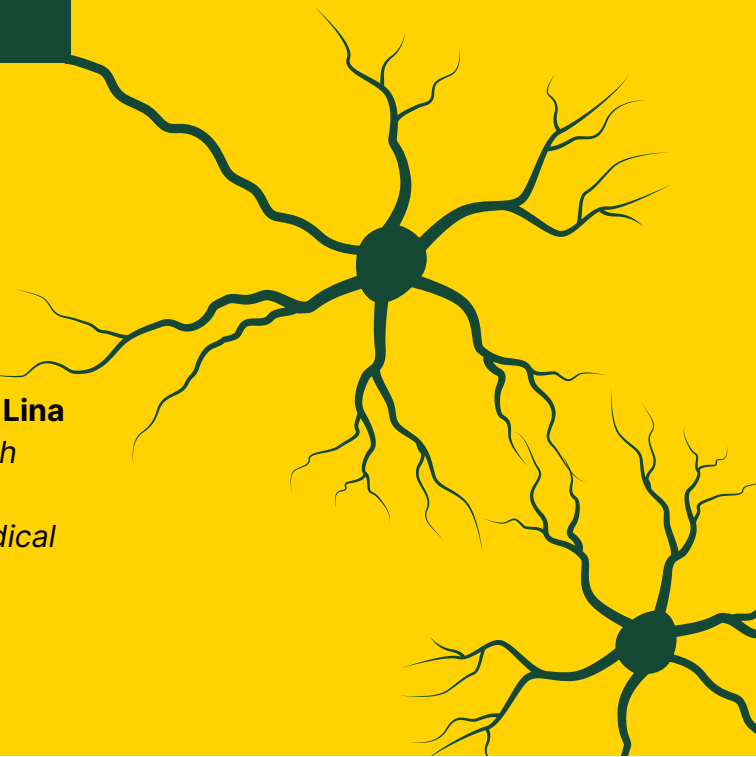
BIOMEDICAL RESEARCH & NEUROSCIENCE APPLIED TO MENTAL HEALTH: THE NEXT GENERATION

Institute of Mental Health Research at York & York Biomedical Research Institute

Our mental health and the brain are inextricably linked yet understanding the complex relationship between the biological and psychological continues to challenge the most accomplished researchers.

With long established research strengths in both mental health and biomedical neuroscience, researchers at the University of York are uniquely positioned to work together in innovative interdisciplinary ways as we strive to better understand how to tackle mental health problems using our knowledge of the fundamental biology of the brain. We continue to nurture the next generation of researchers who work at this exciting interdisciplinary interface.



Event Summary

On the **10th** of **May 2023**, researchers came together in the Ron Cooke Hub's Lakehouse to share ideas and generate new collaborations. The showcasing event was expertly hosted by **Lina Gega** *(Director of the Institute for Mental Health Research at York - IMRY)* and **Tony Morland** *(Neuroscience Theme Lead of the York Biomedical Research institute - YBRI)*.

Alternative perspective

It was a great pleasure to start the day with a keynote speaker and alumnus of the Department of Psychology University of York - **Catherine Harmer**. Catherine is a *Professor of Cognitive Neuroscience at the University of Oxford* where she leads the *Psychopharmacology & Emotion Research Lab* - ***Oxford PERL Lab***.

Catherine's lab explores emotional cognition & the effects of medication. The lab challenges the typical disciplinary division between psychological and pharmacological approaches to understanding how drugs work. Her talk showed that focusing on how the brain processes emotion in depression and then looking at the impact of antidepressant medication on that reveals how quickly the drugs act.

Half empty or Half full?

Antidepressants are able to impact how we process emotion before overall changes in mood occur. The early changes in emotional processing predict clinical change.

Molecular neuroscience

When you lift the lid on the mind you soon realize that understanding it means looking at the philosophical & emotional right down to the microscopic & basic building blocks of life. Our next speaker **Ines Hahn** *(Department of Biology)* spends her time buried deep in the molecular biology of how our cells and genetic code works. Ines eloquently outlined how much **genetic models** help us to understand the mind particularly focusing on neurological disorders.

When the scaffolding and mechanisms that keep our neurons working properly goes wrong, sometimes forming 'spaghetti' like bundles, we see the impact on our mental and neurological health.

Ines explained how understanding how to keep the molecular balance right in the communicating structures of our nerve cells can prevent the spaghetti bowls and keep our neurons working effectively.

View from showcase venue - Ron Cooke Hub Lakehouse

Visual loss the brain & mind

Heidi Baseler *(Department of Psychology & Hull York Medical School)* provided great insight into the importance of vision and how vision loss affects the brain and mind. **Macular degeneration** is a common eye condition that affects the middle part of your vision when part of the retina called the macula is damaged. Heidi's work focuses on the affects of macular degeneration beyond the eye.

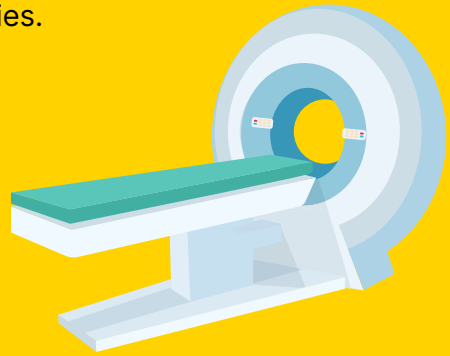
The visual pathways in the brain change as a consequence and by imaging the brain using MRI structural changes can be observed. There is also potentially a decline in cognitive functions and activity levels. Macular degeneration has a life changing impact. Importantly, Heidi and her wider research team are investigating the mental health challenges that result from macular degeneration, considering the prevalence of depression and anxiety.

A good night's sleep

The English proverb *"Sleep is the best medicine"* says much about our belief in its restorative power. **Scott Cairney *(Department of Psychology)*** provided a greater depth of understanding to this saying as we learnt about the neural mechanisms linking sleep disturbances to traumatic memories.

Intrusive memories are a common feature of anxiety, depression and post-traumatic stress disorder (PTSD) and Scott and his team have established a way of investigating them in the lab using a computer based task

Through a series of lab experiments (with some very tired volunteers) Scott was able to clearly demonstrate how sleep deprivation impacts on the brain's ability to control intrusive memories. Using brain imaging Scott has also been able to confirm the parts of the brain that are involved. This research provides helpful insights for sleep problems and mental health conditions that feature intrusive memories.



Body & mind

We often think of the mental and the physical separately but our body is intrinsic to our sense of self. All actions thoughts and feelings exist in the context of the body. **Catherine Preston**'s research in the ***Department of Psychology*** focuses on self-awareness and body perception in relation to underlying neural mechanisms and mental health and well-being.

Catherine explained how body perception can influence the experience of pain as demonstrated by the analgesic effects of multisensory illusions in osteoarthritis. Body perception can also influence emotion in relation to disordered eating. Research techniques that use illusory changes in body size can be used to investigate body satisfaction and the components of body image disturbance within eating disorders.

One period of a women's life when her body changes dramatically is during and after pregnancy. Catherine is also studying how perinatal bodily changes influence maternal and infant health and well-being.

Language & mental health

Our ability to communicate has a profound impact on our mental wellbeing. Children with **Developmental Language Disorder (DLD)** have problems expressing themselves and understanding others. Although it is estimated to affect 7% of school age children, who grow up to be adults with DLD (DLD does not resolve), awareness is low.

Hannah Dobson *(Department of Psychology)* explained how there is a link between mental health problems and language and communication problems. But Mental health problems may not be spotted in DLD and mental health support is not accessible for young people with DLD. By interviewing parents of children with DLD Hannah found that often camouflaging in DLD contributes to mental health problems. Traditional approaches to treatment might also not be appropriate and key professionals need to improve knowledge and work together. This is an area where more research is urgently needed.

New opportunities in applied health research

Jen Brown *(Health Sciences)* explained how her research on improving diabetes self-management and outcomes in people with severe mental illness (SMI) is providing a new opportunity to collect biomedical data from people with serious mental illness. More biomedical data will help improve understanding and inform the future of diabetes care for this patient group which already experiences serious health inequalities.

Thank you to all the researchers who took part in the event and shared their research expertise with us all. Demonstrating the strength and potential for more interdisciplinary mental health research at York.

Contact us

To find out more about mental health research at the University of York please get in touch with the team at the Institute of Mental Health Research.
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