. The impact of these side effects is particularly damaging given the potentially low physical capacity of prostate cancer patients. Traditionally, exercise medicine interventions had only focused on post-surgical recovery. However, an opportune time for exercise medicine is prior to surgery to negate the treatment-related side effects thereby aiding recovery, and enhancing patient outcomes. My research evaluates exercise as a form of medical intervention undertaken prior to surgery with the aimed at enhancing and improving prior surgical physical function, quality of life and hasten post-surgical recovery. The outcomes of my research will provide supportive evidence for the role of pre-surgical exercise in the overall management of prostate cancer.

Sarah Hearne, Curtin University: The eyes have it- how fossil skulls provide insights into ancient reef ecology

Australia is famous for the Great Barrier Reef but on the other side of the country and 380 million years ago Australia's first Great Devonian Reef was teeming with life. The Gogo Formation is a complete ecosystem frozen in time, providing a window into the past through its exceptional three-dimensionally preserved fossils. By measuring the eyes of the fossil fishes inhabiting this reef we can determine the visual niches these fishes occupied. This will enable us begin to understand the ecology of this ancient reef and ultimately the evolution of reef systems to the modern day.

Alice Mason, The University of Western Australia: Choosing what to remember and what to forget

Remembering everything would be as bad a remembering nothing at all. Rewards, such a food, money, and social praise, help us to know what information is valuable and worth remembering. New memories are fragile and need to be converted into stable, long-term stores in our brains so that we can access them in the future. The neurotransmitter dopamine is important for helping to strengthen memories. Our brains release dopamine in response to information about rewards in our environment. For example, information about how big the reward is or how likely we are to receive it. This research looks at the how these different aspects of reward enhance learning and memory. We found that we pay the most attention to how much reward we actually receive. This research benefits everyone children to older adults. Educators have a particular interest in using rewards to increase learning. In particular how rewards can be used to "gamify" the learning environment and make it more engaging and exciting. As we get older we find it difficult to remember as much information but research shows that older adults use rewards to help them prioritise certain items over others.

Majigsuren Enkhsaikhan, The University of Western Australia: Text to knowledge

The Internet and databases are full of text and other types of data, but no one can find and read all of the information they need these days. Therefore, converting noisy and large text

collections into useful knowledge would be invaluable. My research focuses on building and refining a Knowledge Graph from text documents, because a Knowledge Graph can provide structured knowledge representation out of text, using state of the art Information Extraction methods. It supports linked, machine understandable and actionable data that enables intelligent tasks such as question answering, recommendation systems, document ranking and exploration of the underlying knowledge of large text collections. The main contribution of my research is to develop KG refinement

Nguyet (Marisa) Duong, The University of Western Australia: Delving into the protein world of Duchenne Muscular Dystrophy

Duchenne Muscular Dystrophy (DMD) is a muscle degenerative disease which affects one in 3500 boys worldwide. Like with many other chronic diseases, the tissues of the patients suffer from a condition called “oxidative stress”, whereby excessive reactive chemicals are produced in the cells, leading to changes in the protein structures and functions. Proteins are responsible for most functions of the cells (ranging from transporting substances within the cells, speeding up the reactions occurring in the cells, supporting the cell membrane to being responsible for the contraction of muscle cells). Therefore, changes in the protein structures and functions lead to changes in the cell functions, and consequently, the whole tissues such as muscle tissues are affected. My research aims to develop analytical methods to identify the proteins that are oxidised in the muscles of DMD patients, measure the extent to which they are oxidised and locate where these proteins are in the cells. This helps us understand the disease mechanisms better and find effective treatments for DMD patients. As oxidative stress is also present in many other chronic diseases, my techniques could be applied to analysing proteins in other disease models as well.

Laura Skates, The University of Western Australia: How carnivorous are carnivorous plants?

Carnivorous plants use specially modified leaves to attract, capture, and digest prey, supplementing the nutrition they gain from the soil. Charles Darwin considered these plants to be the "most wonderful plants in the world", and they continue to capture the wonder of people to this day. Darwin's treatise "Insectivorous Plants" has been the basis for more than a century of research on carnivorous plants globally. In Western Australia, we are lucky to host nearly a third of the world's recognised carnivorous plant species, including sticky-trap Drosera and Byblis species, suction-trap Utricularia species, pitfall-trap Cephalotus follicularis, and snap-trap Aldrovanda vesiculosa. My research asks: how carnivorous are these native carnivorous plants? Or, in other words, how much do these plants rely on captured prey to get the nutrients they need? We use natural abundance stable isotope techniques to investigate this, as the natural isotopic signature of every organism in an ecosystem gives an ecosystem gives an indication of where they sit within the food web. We compare carnivorous plants to neighbouring non-carnivorous plants and prey, across a variety of climates, habitats, and soil types. This research will provide better understanding of the evolution of carnivorous plants, as well as recommendations for conservation in the wild.

Erchuan Zhang, The University of Western Australia: Compare curves in highly symmetric spaces

I adopt a novel method to compare curves in highly symmetric spaces, which can be applied in image analysis.

Erchuan’s thesis is about variational curves, which are curves governed by variational principles. In computer science, comparing curves or images is a significant issue. For instance, compare medical images to help diagnose disease, analyse images from

meteorologic satellites, and even recognise images of military targets. In this work, we develop new methodology to compare curves in highly symmetric spaces, say, sphere, hyperbolic space, curved space with orthogonal constraints. The key idea is to lift curves in highly symmetric space to its associated "upper space", which is more convenient to compare curves because of its nice measure. Instead of comparing curves in highly symmetric spaces, we consider comparing their liftings.

Rezae Mortaza, Curtin University: Enabling independent community mobility for individuals with autism spectrum

Transportation is a critical obstacle for individuals with autism spectrum. These persons are characterised by difficulties in communication and social abilities, repetitive behaviour, and the inability to self-regulate. It is a common problem for people with autism spectrum to be trapped at home, unable to engage in community activities including employment and education, due to restricted transportation accessibility. My research leverages the ubiquity of smartphones and the well established public transport infrastructures to promote independent public transport use. In my thesis, I design, implement, and test a mobile app that enables independent public transport use for persons with autism spectrum by catering to their individual needs and requirements. The app delivers curated trip management, step-by-step assistance, evidence-based anxiety and sensory tips and strategies, and an array of other assistance options to produce and allow a seamless and easy public transport experience. Most importantly, this research heavily emphasises and engages the target users, individuals with autism spectrum, throughout the project. This project aims to enable people with autism spectrum to freely participate in community activities such as education, employment, and social to lead fruitful and productive lives.

Kunal Dhiman, Edith Cowan University: Why Alzheimer's disease should be diagnosed early

My research is focussed on exploration and evaluation of potential novel cerebrospinal fluid biomarkers, for the early diagnosis of Alzheimer's disease (AD), and understanding the different aspects of disease pathogenesis. Many treatments have failed so far, probably because the therapeutic agents are targeted at a stage where the brain is too compromised, and it is not possible to revert back to a normal stage. The need of the hour is to diagnose AD at an early stage. Therefore, there is a need to explore biomarkers which can not only diagnose AD at the early stage, but also help in devising successful treatment strategies that can help in combating AD at an early stage.

James Wong, The University of Western Australia: Breathing while you hop: How do kangaroos do it?

My research project is to understand how the lungs and airways work in kangaroos that have a hopping-mediated breathing mechanism. This unique breathing mechanism in macropods was previously studied in wallabies (small kangaroos), but not kangaroos. A key question in my research is to investigate if the large body mass of kangaroos (up to 90kg) will adversely affect their breathing. We want to understand how the structure of the lungs and airways can accommodate the potentially large expansive and compressive pressures that occur during hopping. I am taking on a comparative physiology approach to address these questions, which is an approach that has been successful in understanding the mechanisms in different systems, such as how nerves send their electrical signals, a study that was done on the axons of giant squid. My project will combine real breathing data from kangaroos measured when they are hopping, and MRI 3D modelling data to image the structure of the airway tree to tie this unique respiratory structure and function together.

END:

Keep up with all of the action by following British Council Australia on Facebook and @auBritish on Twitter and Instagram, and join the conversation using #FameLabAus. For further information, visit famelab.org.au

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FameLab International has been running annually since 2007. So far, more than 9,000 researchers from 31 countries have brought their science to live audiences on the FameLab stage.

FameLab 2018 is presented by the British Council and Cheltenham Festivals | Founding partners: Western Australian Museum and The McCusker Foundation | Major partner: Woodside Energy Ltd | University partners: Curtin University, Edith Cowan University, Murdoch University, University of Technology Sydney and The University of Western Australia | Venue partners: Museum of Applied Arts & Sciences, Queensland Museum, Museum Victoria, Western Australian Museum and Western Australian Museum Foundation | QLD presenting partner: World Science Festival, Brisbane | WA presenting partner: the Department of Jobs, Tourism, Science & Innovation | UK Government partner: British High Commission | Media partner: Australia's Science Channel | Training and advocacy partner: Inspiring Australia

Notes to editors:

FameLab® is a competition owned and created by Cheltenham Festivals in the UK. The British Council has license to deliver the competition in over 30 countries overseas. Since its birth at the Festival in 2005, FameLab has grown into the world's leading science communication competition. A partnership with the British Council since 2007 has seen the competition go global with more than 9000 young scientists and engineers participating to date.

About the British Council

The British Council is the UK's international organisation for cultural relations and educational opportunities. We work with over 100 countries in the fields of arts and culture, English language, education and civil society. Last year we reached over 65 million people directly and 731 million people overall including online, broadcasts and publications. We make a positive contribution to the countries we work with – changing lives by creating opportunities, building connections and engendering trust. Founded in 1934 we are a UK charity governed by Royal Charter and a UK public body. We receive 15 per cent core funding grant from the UK government. www.britishcouncil.org

STEM*: Science Technology Engineering & Mathematics