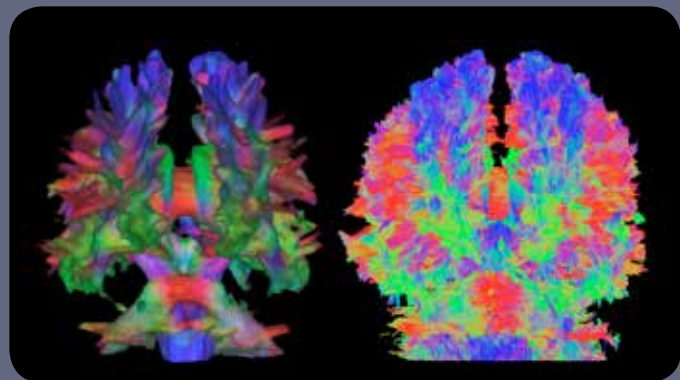


# 2016

## ANNUAL REPORT

MONASH ALFRED PSYCHIATRY RESEARCH CENTRE (MAPrc)





Cover photo: Edited by A/Professor Jerome Maller, from a de-identified MAPrc DTI dataset Right: Whole-brain tractography comprised of 1 million streamlines; Left: Whole-brain track density super-resolved image based on 1 million streamlines.



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## EXECUTIVE

## DIRECTOR'S REPORT



It is my great pleasure and privilege to invite you to read the Monash Alfred Psychiatry research centre's Annual Report for 2016.

MAPrc continues to grow and push the mental health field forward by integrating neuroscience, clinical medicine, sociopolitical dimensions and the all-important humanitarian endeavours to improve outcomes for people with mental ill health and their families.

In 2016, we are proud to inform you that our work in bringing together an understanding of the impact of early life trauma, on brain development and subsequent mental ill health has been recognised by several key groups. We have received an NHMRC project grant to further explore this nexus as well as support from a private philanthropist to undertake research into a new treatment approach for the awful consequences of early life trauma. A better understanding

of the role of environmental impact in neurobiological will hopefully lead to an integrated, innovative set of treatments.

Clearly, we endorse and look forward to the multiple agency approach to the prevention of violence against women- championed by both the Victorian and Commonwealth Governments, and MAPrc continues to contribute to this important area of prevention work. Nonetheless, for the many unfortunate victims of trauma, sensitive and effective new treatments are desperately needed- which we are developing and rapidly translating through our translational clinics.

In 2016, we merged our pharmacology clinical trials unit with the clinical trials unit based at Caulfield Hospital. MAPrc now has a new satellite campus, based at Caulfield, along with our other sites - The Victoria Clinic and teaching at the Malvern Hospital for Addiction. Our research has expanded to include a large number of trials in Alzheimer's Disease with the Caulfield group. Given the burgeoning public health problem of dementia, it is important that MAPrc utilizes our neuroscience and clinical expertise to expand into this critical area. Associate Professor Kate Hoy is a key senior researcher who continues to develop brain stimulation research in the area of dementia.

An important Strategic Planning exercise held in 2016 with an external facilitator, has encouraged greater clarity in our organization and we are working hard to

develop new descriptors for the groups conducting research at MAPrc. This is a tangible demonstration of our growth and the need for organizational structuring work over the next six months. It was heartening to note the very high morale, universal commitment to our mission and great camaraderie within the large MAPrc staff and student group.

MAPrc is a place of great ideas, energy, enthusiasm and above all – great empathy and compassion for people with mental ill health. Our research is grounded in the reality of people's struggles with depression, psychosis, trauma, and many other mental health issues, as well as the capacity to use the very latest that 21st century science and technology has to offer. We continue our mission to develop new treatments, new understanding and new services for people with mental illnesses, by conducting world class psychiatric research with respect, equality and understanding.

Thank you for your continuing support.

A handwritten signature in black ink, appearing to read 'J. Kulkarni', written in a cursive style.

**Professor Jayashri Kulkarni**  
**Director**  
The Monash Alfred Psychiatry  
research centre

## DEPUTY DIRECTOR'S REPORT



2016 was an eventful and exciting time to be part of the family of MAPrc. As always seems to be the case, MAPrc throughout the year was a place of excitement and fulfilment, along with the marked frustrations that come with academic life. The disappointments of grant rejections and the comments of snarky reviewers have a tendency to weigh heavily, especially when these seem to occur without end (no matter how successful you are). The greatest value in working in an environment such as that which exists within MAPrc is the support that comes at these times.

Critically, these setbacks are persistently outweighed by the successes that come with the type of activities that we undertake. The clear research

successes, especially obtaining grants and successfully publishing in decent journals are clear and quantifiable and if anything we probably should celebrate them more. What is less clear, but equally if not more important, certainly in buffering the spirit in difficult times, is the direct evidence of the impact of research success that we certainly have, if not on a day-to-day basis certainly frequently enough for this to be a real and determining factor in regards to the awards are achieved through psychiatry research at MAPrc.

The most tangible way in which this is expressed is in seeing the real benefits that patients can achieve whilst engaging in meaningful and impactful research. Time and time again I have walked out of my office after seeing a patient who has had their life turned around by TMS treatment, or one of the other therapies that we are testing, not just with a pressing need to share this information with those who have contributed to the individual's care, but also reinvigorated to ensure we keep doing what we are doing; to ensure the impact of this research impacts on the lives of many more patients to come.

For my team, and I know across the centre, during 2016 we commenced a series of new trials with the hope that these will really have substantial and

wide reaching impact. In our team, this included new studies in obsessive-compulsive disorder, post-traumatic stress disorder and Alzheimer's disease. These are all severely disabling psychiatric and brain disorders for which current treatments are limited or frequently ineffective. If we have success in developing new treatments for any of these, it will have the possibility of affecting millions of lives, something which is a real privilege to have the opportunity to do. If patients can be helped along the way this is a considerable bonus but one that we actively try and achieve. This comes through the type of research that can be done in the clinical setting, but also through having a team of caring and dedicated staff, whose involvement in of itself can benefit patients as they pass through the centre. We are fortunate to have many of these people in our teams at MAPrc, something everyone gets to benefit from.

A handwritten signature in black ink, appearing to read 'Paul Fitzgerald'.

**Professor Paul Fitzgerald**  
**Deputy Director**  
**Monash Alfred Psychiatry**  
**research centre**

# MAPrc at a Glance

CLIENTS  
& PARTICIPANTS

2,500

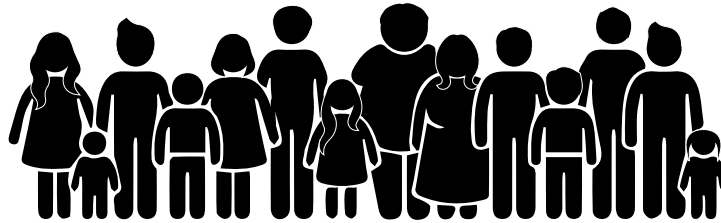
RESEARCH  
PROJECTS

100+

PUBLICATIONS  
& PRESENTATIONS

200

ENGAGED IN OUR ADVOCACY, SEARCH FOR NEW TREATMENTS AND EDUCATION ACTIVITIES FOR BETTER OUTCOMES IN MENTAL HEALTH



150+

Team of staff & postgraduate students from medicine, nursing, psychology, engineering, allied health, neuroscience & health information services.

*“Our philosophy is to conduct world class psychiatric research with respect, equality and understanding.”*

ANNUAL  
TURNOVER

\$4m+



We will continue to unlock the secrets of the brain to enhance the treatments of disorders that impair the mind.

**AT MAPrc, WE MEND MINDS**

## MAPrc Vision

To make a transformative difference to the lives of people with mental illness

## MAPrc Mission

To develop new treatments, new understandings and new services for mental illness.

MAPrc has a great reputation for using advanced neuroscience techniques to investigate brain function and develop innovative treatments. Teaching the next generation of health professionals is also an important part of MAPrc. Over 2016, we hosted approximately 50 students from different educational backgrounds. We are proud of the excellent quality of the students' research projects, many of which will result in on-going innovations.

Our research is funded by independent competitive grants and a range of other philanthropic grants.

Our work, reduces the current huge cost mental illness places on individuals, families and our wider community.

## AWARDS AND DISTINCTIONS



### Fellowship of the Australian Academy of Health and Medical Sciences

On the 6th of October 2016 it was announced that Professor Jayashri Kulkarni had been elected as a Fellow of the Australian Academy of Health and Medical Sciences (AAHMS).

Election to this prestigious position is formal, national recognition of Professor Kulkarni's tireless work in psychiatry research where among other achievements she has pioneered the use of hormonal treatments to improve the outcomes for women living with severe mental illnesses, including schizophrenia, depression, bipolar disorder, menopausal depression and borderline personality disorder which, thanks to Professor Kulkarni's work, is increasingly known as Complex Trauma Disorder.

Fellows are drawn from all states and territories of Australia, and from all aspects of health and medical science across clinical practice and allied health care, with representation from basic translational and clinical research, health economics, general practice and public health.

### Other 2016 Awards and Distinctions

#### Professor Jayashri Kulkarni

- President-Elect, International Association of Women's Mental Health (2016) (Presidential duties began March 2017)
- Member, Expert Taskforce on Mental Health – Innovation Reference Group (2016 – ongoing)
- Member, International PCOS Guideline Development Group (2016 – ongoing)
- Board of Directors Member, Mental Health Foundation Australia (Victoria) (2016 – ongoing)
- Member, Global Alliance for Maternal Mental Health (GAMMH) (2016 – ongoing)

#### Professor Paul Fitzgerald

Monash University Interdisciplinary Research (IDR) program grant for Design and Testing of a Highly Novel Implantable Magnetic Nerve and Brain Stimulation Device; NHMRC Practitioner Fellowship for 'Advancing Brain Stimulation Treatments for Depression', NHMRC Project Grant 'Deep brain stimulation in the treatment of severe depression'

- Weston foundation project grant for 'Investigating the efficacy of high-frequency rTMS treatment for Alzheimer's disease'
- NHMRC equipment grant for 'The development of a portable neurophysiological assessment suite for cognitive function'
- NHMRC project grant for 'Ketamine therapy among patients with treatment-resistant depression: a randomised, double-blind, placebo-controlled trial.'

#### Associate Professor Kate Hoy

- Promoted to Associate Professor, effective Jan 1, 2016;
- NHMRC Excellence Award for the top ranked Career Development Fellowship – Biomedical Level 1; Mason Foundation National Medical Program Grant for "A randomized controlled pilot trial of Theta Burst Stimulation for the treatment of cognitive impairment in mild to moderate Alzheimer's disease."; NHMRC Equipment Grant for a Brain Stimulation Suite.

#### Dr Bernadette Fitzgibbon

- Founding Vice-President, Australasian Social and Affective Neuroscience Society.
- Arthritis Australia National Research Program; The ARA Project Grant funded by the Australian Rheumatology Association for "Interventional repetitive transcranial magnetic stimulation treatment for fibromyalgia";
- Advancing Women's Research Success Grant Program, Monash University.

#### Dr Manreena Kaur

Best overall oral presentation award at the Society for Mental Health Research Conference, 2016

#### Dr Robin Cash

Best Abstract Award at Australian Brain Stimulation Meeting 2016

#### Dr Caroline Gurvich

- promoted to Senior Research Fellow
- Awarded AMREP seed grant and platform access grant for Stress, genes and cognition project

#### Sung Wook Chung

- Top ranked student abstracts for 2nd Australian Brain Stimulation meeting 2016
- 2nd Prize Poster Presentation at SOBR Symposium 2016

#### Aron Hill

Second Runner Up prize for the Central Clinical School 3 minute thesis in 2016.

## OUR PATRON & ABOUT MAPrc



We are privileged to have as our patron the Governor-General His Excellency General the Honourable Sir Peter Cosgrove AK MC (Retd). We are grateful for his continued patronage and support of our centre.

MAPrc is the Monash Alfred Psychiatry research centre. Our name reflects our position within two major institutions — Monash University's Central Clinical School, and the Alfred Hospital's Department of Psychiatry.

Our focus is on world class, translational, clinical research. The location of our centre within the Alfred Hospital Precinct in Melbourne provides a vital impetus, connecting our work with the real issues facing people with mental illness.

We have many national and international collaborative partners including consumers & carers, advocacy organisations, biotechnology companies and researchers from a number of diverse fields.

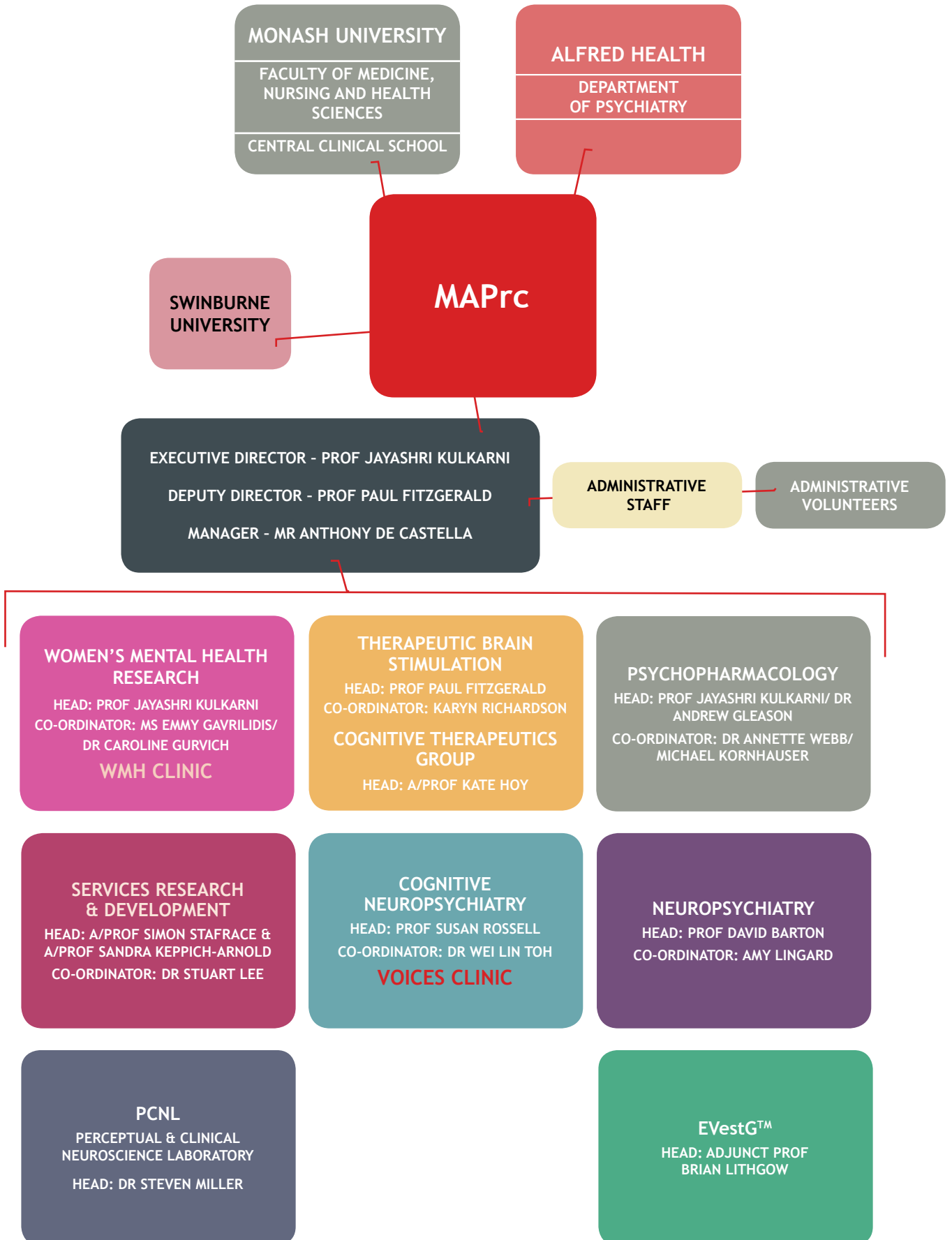
Our goal is to improve the lives of people suffering with serious mental health illnesses such as schizophrenia, bipolar affective disorder, major depression and major anxiety. These severe mental illnesses impact hugely on the quality of a sufferer's life, and impose a huge cost on families and on our wider community.

Research at MAPrc is extraordinarily diverse. Our projects include experimental neuroscience studies which are recognised around the world for the breakthrough insights they provide into brain structure and function, in health and illness.

Our research is funded by independent competitive grants and a range of other philanthropic funding bodies. These grants typically provide only a portion of the funds required to fully cover the total cost of each individual research study or trial. Therefore we also rely on donations, and on our own fund raising events to ensure that we can continue to undertake valuable and innovative research in our pursuit of improving the outcomes and quality of life of people living with mental illness.

MAPrc's Executive team is supported by our Research Fellows, Clinical Research Assistants, our teaching staff, our post-graduate and under-graduate students, our enthusiastic team of volunteers and our dedicated administrative staff.

# MAPrc ORGANISATIONAL CHART





**WMH DIVISION DIRECTOR**

Professor Jayashri Kulkarni

**SENIOR RESEARCHERS**

Emmy Gavrilidis *Team Manager*  
Dr Caroline Gurvich *Team Research Leader/  
Senior Research Fellow*  
Dr Jasmin Grigg *Post Doctoral Researcher*  
Dr Natalie Thomas *Post Doctoral Researcher*  
Dr Caroline Thew *Endocrinologist*  
Dr Rosie Worsley (*maternity leave*) *Research  
Fellow/Endocrinologist*

**CLINIC COORDINATORS**

Cindy Yu  
Michaela Corr

**RESEARCHERS**

Heather Gilbert *Research Nurse*  
Gayan De Mel *Research Assistant*  
Amelia Arnold *Research Assistant*

**CLINIC STAFF**

Professor Jayashri Kulkarni  
Dr Caroline Thew  
Dr Aife Worsley  
Dr Shainal Nathoo

The importance of gender differences in aetiology, diagnoses and treatment has traditionally been neglected in psychiatry. The Women's Mental Health team recognise the complex interaction of biological, psychological and social factors giving rise to clear differences in men and women, and aim to provide gender tailored novel treatments and interventions.

Principle areas of focus in 2016 included clinical trials to assess novel treatments in schizophrenia, borderline personality disorder and perimenopause. Expanding current scientific knowledge on the role of the neuroendocrine system in mental illness is critical to these projects. Exploratory studies of 2016 included exploring the effects of the oral contraceptive pill and depression, methods for harm reduction in smoking in patients with schizophrenia, and policy driven projects including violence against women. NRAMP, the National Register of Antipsychotic Medication in Pregnancy, continued into its 8th year, providing the world's first registry of its kind. This database aims to develop our understanding of the effects of antipsychotic medications taken during pregnancy and the post-natal period.

Alongside research, the team is in a unique position sitting adjunct to the Women's Mental Health Clinic. This provides an interface of research and clinical practice, ensuring direct translation of the treatments and interventions developed, to ensure real world change.

## 2016 HIGHLIGHTS

At the end of 2016, the women's mental health team celebrated a successful NHMRC project grant to continue their preliminary research investigating new treatments for borderline personality disorder.

The team also celebrated publications throughout the year, including a publication in JAMA Psychiatry, a top ranking psychiatry journal.

The team hosted the second 'In Her Shoes' Symposium, a full day workshop/symposium dedicated to women's mental health for medical practitioners, which was enthusiastically received by over 100 delegates.

The team also commenced the production of a new online short course in women's mental health which will be a joint Monash University-Harvard Macy Institute course to be launched during 2017. The aim of this course is to upskill clinicians to work sensitively and effectively with women of all ages experiencing mental ill-health, and to integrate an understanding of factors such as the role of trauma and endocrinology in the development of mental illness, as well as implications for treatments.



## FEATURE CASE STUDY

### Tibolone in perimenopausal depression (the case of Mrs N)

Mrs N is a 51 year old specialist Nurse who worked in a senior role in a large hospital. She was in charge of a busy medical ward and had worked in the same hospital for 22 years, achieving many promotions over this period of time. She enjoyed her work and was a highly respected member of the Hospital. She and her husband of 24 years had two sons, aged 17 and 14 years.

Mrs N had enjoyed a warm, nurturing early family life, a stable, loving marriage and had energetic, caring sons. She had no mental ill health, no serious physical illnesses and coped appropriately with the death of her father 6 years earlier.

Over 2 years, Mrs N's life changed drastically. Insidiously but steadily, Mrs N developed depression and anxiety symptoms that worsened over 6 months. She began to have episodes of crying and sadness for no reason; became irritable and hostile at work and experienced great difficulties with her memory and concentration. One day, she was about to give a patient the wrong dose of medication and was stopped in time by a nursing colleague. Mrs N felt devastated, ashamed and guilty about her error, and then started to have panic attacks on her way to work. She lost her confidence and avoided having to give medications to patients. Mrs N was asked to take leave, and interpreted this as punishment for the recent incident. She stayed at home and became increasingly irritable, angry and resentful of her busy family. At the same time, she noted that she had gained 4 kilos in weight despite her usual healthy diet, was sleeping very poorly and felt exhausted a lot of the time. Initially, her family tried to soothe her but after some months began to respond negatively towards her. Her oldest son, a bright student, was doing his final year at high school, and began to refuse to have dinner with his family, saying that it was too difficult to be around his mother. Previously, Mrs N had taken a great interest in both of her son's schooling – often helping with homework. Her younger son became isolative and said that he didn't know why his mother "seemed to hate him now".

At this time, Mrs N's mother insisted that her daughter see her doctor. Mrs N was diagnosed with depression and commenced on a large dose of an antidepressant. She developed a number of adverse effects to the medication, such as agitation, increased weight gain with worsened self-esteem, increased anger and generally feeling "wired".

She was treated with 2 different antidepressants and then an antipsychotic medication was added to her treatment. Mrs N

continued to feel angry, agitated, and tearful and now had an increasing sense of pessimism about her future. Her oldest son was suspended from school for using street drugs and he decided to leave school and travel with his friend. Mrs N felt guilty about her son and one night she drove to a secluded spot and took an overdose of medications with alcohol, leaving a suicide note for her family in which she apologized profusely and stated that she felt they would be better off without her. By chance, a passer by found her and called an ambulance.

Mrs N was seen in the MAPrc Women's Mental Health Clinic after a referral from her treating psychiatrist. She had been started on a different antidepressant, with partial response but she still felt agitated and sad, extremely guilty (now about her suicide attempt as well as previous issues), and had problems concentrating. Mrs N felt that her future was bleak and also could not believe how different her life was now compared to just two years previously.

We diagnosed PERIMENOPAUSAL DEPRESSION. Mrs N joined one of our clinical trials of a particular hormone treatment (tibolone) and after a few weeks, she had improved greatly. After the trial, she continued to take the tibolone treatment and has ongoing breast screening and other general health tests with her GP. Six months after the trial, still taking tibolone, she felt like her old self. Therapeutic work with Mrs N, her husband and sons over the next four months restabilised the family and all were able to regain an excellent quality of life.



### Adjunct tibolone for depression in perimenopausal and postmenopausal women

All women experience menopause; a significant number suffer from ongoing, severe depression beginning with the major hormone fluctuations in the middle stage of life. We know that the brain and mental state are affected by fluctuating hormone systems approximately five years before the common physical symptoms of hot flushes begin and the cessation of the menstrual period.

Studies have shown that many women experience significant physical and psychological changes as they approach menopause and for a long time following. Symptoms such as hot flushes, night sweats, sleep disturbances and changes in libido are common, and impact significantly on quality of life. However, the major reason that many women seek help from menopause clinics or their doctors is for depression and anxiety.

We are undertaking a clinical trial aimed at discovering a new treatment approach for this understudied depression that affects a large proportion of women in their late forties and fifties. This trial is comparing the effectiveness of a hormone treatment (Tibolone) for women with severe depression related to menopause, compared with placebo.



### The oral contraceptive studies – effects on mood and cognition

The oral contraceptive pill has been an important means of reproductive control for women worldwide. However, there are many mental health aspects associated with continued use of the oral contraceptive. Since 2006, we have conducted several studies examining the correlation between different oral contraceptive pills and depression, changes in cognition, and anxiety. Our earlier studies have been widely reported in the general media, with the key finding that low-dose estradiol pills were more likely to cause depression than higher-dose estradiol pills. Also, the progesterone-only preparations seem to be associated with a greater incidence of depressive symptoms. There are two studies ongoing in this area.



### Research in women with Borderline Personality Disorder

We are researching new approaches to better understand women who have a condition called Borderline Personality Disorder. This poorly understood mental disorder often occurs as the result of early life violence and trauma and has a high mortality rate. Our research uniquely combines biological, psychological and environmental approaches for a new model of treatment for this condition. We are conducting a survey of women to understand the role of trauma and violence in the presentation of this condition. As a new initiative, we are performing endocrine (hormone) analyses to better understand the correlation between polycystic ovary syndrome and Borderline Personality Disorder.

We are also evaluating the role of memantine, a cognitive enhancing agent, in improving symptoms of Borderline Personality Disorder. Memantine is a moderately selective non-competitive NMDA antagonist that has recently been shown to be effective in improving emotional dysregulation and cognitive performance. Given that these processes are impaired in Borderline Personality Disorder, this research project will investigate the effectiveness of memantine in the treatment of its symptoms. Specifically, we aim to develop evidence-based guidelines to help reduce the symptoms of Borderline Personality Disorder and complex post-traumatic stress in the hopes that with appropriate intervention, the symptoms of Borderline Personality Disorder can be better managed, reduced or even eliminated.

### **A novel adjunct hormone treatment for men and women with schizophrenia and related disorders**

Increasing evidence points to the protective role of estrogen in the brain, and its positive effect on the symptoms of schizophrenia and schizoaffective disorder. However, adverse effects on breast and uterine tissue in females, and feminisation of males, limit the long-term therapeutic use of estrogen in this population.

Raloxifene is a new hormone treatment that belongs to a group of medications called Selective Estrogen Receptor Modulators (SERMs). Raloxifene is thought to have positive estrogenic effects in the brain without affecting peripheral body tissue, thus offering a longer-term treatment approach with potential mental health and cognitive benefits, and few estrogenic side effects.

Although more commonly associated with women, estrogen is also a naturally occurring hormone in men, and is already used clinically to reverse bone loss, enhance cardiovascular function, and treat prostate cancer. The advantage of using raloxifene instead of estrogen in men is that the beneficial effects of estrogen can be experienced in the brain without the feminising side effects typically associated with hormone treatments.

We are examining whether adding raloxifene 120mg/day to regular antipsychotic treatment can improve psychotic symptoms, mood and cognitive functioning, for men and women with schizophrenia or schizoaffective disorder.

### **Metformin for mind and metabolism**

We are investigating metformin, which is an old anti-diabetic medication commonly used to treat type-II diabetes mellitus. Metformin has been shown to have some effect on the mitochondria at the cellular level, which suggests that it may have some impact in treating depression. Metformin is also used as an adjunct in the treatment of obesity. Combining these two potential effects, metformin may be a very useful and safe treatment for both depression and obesity. We are trialling metformin for its ability to improve mood and cognition, and reduce weight, in women and men with co-morbid treatment-resistant depression and abdominal obesity.

### **Transcranial direct current stimulation for the treatment of depression in women**

Transcranial direct current stimulation (tDCS) is a mild non-invasive brain stimulation technique. It involves the application of a gentle electrical current to the surface of the brain through scalp electrodes. tDCS can be used to either increase or decrease activity in the area of the brain under the stimulating electrode depending on where the electrodes are positioned. tDCS to the prefrontal region of the brain has been found to have some antidepressant efficacy, and we are evaluating its efficacy as a new non-medication brain stimulation treatment for many conditions including depression and anxiety. The role of estrogen and progesterone in impacting on tDCS has never been explored before. In this study, women are treated with tDCS at two time points across a monthly cycle, with examination of their hormone profiles. In this way, greater accuracy of treatment with attention to hormone impacts is being measured and will be an important guide for other brain stimulation treatments.

### **The perimenopausal questionnaire: Meno-D**

We have developed a unique questionnaire to characterise the different symptoms of depression that women in the perimenopausal period experience. This questionnaire has been circulated to many general practitioners and other healthcare professionals, who are assisting us with validating this important assessment tool.

### **Family violence – understanding health practitioners' current practice, attitudes and beliefs**

Family violence directly affects one in five Victorian women over the course of their lifetime. It is the leading contributor to preventable death, disability and illness in Victorian women aged 15 to 44 years. The issue of family violence is a complex one that health practitioners find very difficult to deal with. In order to understand and promote early intervention more research is required.

This current study aims to obtain information from health practitioners about their current practice, attitudes and beliefs to better inform procedures and guidelines about what to do when a patient is experiencing family violence.

### Using accelerometer-based compact system as a diagnostic tool to assess and monitor drug-induced parkinsonism

This research project is testing an experimental device known as an accelerometer for the detection and monitoring of abnormal movements known as “parkinsonism”— that can be caused by some medications. An accelerometer is worn like a watch around the wrist or ankle for about 30 minutes to measure movements. It is not painful at all. Men and women with a diagnosis of schizophrenia managed on first generation antipsychotic medications, or who have parkinson’s disease, or who are healthy people are invited to participate in this study which may assist in our understanding of movement disorders and in the development of a more sensitive and early detection tool for diagnosing parkinsonism.

The objective of this pilot study is to evaluate the effectiveness of accelerometer in quantifying Drug-Induced Parkinsonism (DIP) symptoms such as tremor, bradykinesia and gait abnormalities and detecting sub-clinical DIP in patients suffering from schizophrenia.



### The National Register of Antipsychotic Medication in Pregnancy (NRAMP)

The desire to reproduce is both a powerful urge and a basic human right for women regardless of mental health status. Deinstitutionalised treatment for mental illness, better pharmacotherapies, and generally higher expectations for a normal quality of life have the potential to raise the incidence of pregnancy in women with psychosis (Miller, Bloom & Resnick, 1992). The right of women with mental illness to become parents subsequently places responsibility upon health care professionals to ensure sound antenatal and ongoing care are both available and accessible.

However there is a notable dearth of information available to clinicians and women who need to make informed decisions for the health and wellbeing of both mother and baby during

pregnancy and breast feeding. Therefore The National Register of Antipsychotic Medication in Pregnancy (NRAMP) was established in 2005, to investigate the safety of antipsychotic medication during pregnancy and in the first 12 months of life.

This targeted development of evidence-based clinical guidelines will expand our knowledge, understanding and care plan options for pregnant women and new mothers with severe mental illness who take antipsychotic medication during pregnancy. By conducting this research, we aim to provide a better understanding of the safe use of antipsychotic medication during pregnancy and breastfeeding, and develop best-practice guidelines to inform clinical decisions, improved treatment options and encourage safer outcomes for mother and baby.



**CURRENT GRANTS**

**Adjunctive Hormone Therapy for Treatment Resistant Depression in Peri menopausal Women**  
*National Health and Medical Research Council,*  
Kulkarni J. \$599,514

**The National Register of Antipsychotic Medications in Pregnancy**  
*Janssen-Cilag,*  
Kulkarni J. \$50,000

**Servier Research Fellow in Women's Mental Health**  
*Servier,*  
Kulkarni J. \$30,000

**Janssen-Cilag Prolactin Meta-Analysis**  
*Janssen- Cilag,*  
Kulkarni J. \$108,250

**'Mothers Matter Intervention', a new support service for pregnant women with mental illness**  
Alfred Felton Bequest Small Grants March 2016: \$19,751

**GRANTS AWARDED**

funding to commence in 2017  
**A Randomised Controlled Trial of NMDA Antagonist, Memantine, for the Treatment of Borderline Personality Disorder**  
NHMRC Project Grant-  
March 2016: \$993,067

**STUDENTS**

The Women's Mental Health Team provides a friendly and nurturing environment where students are encouraged to interact with senior staff on issues surrounding research design and analysis. Further, students are given the unique opportunity to be treated like staff members. This includes attending staff meetings, sharing ideas about research, and attending conferences both locally and internationally. This unique student environment is an ideal gateway between being a university student and joining the research workforce.

During 2016, we congratulated Sacha Filia on successfully passing her PhD "A comprehensive assessment of factors related to smoking and other cardiovascular disease risk factors among people experiencing severe mental illness".

Women's Mental Health Team has:

- 1 x Bachelor of Science - Pharmacology (Honours) Student
- 3 x Bachelor of Medical Science (Honours) Students
- 6 x 5th Year Bachelor of Medicine, Bachelor of Surgery Students
- 2 x Bachelor of Medicine, Bachelor of Surgery Enrolled Students
- 10 x Research Support Affiliates / volunteers
- 1 x PhD Students

**MEDIA & COMMUNITY**

**Kulkarni J.** Diagnosing the Victims of Family Violence – Mindcave Psych E Opinion Issue 19, April 2016.

**Kulkarni J.** International Women's Day Luncheon – presentation "Women's Mental Health- Not A National Priority, Not Good Enough!" – 8th March 2016, Melbourne

**Kulkarni J.** Leader Community Newspaper – comments on "McKinnon life coach says his two-month online course is rehab for violent men" – 19th February 2016

**Kulkarni J.** Dr Colin Holloway, Daily Blog – Article "Chemical messengers: how hormones affect our mood" 10th February 2016

**Kulkarni J.** ABC774 Radio with Rafael Epstein – segment "Life and Other Catastrophes" topic discussed "Is your workplace culture making you sick?" - 8th February 2016

**Kulkarni J.** International Business Times – comments on "Schizophrenia breakthrough: Schizophrenia cure may be possible in future after scientists discover biological cause" 29th January 2016

**Kulkarni J.** Sydney Morning Herald with Kate Aubusson – Interview "C4 variation and schizophrenia" 28th January 2016

**Kulkarni J.** Radio West – Southern Cross Austereo, Interview (fortnightly) "Return to work blues" 22th January 2016

**Kulkarni J.** ABC Perth – Gillian O'Shaughnessy, Interview "novel antidepressants" 13th January 2016.

**Kulkarni J.** Daily Mail Australia – comments on "The Truth about the Pill" Does it make you fat and should you take it for years? - 5th January 2016

**Kulkarni J.** The Daily Advertiser - Article "Plan ahead to make resolutions succeed" 1st January 2016.

**Kulkarni J.** Stock & Land - Article "Plan ahead to make resolutions succeed" 1st January 2016.

**Gurvich C. Thomas N.** Colosoul Magazine "Mental Health to Menopause: The Truth Behind Women's Health" 6th September, 2016



# *In Her Shoes*

The Monash Alfred Psychiatry Research Centre (MAPrc) together with Servier Pharmaceuticals hosted its 2nd Annual Conference titled "In her Shoes" on the 3rd September 2016 at the Stamford Plaza, Melbourne. The one day conference was attended by 100 general practitioners from both metropolitan and rural areas all over Australia.

In her opening address, Professor Jayashri Kulkarni pleaded that "Women's Mental Health needs to be made a national priority and is everyone's business".

The Women's Mental Health team from MAPrc presented the latest research and understanding about key issues impacting on women's mental health.

The areas covered included:

- Polycystic ovary syndrome (PCOS)
- Premenstrual dysphoric disorder (PMDD)
- Understanding and Managing Borderline Personality Disorder (BPD)
- Motherhood and Mental Health
- Perimenopause/Menopause- Endocrine Aspects, Anxiety and Depression, Cognitive changes
- Assessment of Violence against Women

The event was informative, nurturing and inspiring for those who attended.

RESEARCH  
THERAPEUTIC  
BRAIN STIMULATION

OUR TEAM



**DIRECTOR/CHIEF INVESTIGATOR**

Professor Paul Fitzgerald

**DEPUTY DIRECTOR TBS**

**HEAD COGNITIVE THERAPEUTICS RESEARCH PROGRAM**

Associate Professor Kate Hoy

**TEAM COORDINATOR**

Karyn Richardson

**RESEARCH FELLOWS**

Professor Marco Romano-Silva  
Professor of Psychiatry (Visiting)

Dr Neil Bailey  
Dr Robin Cash  
Dr Bernadette Fitzgibbon  
Dr Manreena Kaur  
Dr Behailu Kibert  
Dr Rebecca Segrave  
Dr Richard Thomas

**RESEARCH REGISTRARS**

Dr Odette Edelstein

**RESEARCH NURSES**

David Elliot  
Susan McQueen  
Lenore Wambeek

**RESEARCH ASSISTANTS**

Hannah Coyle  
Robert Eres  
Kirsten Gainsford  
Laura Knox  
Karyn Richardson  
Caitlyn Rogers  
Caley Sullivan

**STUDENT RESEARCHERS**

Rodney Anderson  
Xianwei Che  
Sung Wook Chung  
Hannah Coyle  
Melanie Emonson  
Amity Green  
Phillip Hall  
Aron Hill  
Oscar Murphy  
Sin-Ki Ng  
Karyn Richardson  
Greg Roebuck

**“Using advanced neuroscience techniques allows us to investigate brain function and develop innovative treatments”**

The development of truly effective treatments in psychiatry and neurology requires an understanding of the biological basis of brain illnesses. Through the use of advanced neuroscience techniques we are able to investigate brain function in illness and develop innovative treatments. The Therapeutic Brain Stimulation Team's research is aimed at developing and expanding innovative brain stimulation techniques, through world-first research and commercialisation, and to evaluate their clinical applications. We conduct clinical trials in conditions such as depression, schizophrenia, anxiety disorders, post-traumatic stress disorder, traumatic brain injury, Alzheimer's disorder, pervasive developmental disorders and chronic pain. In addition to our clinical trials, the team is also engaged in studies using advanced neuroscience techniques to try and better understand the underlying brain processes of psychiatric and neurological disorders and the mechanisms through which brain stimulation may enhance function. The team includes internationally recognised researchers with backgrounds in neuroscience, biomedical engineering, psychiatry, clinical neuropsychology, clinical psychology and psychiatric nursing.

In 2016 we conducted nine separate clinical trials across depression, autism, fibromyalgia, head injury, schizophrenia, PTSD and Alzheimer's disease. We also conducted 13 experimental studies, published 39 papers, ran the Australasian Brain Stimulation Meeting and three clinical TMS training courses. We were also successful in applications for eight grants. In addition, we had three students complete their degrees.

## HIGHLIGHTS, AWARDS & DISTINCTIONS

### PROFESSOR PAUL FITZGERALD

- Weston foundation project grant for 'Investigating the efficacy of high-frequency rTMS treatment for Alzheimer's disease'
- NHMRC equipment grant for 'The development of a portable neurophysiological assessment suite for cognitive function'
- NHMRC project grant for 'Ketamine therapy among patients with treatment-resistant depression: a randomised, double-blind, placebo-controlled trial.'

### ASSOCIATE PROFESSOR KATE HOY

- Mason Foundation National Medical Program Grant for 'A RCT of Theta Burst Stimulation for Alzheimer's.'
- Invited to join the nine member NHMRC Early and Mid-Career Reference Group, contributing to the structural review of the NHMRC's Grant Program.
- Kate also initiated the women in brainstim database site aimed at addressing the extreme gender imbalances at international brain stimulation conferences. Go to [womeninbrainstim.com](http://womeninbrainstim.com) to find out more and register.

### DR BERNADETTE FITZGIBBON

- Mason Foundation National Medical Program Grant for 'A double-blind placebo-controlled clinical trial of prefrontal theta burst stimulation in fibromyalgia'

### DR MANREENA KAUR

- NHMRC Early Career Fellowship for 'Repetitive transcranial magnetic stimulation treatment of auditory hallucinations in psychotic disorders: a clinical and neurobiological investigation'

## COLLABORATIONS

### Brain Stimulation Research

We have a strong and highly productive research collaboration with the Centre for Addiction and Mental health, Department of Psychiatry, University of Toronto. It includes close links with the Temerty Centre for Therapeutic Brain Intervention headed by Professor ZJ Daskalakis. This collaboration involves the joint development of research protocols, strategic planning and research projects and has generated a considerable number of joint publications.

### Clinical Trial Collaborations

We have a number of strong collaborations with researchers and clinicians which involve investigating novel treatments for a variety of conditions. These collaborations allow the conduct of ground breaking clinical trials in conditions such as depression, anxiety disorders, post-traumatic stress disorder, Alzheimer's disease, pervasive developmental disorders and chronic pain.

- Associate Professor Richard Bittar (Neurosurgeon) and Professor Dennis Velakoulis (Royal Melbourne Hospital and University of Melbourne)
- Professor Colleen Loo (University of NSW; Black Dog Institute)
- Associate Professor Peter Enticott, Cognitive Neuroscience Unit, Deakin University
- Associate Professor Geoffrey Littlejohn and Dr Emma Guymer, (Monash Medical Centre)
- Professor David Forbes and Ms Jane Nurse (Phoenix Australia – Centre for post-traumatic stress disorder University of Melbourne)
- Zahra Kazem-Moussavi, Associate Professor (University of Manitoba)
- Professor Cherrie Galletly (Adelaide University and Adelaide Clinic)



## INDUSTRY PARTNERS

We have established a collaboration with Medibio Limited, which involves exploring the relationship between autonomic arousal and response to magnetic stimulation treatments for affective disorders. We have additional partnerships or relationships with a number of brain stimulation device manufacturers including Medtronic (US), Neuronetics (US), MagVenture (Denmark), Neurosoft (Russia) and Brainsway (Israel).

**Device Development:** In addition to our clinical and experimental trials, we are working closely with a variety of collaborator to develop brain stimulation technologies with the goal of providing more accessible and personalised treatment options:

- Professor Malin Premaratne, (Department of Electrical and Computer Systems Engineering; Monash University)
- Mark Armstrong (Practice Professor in Design; Monash University)
- Professor Jon McCormack (Faculty of Information Technology, Monash University)
- Robot Circus (Game software developer)

**National TMS Clinical Trial Network:** We have an established national network of TMS trial centres in multiple private psychiatric hospitals around Australia. This network has been engaged in the conduct of multiple multi-site clinical TMS trials.



## SELECTED PROJECTS

### Deep Brain Stimulation in the treatment of Severe Treatment Resistant Depression

#### COORDINATING PRINCIPAL INVESTIGATOR

Professor Paul Fitzgerald

#### PRINCIPAL INVESTIGATORS

Professor Richard Bittar (RMH)  
Professor Paul Fitzgerald

#### ASSOCIATE INVESTIGATORS

Dr Rebecca Segrave,  
Ms Karyn Richardson, Ms Caitlyn Rogers,  
Ms Laura Knox

#### FUNDING

NHMRC Project grant \$967,355

#### BACKGROUND

Major depression is a severe illness with high prevalence. Even when the full range of standard antidepressant treatments have been tried, 10-20% of patients continue to experience symptom that result in marked disability and high morbidity. Deep brain stimulation (DBS) involves the implantation of stimulating electrodes into localised brain regions. In recent years DBS has been investigated as a potential treatment option for patients with the most severe and treatment non-responsive forms of depression. Studies have investigated several implantation sites, but the optimal neuroanatomical targets are yet to be identified. We are conducting a randomised, controlled double-blind trial to assess, whether DBS of the Bed Nucleus of the Stria Terminalis (BNST) has antidepressant efficacy.

#### CASE REPORT:

Mrs P is a 40 year old woman who had experienced severe treatment resistant depression for close to a decade. She had tried every standard treatment for depression, including medications from all antidepressant classes, combination pharmacotherapy, and numerous courses of ECT and rTMS, none of which provided sustained benefit. Mrs P underwent DBS surgery in 2016, followed by a randomised trial of five stimulation settings that included a sham condition. Mrs C had a positive response to one of the five settings, with the severity of her symptoms decreasing by 50%. All other settings resulted in a return of her symptoms to pre-operative levels. When the device was adjusted back to the settings that resulted in an improvement in her mood, Mrs P again had a significant reduction in symptom severity. This included a 50% reduction in depressive symptoms and a marked reduction in suicidal ideation.

#### CONCLUSIONS

DBS of the BNST showed promise in reducing the symptoms of depression in this case. This provides further evidence that the BNST may prove an effective and safe site for DBS treatment of depression.

#### CURRENT STATUS

Recruitment on-going.



## RESEARCH

# THERAPEUTIC BRAIN STIMULATION

## SELECTED PROJECTS

### A randomized controlled trial of Theta Burst Stimulation for the treatment of mild to moderate Alzheimer's Disease

#### CHIEF INVESTIGATOR

Associate Professor Kate Hoy

#### ASSOCIATE INVESTIGATORS

Professor Paul Fitzgerald  
Ms Susan McQueen, Mr David Elliot,  
Ms Lenore Wambeek, Ms Hannah Coyle,  
Ms Caitlyn Rogers, Ms Kirsten Gainsford

#### FUNDING

Mason Project grant (\$59,180), Monash SGS grant scheme

#### BACKGROUND

Alzheimer's disease (AD) is the most common form of dementia, with 1,700 newly diagnosed cases in Australia each week. AD is characterised by progressive decline in cognitive functioning in most areas, including in memory, attention, visuospatial ability, language and executive function. There is an urgent need to develop new treatments for AD as there are currently no effective treatments for these hallmark symptoms. One promising new treatment option is Theta Burst Stimulation (TBS); a non-invasive technique that can change the activity of cortical networks, such as the one implicated in cognitive impairment in AD. We are therefore conducting a double-blind placebo-controlled randomised pilot study comparing a treatment course of active TBS to sham TBS.

#### CASE REPORT

Mrs A is an 83 year old woman, who had been diagnosed with mild Alzheimer's disease 6 months prior to entering into the trial. She described difficulty remembering appointments and forgetting the name plants and flowers she could previously. Mrs A received treatments over a six week period. Her cognitive function was assessed at the beginning, at the end of the treatment course and at a 3 month follow up. Mrs A's performance following treatment indicated she experienced some improvement immediately following the treatment course, and that she did not experience cognitive decline over the 3 months follow up. Mrs A also showed slightly improved performances on the tests of attention and concentration. She also improved on assessments of speed of information processing and working memory, with performances within age expected levels.

#### CONCLUSION

TBS showed some promise in potentially delaying the progression of cognitive decline in this case, and resulted in improvements in some cognitive functions. This provides promising evidence to continue investigating the utility of TBS in the treatment of AD.

#### CURRENT STATUS

Recruitment on-going.

### Improving Magnetic Seizure Therapy in Major Depressive Disorder: A Randomised Clinical Trial comparing two alternate forms of Magnetic Seizure Therapy

#### PRINCIPAL INVESTIGATOR

Professor Paul Fitzgerald

#### ASSOCIATE INVESTIGATORS

Associate Professor Kate Hoy,  
Ms Susan McQueen,  
Mr David Elliot, Ms Lenore Wambeek,  
Dr Glenn Downey, Ms Anne Maree Clinton, Dr Brian Lithgow,  
Ms Caitlyn Rogers, Professor. Marco Romano-Silva, Dr Robin Cash,  
Ms Laura Knox

#### FUNDING

NHMRC Project Grant, \$470,000, 2013-2016

#### BACKGROUND

Magnetic Seizure Therapy (MST) is novel method of brain stimulation treatment for Major Depressive Disorder. Similar to Electroconvulsive Therapy (ECT), MST involves the induction of a seizure and is administered under anaesthetic by a trained psychiatrist. Preliminary findings have shown that MST can produce similar therapeutic benefits to ECT without impacting upon cognition or memory.



**CASE STUDY**

Ms R is a 25 year old female who has a long-standing history of Major Depressive Disorder. Prior to undergoing a course of MST, Ms R had trialled numerous antidepressant medications, psychotherapies, ECT and Transcranial Magnetic Stimulation (TMS) with little to no benefit. Prior to treatment, Ms R experienced severe depressive symptoms including low mood, hopelessness, poor motivation, difficulties concentrating and suicidal ideation.

Ms R underwent a course of 15 MST treatments over a period of 5 weeks. Following completion of treatment, her depressive symptoms had substantially decreased by over 50%. At one- and three-months following the completion of her treatment, Ms R no longer met criteria for Major Depression.

**CONCLUSION**

MST showed some promise in alleviating symptoms of depression in this case, and resulted in improvements in some cognitive functions. This provides promising evidence to continue investigating the utility of TBS in the treatment of AD.

**CURRENT STATUS**

Recruitment on-going.



**Repetitive transcranial magnetic stimulation for the treatment of fibromyalgia**

**COORDINATING PRINCIPAL INVESTIGATOR**

Dr Bernadette Fitzgibbon

**PRINCIPAL INVESTIGATORS**

Professor Paul Fitzgerald, Associate Professor Kate Hoy, Dr Alan Pearce, Associate Professor Geoffrey Littlejohn, Dr Emma Guymmer, Associate Professor Peter Enticott

**ASSOCIATE INVESTIGATORS**

David Elliot, Susan McQueen, Lenore Wambeek, Laura Knox

**FUNDING**

Mason Project Grant

**PARTICIPANTS**

Persons with treatment resistant depression between the ages of 18 and 75.

**BACKGROUND**

Fibromyalgia is a complex chronic disorder characterised by widespread musculoskeletal pain and muscle tenderness. It is a debilitating condition that has substantial consequences for the individual, their family and the economy. To date, pharmacological interventions remain the primary treatment option for fibromyalgia despite limited evidence to support their use.

One novel and promising approach for treatment is repetitive Transcranial Magnetic Stimulation (rTMS); a safe and non-invasive procedure that enhances cortical activity at the site of stimulation. Research suggests that people with fibromyalgia may have an imbalance in cortical activity in areas of the brain that are responsible for the experience of pain, such as the dorsolateral prefrontal cortex (DLPFC). Hence, we are carrying out a randomised double-blind placebo-controlled clinical trial of a course of DLPFC rTMS treatment in patients who suffer from fibromyalgia.

**CASE STUDY**

Ms B is a 35 year old female who was formally diagnosed with fibromyalgia a year prior to her contact with MAPrc. Life with fibromyalgia was difficult for Ms B. She reported that her symptoms almost completely interfered with her general activity, ability to work, relationships with others, sleep, mood, and her overall enjoyment of life. Ms B described feeling overwhelmed by her symptoms and experienced little to no lasting relief from pain medication.

Ms B received 20 treatments of active rTMS over a four week period. Ms B experienced some significant benefits with treatment, including a 62.5% reduction in both pain intensity and pain unpleasantness at a one month follow up assessment. Ms B also reported a 56% reduction in pain interference upon her general activity, mood and enjoyment of life.

**CONCLUSION**

A four week course of left DLPFC rTMS was effective in reducing the impact and severity of pain in this case, and resulted in improvements in daily functioning and enjoyment of life. Importantly, this case also demonstrates that rTMS treatment has the potential to provide sustained pain relief and alleviation of symptoms without side effects, which is a limitation of most current pharmacological interventions to date.

**CURRENT STATUS**

Recruitment on-going.



The Cognitive Therapeutics Research Program, led by Associate Professor Hoy, is focused on the development of novel biological treatments for cognitive impairment, in both psychiatric and neurological illnesses. Specifically, the group investigates the cognitive and neurobiological effects of brain stimulation techniques such as transcranial Direct Current Stimulation (tDCS), transcranial Alternating Current Stimulation (tACS), transcranial Random Noise Stimulation (tRNS), Transcranial Magnetic Stimulation (TMS), and Theta-Burst Stimulation (TBS).

**CURRENT CLINICAL TRIALS**

- A new non-medication approach to improving cognition symptoms in people with schizophrenia
- Investigating the use of brain stimulation to treat the cognitive symptoms of mild to moderate Alzheimer's
- Examining the effects of brain stimulation on cognitive aging in healthy older adults between the ages of 65 and 80 years

**SELECTED CURRENT EXPERIMENTAL RESEARCH PROJECTS**

- The relationship between cortical inhibition in the prefrontal cortex and working memory in schizophrenia. (DPsych Student: Karyn Richardson).
- Investigating neurobiological and neurocognitive effects of tDCS (PhD Student: Aron Hill).
- The relationship between cortical activity and cognitive function after head injury. (PhD Candidate Hannah Coyle).
- Investigating the use of brain stimulation to enhance neural plasticity and cognitive performance in younger adults, and older adults with or without memory complaints. (DPsych Candidate Melanie Emonson).





Left to right: Susan Rossell, Francesca Beilharz, Toni Pikoos, Michelle Robertson, Caitlin Yolland, Phil Sumner, Lizzie Thomas, Ratu Lucky Nitibaskara, Maree Reser, Sally Grace, Sarah Lancaster, Natalia Contreras, Eric Tan, Wei Lin Toh, Stephanie Louise, Amy Malcolm

**TEAM LEADER/CHIEF INVESTIGATOR**

Professor Susan Rossell

**TEAM COORDINATOR**

Dr Wei Lin Toh

**CLINIC COORDINATOR**

Dr Wei Lin Toh

**SENIOR RESEARCHERS**

Associate Professor Neil Thomas  
**Voices Clinic**

Dr Caroline Gurvich **Research Fellow**

Dr Eric Tan **Postdoctoral Researcher**

**STUDENT RESEARCHERS**

Ratu Lucky Nitibaskara **Honours in Biomedical Science**

Imogen Bell **Clinical PhD**

Rachel Brand **PhD**

Shayden Bryce **Doctorate of Clinical Neuropsychology**

Sean Carruthers **PhD**

Natalia Contreras **PhD**

Dane Easden **Honours in Psychology**

Sarah Gaetano **PhD**

Stephanie Louise **Clinical PhD**

Toni Pikoos **Honours in Psychology**

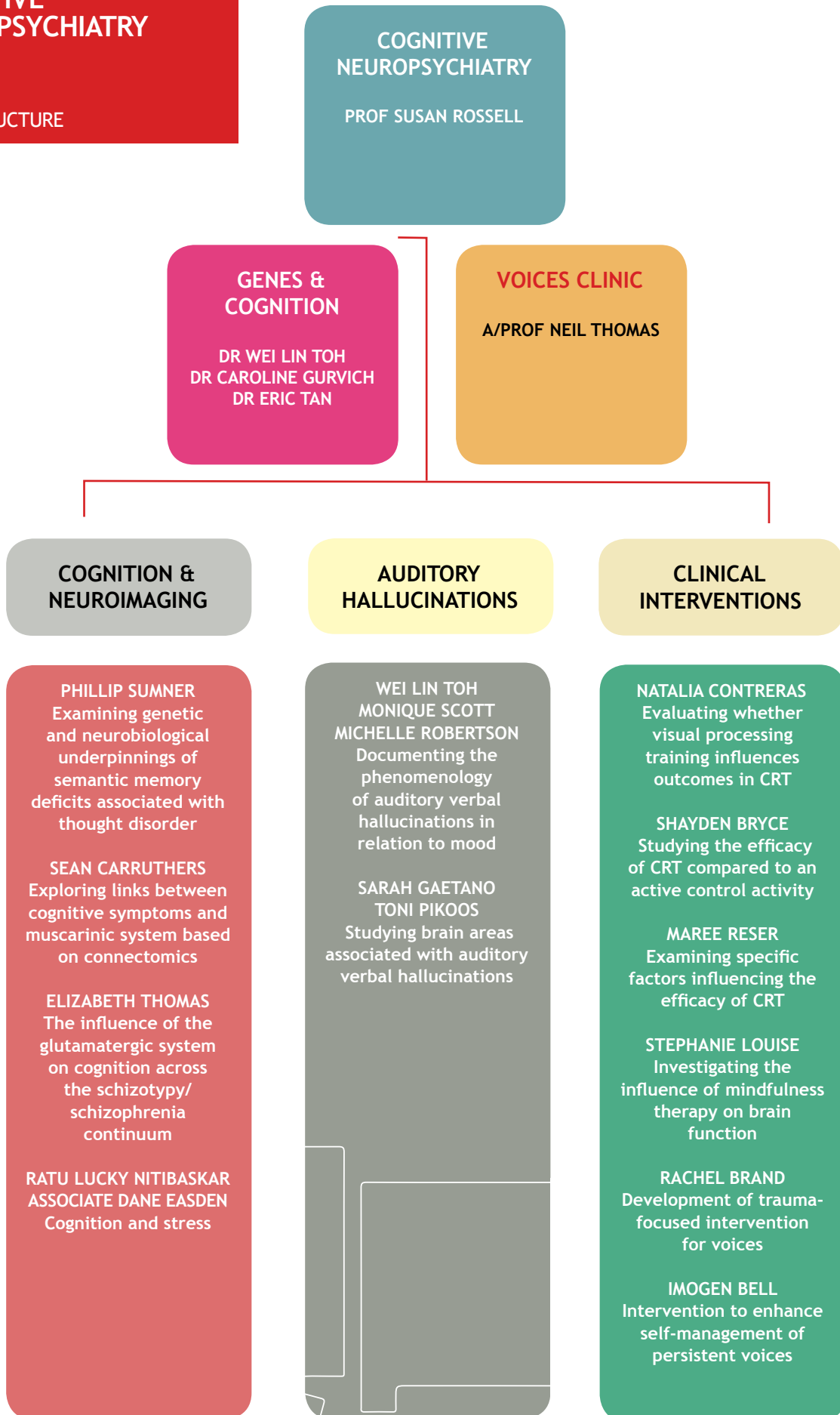
Maree Reser **Clinical PhD**

Michelle Robertson **Honours in Psychology**

Monique Scott **Clinical PhD**

Phillip Sumner **PhD**

Elizabeth Thomas **PhD**



## RESEARCH

# COGNITIVE NEUROPSYCHIATRY

## TEAM OVERVIEW

The Cognitive Neuropsychiatry lab aims to examine the relationships between mental illness, cognitive function and emotion processing, especially focusing on schizophrenia, schizoaffective disorder, bipolar disorder and major depressive disorder. We use techniques involving a full battery of cognitive assessments, eye-tracking and neuroimaging to better understand the biological underpinnings of these disorders. We also collect genetic information so that in time, we may link the cognitive, eye-tracking and neuroimaging data to specific combinations of genes.

## HIGHLIGHTS

The year of 2016 has been a stimulating and fulfilling year for the Cognitive Neuropsychiatry team, with exciting developments and milestones achieved. To this end, we have seen the completion of one PhD (Dr Natalia Contreras) and two Honours students (Dane Easden and Ratu Lucky Nitibaskara) with excellent outcomes, the addition of several new students at the Honours and doctoral levels as well as high-quality research and academic progress of existing students. From the perspective of academic outputs, our team has produced upwards of 40 peer-reviewed publications in high-impact journals, and conducted numerous symposia, oral and poster presentations at several local (i.e. World Congress of Behavioural and Cognitive Therapies; Australasian Cognitive Neuroscience Society) and international (i.e. Schizophrenia International Research Society in Florence, Italy; International Consortium on Hallucination Research in Chicago, USA; World Congress of Psychiatric Genetics) scientific conferences. In term of philanthropic and nationally competitive grants, we have been awarded close to \$1M for a variety of research studies, ranging from cognitive remediation therapy (CRT) to clinical studies targeting negative symptoms in schizophrenia.

## COLLABORATIONS

### NATIONAL

Professor Jennie Ponsford, Monash University  
Dr Greg Yelland, Monash University  
Dr Yitz Hollander, Alfred Hospital  
Dr Kiymet Bozaoglu, Baker IDI  
Associate Professor Mal Hopwood, Albert Road Clinic  
Dr John Farhall, La Trobe University  
Dr Ellie Fossey, La Trobe University  
Professor Pat Michie, University of Newcastle  
Professor Brian Dean, Howard Florey Institute  
Associate Professor Carol Harvey, University of Melbourne  
Professor David Castle, St Vincent's Health  
Dr Tamsyn Van Rheenen, Melbourne Neuropsychiatry Centre  
Swinburne University Neuroimaging Facility

### INTERNATIONAL

Dr Rachel Mitchell, Institute of Psychiatry, UK  
Professor Val Curran, University College London, UK  
Professor Celia Morgan, University of Exeter, UK  
Dr Phillip Grant, University of Giessen, Germany  
Professor Iris Sommer, University of Utrecht, Netherlands

## RESEARCH PROJECTS

In the Cognitive Neuropsychiatry lab group, focus is placed on a large-scale research program, with a series of smaller studies subsumed under umbrella of this project. These individual studies are often run by students to fulfil the research component toward attaining their postgraduate qualifications (see Figure 1). Our large-scale research program 'Genes and Cognition' requires participants to complete a set battery of tasks designed to evaluate clinical symptomatology, cognitive function and eye movements. The majority of participants assessed by our research group will complete this battery. Thereafter, they may wish to further participate in specific projects,



for instance neuroimaging sessions conducted at Swinburne University, or therapies aimed at strengthening specific thinking skills, such as attention, memory and organisation.

**Cognition and neuroimaging studies**

Professor Susan Rossell (Chief Investigator), Dr Caroline Gurvich, Dr Wei Lin Toh, Dr Eric Tan, Sean Carruthers, Sarah Gaetano, Phillip Sumner, Elizabeth Thomas

**FUNDING**

NHMRC; Barbara Dicker Brain Science Foundation

**BACKGROUND**

Psychotic disorders, involving schizophrenia, schizoaffective disorder, and bipolar disorder, are characterised by a broad range of symptoms, such as hallucinations, delusions, and thought disorder. People who experience psychosis are also likely to exhibit noted cognitive difficulties, specifically in the areas of language, memory and executive function. There is a need to further investigate how these cognitive deficits are linked to particular psychotic symptoms, such as 'hearing voices', unusual beliefs or impaired thinking patterns. In some cases, the cognitive deficits have also been coupled with specific brain abnormalities. In a similar way, multiple genes have been found to be related to the presence of certain observed symptoms. Our hope is that a better understanding of cognition, neurobiology and genetic contributions underlying these disorders will spur the development of effective and novel pharmacological and psychological interventions.

**AIMS**

Study 1 aims to examine the genetic and functional magnetic resonance imaging (fMRI) underpinnings of semantic memory deficits Associate with thought disorder in schizophrenia. Study 2 aims to specifically investigate the influence of a genetic polymorphism of the M1 receptor gene on cognition as well as structural networks connecting key brain regions involved in cognitive function in schizophrenia.

**METHOD**

Participant groups are individuals with schizophrenia (n=50; including those with thought disorder) as well as age-, sex-, and IQ-matched healthy controls (n=50). Participants are asked to undergo a standard clinical and cognitive assessment battery, blood-taking for genetic testing, followed by a two-hour non-invasive functional and structural magnetic resonance imaging (MRI) session.

**CURRENT STATUS**

Ongoing until end 2017

**Auditory verbal hallucination studies**

Professor Susan Rossell (Chief Investigator), Dr Neil Thomas, Dr Wei Lin Toh, Sarah Gaetano, Toni Pikoos, Monique Scott, Michelle Robertson

**FUNDING**

NHMRC; Barbara Dicker Brain Science Foundation

**BACKGROUND**

Auditory verbal hallucinations, also known as 'hearing voices', refer to the perception of verbal utterances in the absence of corresponding external stimuli. Whilst auditory verbal hallucinations are regarded as a hallmark indicator of psychosis, they are encountered in various diagnoses. Yet only limited research has considered them in the presence of bipolar disorder and major depressive disorder, despite recognition of their frequency in these conditions. These gaps in knowledge therefore need to be addressed, and it is imperative to identify how voice characteristics differ in the mood disorders, and also fluctuate according to diagnostic subtype or illness phase.

Whilst the phenomenology of auditory verbal hallucinations has been well-documented in schizophrenia, its specific neurobiological mechanisms and genetic underpinnings remain unknown. Emerging

research indicates that individuals with auditory verbal hallucinations show auditory and cortical abnormalities not present in other individuals with psychosis who do not 'hear voices'. As such, neuroimaging techniques involving MRI and magnetoencephalography (MEG; with millisecond 'real-time' resolution) will be employed to elucidate the specific neuroanatomical brain regions as well as cerebral activation patterns implicated in 'voice-hearing' experiences.

**AIMS**

Study 1 aims to explore the phenomenology of auditory verbal hallucinations in relation to mood in bipolar disorder and major depressive disorder. Study 2 aims to discover activations Associate with 'voice-hearing' in schizophrenia, as well as determine the roles that the anterior cingulate, primary auditory cortex and superior temporal gyrus play in these experiences.

**METHOD**

For Study 1, participant groups are individuals who experience auditory verbal hallucinations, and have a diagnosis of bipolar disorder (n=60), major depressive disorder (n=30) or schizophrenia (n=60), OR who do not have a significant mental health history (n=30). Participants are asked to undergo a standard clinical assessment battery, followed by a focused interview on the phenomenology of their 'voice-hearing' experiences.

For Study 2, participant groups are schizophrenia 'voice-hearers' (n=50), schizophrenia 'non-voice-hearers' (n=50) and healthy controls (n=50). Participants are asked to undergo a standard clinical and cognitive assessment battery, blood-taking for genetic testing, followed by a two-hour non-invasive MRI and MEG session, and auditory tasks.

**CURRENT STATUS**

Studies 1 and 2 are ongoing until end 2017.

**Clinical intervention studies**

Professor Susan Rossell (Chief Investigator), Dr Neil Thomas, Shayden Bryce, Natalia Contreras, Stephanie Louise, Maree Reser, Rachel Brand, Imogen Bell

**FUNDING**

Barbara Dicker Brain Science Foundation; MAZDA; Aikenhead Centre for Medical Discovery Research Endowment Fund.

**BACKGROUND**

Cognitive Remediation Therapy (CRT) comprises a set of cognitive drills or compensatory interventions designed to improve cognitive abilities such as attention, working and verbal memory, flexibility and planning, and executive function, which in turn lead to improved social functioning. There is increasing empirical support regarding the benefits of CRT for people with schizophrenia. These positive effects on cognitive performance are noted to persist, even after the interventions have ceased. In fact, these cognitive gains have been linked to advances in securing and maintaining gainful employment. There is wide variation in existing CRT programs in terms of their focus (e.g. psychosocial vs. vocational), frequency/duration of sessions, or appropriate outcome measures. Ongoing research has tried to identify the 'active ingredients' promoting a positive treatment response as well as motivational enhancements indicative of intervention success.

Mindfulness-based therapy seeks to interrupt automatic cognitive processes and teach individuals to focus less on reacting to incoming thoughts and feelings, but instead become aware of, observe and accept them without attachment or judgment. This mindfulness practice allows one to notice when these involuntary responses are occurring and to alter their reaction to form more of a reflection. There has been scant neuroimaging research in this area, but preliminary fMRI data has shown increased activation in the prefrontal cortex, signifying a greater degree of self-control.

There is mounting evidence traumatic and adverse life events play a role in the development of voice-hearing experiences and Associate distress. There is considerable comorbidity between post-traumatic stress disorder (PTSD) and voice hearing experiences, with many of the same psychological mechanisms implicated in the development of these difficulties following trauma. Trauma-focused psychological treatments known to effectively manage PTSD may therefore represent a new approach to treating voice-hearing experiences. These approaches have been tested in populations with psychosis to treat comorbid PTSD, with evidence suggesting they could be safe and effective. However, these treatments have not yet been directly applied to treating voice-hearing experiences specifically.

Significant advances in the area of digital health have opened a gateway of research studies exploring how these technologies could be harnessed to improve mental health problems. Digital interventions which promote self-management of mental health symptoms through the use of technologies such as smartphone apps are growing increasingly popular, particularly among those with lived experiences of these symptoms. Research shows some people with serious mental illness, such as schizophrenia or bipolar disorder, are interested and able to use these technologies to manage their day-to-day symptoms. In addition, preliminary findings from intervention trials suggest this can be effective in reducing symptoms and improving functioning. This highlights the need for research to further develop and evaluate new interventions which make use of cutting-edge technology to advance the mental health interventions.

**AIMS**

Studies 1, 2 and 3 all seek to evaluate various aspects pertaining to the efficacy of CRT in individuals with schizophrenia or schizoaffective disorder. Study 1 aims to evaluate whether visual processing training influences outcomes in CRT. Study 2 aims to examine the efficacy of a

top-down cognitive remediation program (COGPACK) relative to an active video-game control. Study 3 aims to identify specific factors influencing the efficacy of CRT outcomes.

Study 4 is a mindfulness-based treatment for people who experience auditory verbal hallucinations, and comprises a group therapy program designed to help people cope better with these experiences. Study 5 is a pilot randomised controlled trial evaluating the feasibility and initial effectiveness of an established psychological treatment for PTSD, imaginal exposure, to treat voice-hearing experiences related to traumatic or adverse events. Study 6 is a randomised controlled trial to evaluate the feasibility, acceptability and preliminary efficacy of SAVVy: Smartphone-Assisted coping focused interVention for Voices.

**METHOD**

For Studies 1, 2 and 3, participants are asked to attend a set number of hour-long group CRT sessions per week for a pre-determined number of weeks. Baseline, mid-intervention, end-intervention, and follow-up assessments will be conducted, with cognitive performance (MATRICS) and self-reported independent living skills as the main outcome measures.



## RESEARCH

# COGNITIVE NEUROPSYCHIATRY

## OUR RESEARCH

For Study 4, participants attend a mindfulness-based group therapy program targeted at 'voice-hearers'. Prior to and following this intervention, they are asked to undergo a neuroimaging session to explore whether such therapy can lead to brain changes. In study 5, participants are randomly allocated to either receive six sessions of psychological intervention using imaginal exposure in addition to their usual psychiatric treatment, or to continue their usual psychiatric treatment. Baseline, post-intervention and follow-up assessments will assess outcomes relating to voice-hearing severity, distress and possible psychological mechanisms of change. Study 6 involves participants receiving four sessions of therapy focused on improving coping with distressful voice-hearing experiences, in conjunction with the use of a smartphone app for self-monitoring and coping strategy reminders between sessions. Participants complete an assessment before and after the intervention to evaluate changes in voices, coping and general mental health symptoms. This trial is being jointly conducted at MAPrc and the Voices Clinic in Sussex, UK.

### CURRENT STATUS

Study 1 has been completed, and Studies 2, 3 and 4 are ongoing until end 2017. Studies 5 and 6 are ongoing until 2019.

### Cognition and stress studies

Dr Caroline Gurvich (Chief Investigator), Dr Kiymet Bozaoglu, Prof Susan Rossell, Ratu Lucky Nitibaskara, Dane Easden, Fran Jueres

### FUNDING

AMREP Collaborative Seed Grant; Platform Access Grant (Monash); Barbara Dicker Brain Science Foundation

### BACKGROUND

Uncontrolled stress can have a significant adverse impact on higher order cognitive functions, and drive the development and exacerbation of mental illness. The objective of this study was to better

understand how psychological and biological factors contribute to individual variations in the adverse effects of stress on cognition, with a focus on memory and higher order cognitive functions. A secondary objective was to explore biological and psychological factors contributing to the resilience some people have when exposed to stressful events, via an exploration of coping strategies. Overall findings will help drive larger studies in clinical populations, and ultimately lead to clinical trials of interventions aimed at reducing stress and Associate adverse effects on cognition and mental illness.

### AIMS

The aim of this project was to i) compare performance on objective measures of higher order cognitive abilities in groups with high versus low stress; ii) identify variations in gene expression (specifically in genes that regulate dopamine and BDNF) that underpin the relationship between cognition and stress in a healthy population and iii) identify key psychological and life experience features that contribute to, or moderate the stress-cognition relationship. Secondary aims were to explore additional genomic mechanisms (such as telomere length)

as well as the relationship with stress hormone cortisol that may further explain biological contributors to the stress-cognition relationship.

### METHOD

A cross sectional study design was adopted that involved 61 healthy adult participants, aged between 18 and 45 years old (a subsample of 24 formed a 'high stress' group, and a subsample of 24 formed a 'low stress' group). Participants attended MAPrc for a single session, and provided saliva samples on the morning of testing (to allow for measurements of the stress hormone, cortisol, upon awakening) as well as blood samples for further genetic analyses. They completed demographic and personal history measures, including childhood stress, ongoing/life stress and coping styles, a neuropsychological battery and eye-tracking tasks, including an emotional anti-saccade task.

### CURRENT STATUS

Data collection was completed in 2016, with data analysis and manuscript preparation now underway. Two honours students also used data from this project to complete their theses.



Eye tracking assessment demonstrated by Caroline Gurvich and Elizabeth Thomas, PhD candidate

**TEAM LEADER/CHIEF INVESTIGATOR**

Professor Jayashri Kulkarni  
Dr Andrew Gleason

**SUB-INVESTIGATOR**

Dr Arie Sebastian  
Dr Shainal Nathoo

**TEAM COORDINATOR**

Dr Annette Webb  
Michael Kornhauser

**RESEARCHERS**

Dr Aife Worsely  
Dr Antony Sutherland  
Dr Claire Wise  
Dr Eli Kotler  
Dr Fenny Muliadi  
Dr Hyacinta Xavier  
Dr Luke Smith  
Dr Sam Hunt  
Caitlin Finney  
Jenny Bortoli  
Jenny Ung  
Mathew Lewis  
Miniver Canty  
Paul Cortissos  
Sue Del Sasso  
Mirajana Stojkovic  
Anthony de Castella  
Gayan De Mel  
Natalia Contreras

**TEAM OVERVIEW**

With the incorporation of the MAPrc and Caulfield psychopharmacology teams this year, the unit has become a much larger research group. This transition was successfully guided by both Professor Jayashri Kulkarni and Dr Gleason and all staff showed how adaptive and fluid they can be. Of particular note in this transition was Dr Gleason's ability to take on all principal investigator roles at the Caulfield site while continuing to demonstrate new work feasibility. This year we took on an additional three clinical trials, more than doubling the output of research performed by the team.

June of 2016 saw the team attract significant media attention through a feature segment on *A Current Affair*. The segment gave detailed insight into the research team and their work particularly in the field of Alzheimer's disease. This media attention stimulated great interest into our research unit with the team receiving over 5000 national and international enquiries about clinical trials.

SELECTED PROJECTS

The psychopharmacology research team specialises in executing industry-sponsored clinical trials for new pharmacological treatments in neuropsychiatric conditions. Under the guidance of both Professor Jayashari Kulkarni and Dr Andrew Gleason, our team of 17 researchers, including six medical practitioners, two neuropsychologists and eight clinical trials coordinators, has contributed to the effort to find new treatments for Alzheimer's disease and mood disorders.

Our expert ability and knowledge is reflected in the first-rate reviews we receive from various clinical trial stakeholders. We continue to foster invaluable partnerships with numerous practicing clinicians and develop an ongoing patient referral pipeline. We also receive consistent positive feedback from our patients who report great enjoyment from being a part of our research programs.

Research into treatments for Alzheimer's disease is becoming increasingly more important. With an aging population, it is estimated that there are currently 358 000 people living with dementia in Australia and this is expected to increase to 400 000 in the next 5 years. Now more than ever, there is a need for pharmaceutical treatments that not only treat the symptoms of dementia but also act on the underlying pathophysiology. A number of current clinical trials focus on delivering disease-modifying treatment to the general population in the future.

2016 saw the amalgamation of the MAPrc psychopharmacology team with the Caulfield Aged psychiatry clinical trial team. Moving forward in 2017, we will continue to focus mostly on Alzheimer's disease, while also exploring work in other neuropsychiatric conditions. In July of 2017 we will again be attending the Alzheimer's Association international Conference and we hope that this will continue to foster our growth and development as a major player in the psychopharmaceutical research field.

**ANAVEX2-73-002**

**CHIEF INVESTIGATOR**

Dr Andrew Gleason,  
Associate Professor Stephen MacFarlane

**ASSOCIATE INVESTIGATORS**

Dr Eli Kotler, Dr Antony Sutherland,  
Dr Claire Wise, Dr Sam Hunt

**LIST OF RESEARCHERS**

Clinical Trial Coordinator:  
Miniver Canty

**COGNITIVE RATERS**

Micheal Kornhauser, Ella Modini

**FUNDING – AMOUNT AND SOURCE**

Anavex Lifesciences

**PROJECT OBJECTIVE**

The ANAVEX clinical trial was a phase IIa study of the novel agent Anavex 2-73 for the treatment of Alzheimer's disease. Taken either with or without cholinesterase inhibitors, Anavex2-73, a small molecule, had been shown to significantly increase cognitive function in pre-clinical settings.

**BACKGROUND**

Anavex2-73 is a potential disease-modifying therapy which acts as a sigma-1 receptor agonists. The focus of the phase IIb study was to set up a dose strategy while collecting pharmacokinetic parameters and measuring inter-patient variability in response to the drug.

**INCLUSION/EXCLUSION CRITERIA**

The inclusion criteria for the study called for subjects with mild to moderate Alzheimer's disease.

**METHODOLOGY**

Anavex2-73 was administered in a tablet form taken once a day. Subjects attended the clinic every 4 to 6 weeks for cognitive testing to monitor their progress and for safety assessments.

**PROJECT STATUS**

Of the 32 subjects recruited for the study, 17 took part at the Caulfield site. The study was successfully completed in January of 2017 and has now continued onto an open label extension of the trial. During the extension phase of the study, subjects continue to receive Anavex2-73 and visit the clinic for ongoing safety assessments. A placebo-controlled study is planned to further evaluate the efficacy of this compound.

**LZAX — EXPEDITION 3****CHIEF INVESTIGATOR**

Dr Andrew Gleason and Associate Professor Stephen MacFarlane

**ASSOCIATE INVESTIGATORS**

Dr Antony Sutherland, Dr Eli Kotler, Dr Claire Wise, Dr Sam Hunt

**LIST OF RESEARCHERS**

Clinical Trial Coordinator: Michael Kornhauser, Miniver Cauty  
Cognitive Raters: Ella Modini

**FUNDING — AMOUNT AND SOURCE**

Eli Lilly

**PROJECT OBJECTIVE**

The LZAX clinical trial was a phase 3 placebo controlled study looking at the long-term safety and efficacy of solanezumab.

**BACKGROUND**

The LZAX study addressed the hypothesis that Alzheimer's disease is related to the over expression of amyloid beta in the brain. Solanezumab is a monoclonal antibody that aims to clear amyloid beta from the brain thus reducing this neurotoxic plaque.

**INCLUSION/EXCLUSION CRITERIA**

The inclusion criteria for the study called for subjects with mild Alzheimer's disease.

**METHODOLOGY**

Solanezumab was administered to subjects via intravenous infusion given every four weeks for 76 weeks. To measure the effect on cognition, subjects underwent regular ADAS-Cog assessments as well as a variety of functional assessments. In addition, the LZAX study investigated the effect of solanezumab on amyloid beta within the brain and all subjects underwent florbetapir PET scans to trace levels of amyloid within the brain.

**PROJECT STATUS**

Our site recruited 10 subjects for the LZAX study including the last subject to be enrolled among the 2100 subjects who participated worldwide. The placebo-

control arm of this study was completed in October of 2016. In December 2016, preliminary results were released for the LZAX study and unfortunately the primary endpoints for the study were not met with no significant change in ADAS Cog being reported. This result has highlighted some of the challenges faced in the field of Alzheimer's disease pharmacology, but it has not swayed efforts to continue to work towards new treatments.

**AXOVANT — MINDSET****CHIEF INVESTIGATOR**

Dr Andrew Gleason

**ASSOCIATE INVESTIGATORS**

Dr Antony Sutherland, Dr Eli Kotler, Dr Claire Wise, Dr Hyacinta Xavier

**LIST OF RESEARCHERS**

Clinical Trial Coordinator:  
Paul Cortissos, Jenny Bortoli  
Cognitive Raters: Dr Fenny Mulaidi,  
Dr Luke Smith

**FUNDING — AMOUNT AND SOURCE**

Axovant Sciences Ltd

**PROJECT OBJECTIVE**

The Mindset study is a phase 3 placebo controlled trial of the drug RVT-101 taken in combination with the cholinesterase inhibitor donepezil. The study aims to test the safety and efficacy of RVT-101 in subjects with mild to moderate Alzheimer's disease.

**BACKGROUND**

RVT-101 is a 5-hydroxytryptamine sub-type 6 (5HT6) antagonist which modulates cholinergic and other neurotransmitter systems. Operating with a profile distinct from cholinesterase inhibitors, RVT-101 aims to boost cognitive function via an independent mechanism of action.

**INCLUSION/EXCLUSION CRITERIA**

The inclusion criteria for the study called for subjects with mild to moderate Alzheimer's disease who are taking a stable dose of the cholinesterase inhibitor donepezil.

**METHODOLOGY**

Subjects on this study are administered an oral tablet of RVT-101 or placebo every day for six months. The efficacy, in terms of cognitive improvement, is measured using the ADAS-Cog and ADCS ADL.

**PROJECT STATUS**

Worldwide, the study aimed to recruit 1150 subjects. Within Australia, our site was the highest recruiting site, screening 22 subjects and enrolling 11.

**ESKETAMINE — 3004****CHIEF INVESTIGATOR**

Professor Jayashari Kulkarni,  
Dr Andrew Gleason

**ASSOCIATE INVESTIGATORS**

Dr Aife Worsely, Dr Eli Kotler, Dr Antony Sutherland, Dr Claire Wise, Dr Sam Hunt

**LIST OF RESEARCHERS**

Clinical Trial Coordinator: Sue Del Sasso,  
Jenny Ung, Caitlin Finny  
Cognitive Raters: Dr Fenny Mulaidi

**FUNDING — AMOUNT AND SOURCE**

Janssen Research and Development

**PROJECT OBJECTIVE**

The aim of this study was to test the long-term safety and tolerability of intranasal administered esketamine in combination with a newly prescribed oral antidepressant.

**BACKGROUND**

Esketamine targets the N-methyl-D-aspartate (NMDA) glutamate receptor, which has been implicated in depression. The mechanism of action is distinct to conventional monoaminergic antidepressant treatments and it is hypothesised that this kind of agent offers an alternate route of treatment for individuals suffering from treatment resistant depression. Esketamine has been shown to rapidly improve symptoms in previous studies.

SELECTED PROJECTS

**INCLUSION/EXCLUSION CRITERIA**

Subjects were aged over 18 and met the DSM-5 diagnostic criteria for Major Depressive Disorder. All subjects need to exhibit treatment resistant depression (TRD) evidenced by non-response to >2 oral antidepressant treatment regimes.

**METHODOLOGY**

Subjects receive weekly to fortnightly doses of intranasal esketamine. Depression symptoms are measured using the MADRAS score and treatment is adjusted as symptoms change.

**PROJECT STATUS**

This is a 52 week study with the option to complete a second extension phase running for an additional 52 weeks. Our teams has already enrolled four patients, and recruitment remains open.

**Using vaporised nicotine to investigate harm reduction in people with severe persistent mental illness**

MAPrc is currently running a VicHealth sponsored pilot trial to investigate if adding a tobacco harm reduction intervention to standard care for smoking cessation is an acceptable and attractive public health strategy for Victorian smokers with such severe mental illnesses as schizophrenia.

Victorians with severe mental illness are much more likely to smoke than the general Victorian population (62% vs 16%) and tend to smoke more cigarettes per day than the average smoker. This has important implications with high rates of smoking known to increase the risk of coronary heart disease and cancer. The higher rates of smoking in people with severe mental illness is the result of a higher rate of smoking uptake, combined with fewer quit attempts and markedly lower success rates in quit attempts.

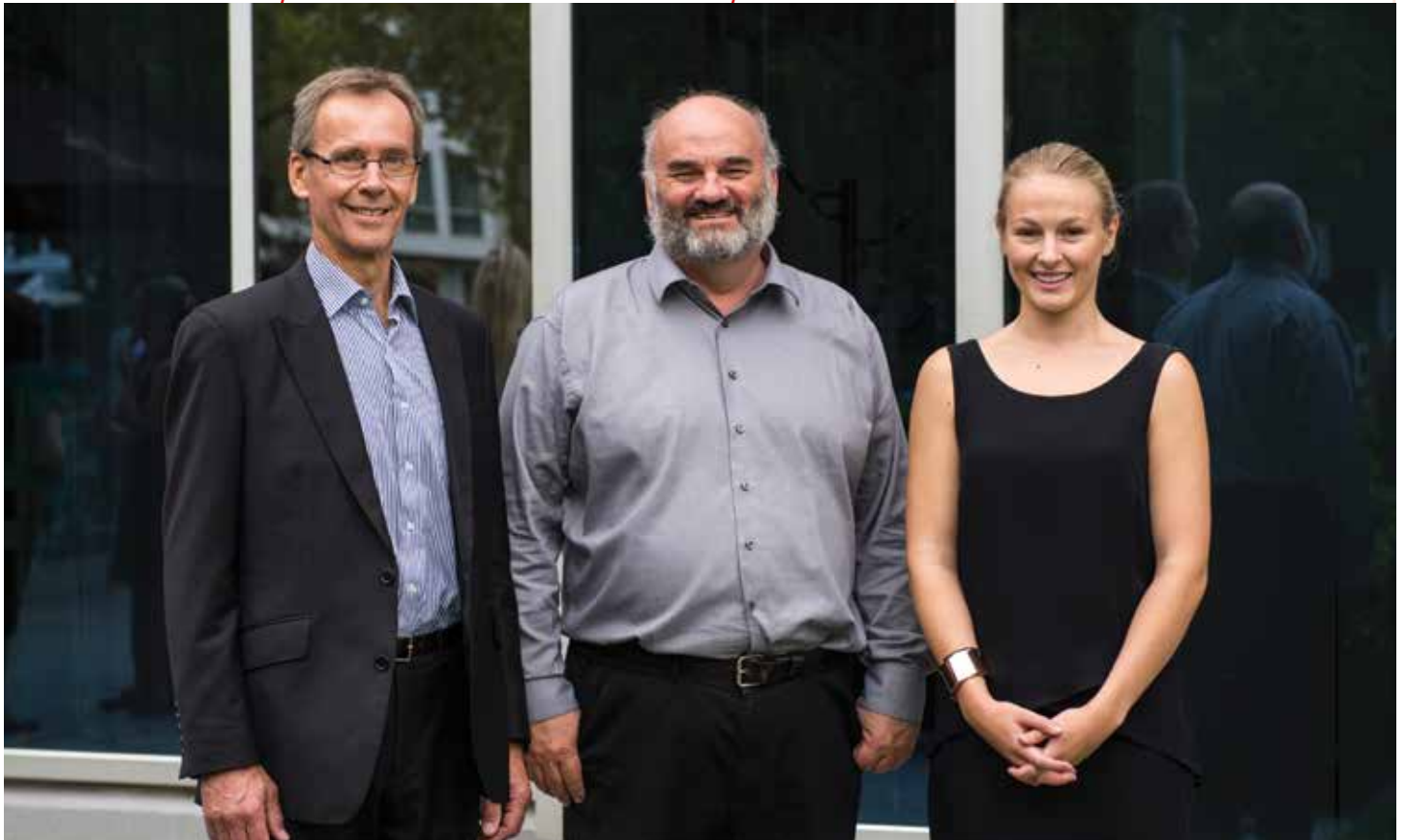
Current public health campaigns have been ineffective in reducing the smoking rates in people with severe mental illness when compared to the general population. Harm reduction options, such as switching to other nicotine replacement therapies, may be more achievable for people with severe mental illness who are not motivated to stop smoking, or struggle with quit attempts. Vaporised nicotine products could potentially be a successful method of nicotine replacement as they maintain the habitual hand to mouth motion of smoking cigarettes.

The MAPrc pilot trial will provide people with severe mental illness the opportunity to try either an e-cigarette or an inhalator (in addition to nicotine patches) to see if they can reduce their cigarette smoking during a six month period.



RESEARCH  
NEUROPSYCHIATRY  
TEAM

OUR TEAM



**TEAM LEADER**

Professor David Barton

**TEAM COORDINATOR**

Amy Lingard

**RESEARCH ASSISTANTS**

Dr Allan Davey

Dr Arup Dhar

Amy Lingard

Despina Rozakis

**TEAM OVERVIEW**

The Neuropsychiatry team specializes in neuropsychiatry, old age and consultation liaison psychiatry. Our major areas of research currently are into psychiatric illness associated with acquired brain injury and physical comorbidities associated with mental illness, in particular cardiovascular disease and obstructive sleep apnoea.

Our overall aim is to improve the survival rate and quality of life of those who experience psychiatric illness associated with physical illness.

The team is based at the Acquired Brain Injury unit at Caulfield Hospital and the South Eastern Private Hospital in Noble Park where Professor Barton is the Director of the Mental Health Service.

**A randomised trial examining the effectiveness of sympathetic nervous inhibition in alleviating the metabolic side effects of antipsychotic medications in patients with schizophrenia**

**PRINCIPAL INVESTIGATOR**

Professor Gavin Lambert

**ASSOCIATE INVESTIGATORS**

Professor David Barton

J Dixon

N Straznicky

**FUNDING**

NHMRC Project Grant- \$461,250

Commenced 2012

**AIM**

This study aims to explore the role of the sympathetic nervous system and its association with cardiovascular and metabolic risk factors. It also aims to determine the efficacy of moxonidine in reducing the metabolic side-effects of antipsychotic medications. Research has shown a link between antipsychotic medications and obesity, with patients with schizophrenia having increased risk of cardiovascular disease. Moxonidine is designed to treat hypertension and is an experimental treatment for the side-effects of antipsychotics.

**CURRENT STATUS**

ongoing

**Interactions between the serotonin transporter and sympathetic nervous system activity in patients with major depressive disorder- understanding the link between the brain and the heart**

**PRINCIPAL INVESTIGATOR**

Professor Gavin Lambert

**ASSOCIATE INVESTIGATORS**

Professor David Barton

**FUNDING**

NHMRC Project Grant - \$509,250

Commenced 2012

**FUNDING – AMOUNT AND SOURCE**

Janssen Research and Development

**AIM**

There is strong evidence suggesting that patients with major depressive disorder (MDD) are at increased risk of developing coronary heart disease. This has been associated with increased sympathetic nervous system activation as seen in one third of untreated MDD patients. A gene, known as the serotonin transporter (5-HTT) gene, is thought to be involved in this. This project aims to identify the role of the 5-HTT gene on cardiovascular risk factors associated with increased sympathetic activity in patients with MDD. In addition, we aim to assess the effect of selective serotonin reuptake inhibitors in these patients.

**CURRENT STATUS**

ongoing

**COLLABORATIONS**

**Professor Jayashri Kulkarni** MAPrc

**Professor Paul Fitzgerald** MAPrc

**Professor Gavin Lambert** Baker IDI

Heart and Diabetes Institute

**Professor Markus Schlaich** Baker IDI

Heart and Diabetes Institute

**Professor Murray Esler** Baker IDI Heart

and Diabetes Institute

**Dr Mithu Palit** Acquired Brain Injury Unit,

Caulfield Hospital, Alfred Health

**2016 HIGHLIGHTS,  
AWARDS & DISTINCTIONS**

The Acquired Brain Injury (ABI) unit at Caulfield Hospital has been open 2 years and is a State wide service. Rather than a classical Consultation Liaison Service the psychiatric team is embedded in the unit with all patients in shared care with a rehabilitation physician.

The model of care and the nature of the psychiatric presentations are being investigated by the research team at the unit.

Our team presented a snapshot of this first year at the 2016 International Royal Australian and New Zealand Psychiatry Congress in Hong Kong.

Professor Barton opened a new research unit in collaboration with HealtheCare at South Eastern Private Hospital in Noble Park. When fully operational, this service will have 60 beds and provide training for general adult, old age and consultation liaison psychiatry.



Dr Stuart Lee

#### TEAM LEADER/CHIEF INVESTIGATOR

Professor Jayashri Kulkarni  
Associate Professor Simon Stafrace  
Associate Professor Sandra Keppich-  
Arnold

#### TEAM COORDINATORS

Dr Stuart Lee  
Dr Liza Hopkins

#### PRINCIPAL RESEARCHERS

Professor Wendy Cross  
Associate Professor Yitzchak Hollander  
Dr Evan Symons  
Dr Toby Winton-Brown  
Fiona Whitecross  
Anthony de Castella  
Pam Hellema

Vicky Northe  
Rachel Barbara-May

#### RESEARCHERS

Dr Roxy Tsui  
Dr Laura McCartney  
Stella Neale  
Jennifer Hunt

#### STUDENT RESEARCHERS

Ross Anderson  
Shayden Bryce  
Richard Lawrence  
Aimee Donaldson  
Corinna Campbell  
Jake Iaria

## RESEARCH AND AIMS

The Mental Health Service Research Team operates as a partnership between Monash Alfred Psychiatry research centre (MAPrc) and the Department of Psychiatry, Alfred Health, with staff additionally conducting and facilitating the conduct of research through headspace centres in Melbourne's south-east.

The team is led by Associate Professor Simon Stafrace (Program Director, Alfred Psychiatry) and Associate Professor Sandra Keppich-Arnold (Associate Director of Nursing and Operations, Alfred Psychiatry) and receives expert academic input from Professor Jayashri Kulkarni (Director, MAPrc). Two research fellows operate to coordinate the conduct of research in particular within the adult consultation and liaison, emergency psychiatry programs, child/youth and headspace programs operated by Alfred Psychiatry.

We are focused on conducting research to better understand factors impacting on the quality, effectiveness and experience of mental health care delivery and implement and measure the impact of innovative interventions or approaches to therapy or care provision.

In 2016, a number of conducted projects have had an impact on the delivery of care across Alfred Health and more broadly across Victoria. For example, two funded projects measured how frequently people presented to The Alfred's emergency department either while homeless or following a suicide attempt, the nature of care received, and the outcomes following the received care. Findings are being used to re-design the way The Alfred provides emergency department psychosocial

and mental health care. We also conducted a review of high dependency psychiatry care across Victoria for the Victorian Government Department of Health and Human Services. The review highlighted opportunities to strengthen the environments, staff expertise and available interventions to more effectively and safely provide psychiatric intensive care.

In 2016, staff from the Mental Health Service Research Team or collaborating clinicians of Alfred Psychiatry had 19 papers accepted for publication in peer-review journals and gave nine conference or invited research presentations.

## COLLABORATIONS

School of Nursing and Midwifery, Monash University.  
School of Social Sciences, Monash University.  
School of Psychological Sciences, Monash University.  
Brain and Psychological Sciences Centre, Swinburne University of Technology.  
Centre for Forensic Behavioural Science, Swinburne University of Technology.  
Victorian Adult Burns Service, Alfred Health.  
Malignant Haematology and Stem Cell Transplantation, Alfred Health.  
Headspace the National Youth Mental Health Foundation.

## 2016 HIGHLIGHTS

Dr Stuart Lee commenced a National Health and Medical Research Council fellowship to measure the potential for cognitive and social skills training to improve the quality of life and functioning of people with schizophrenia.

RESEARCH

# MENTAL HEALTH SERVICE RESEARCH

TEAM STRUCTURE

## MENTAL HEALTH SERVICE RESEARCH

Prof Jayashri Kulkarni,  
A/Prof Simon Stafrace &  
A/Prof Sandra Keppich-Arnold

### ADULT, EMERGENCY & CONSULTATION-LIAISON

Dr Stuart Lee

### CHILD AND YOUTH & HEADSPACE

Dr Liza Hopkins

#### DR STUART LEE

Review of non-acute bed-based services of Alfred Psychiatry

#### A/PROF SIMON STAFRACE & PHILLIPA THOMAS

Homelessness in people attending The Alfred's emergency department

#### DR EVAN SYMONS & DR ROXY TSUI

Care for people presenting post suicide to The Alfred's emergency department

#### ANTHONY DE CASTELLA

Examining outcomes of long-acting injectable antipsychotic treatment

#### PAM HELLEMA

Evaluating a group for admitted consumers with a trauma history to improve coping

#### PROF WENDY CROSS

Exploring how mental health nurses understand/deliver Trauma-Informed Care

#### VICKY NORTHE

Experience of contact with the Problem Gambling & Mental Health Service

#### DR LIZA HOPKINS

Discovery College Evaluation

#### DR LIZA HOPKINS & MELANIE PURKISS

YoPS: Youth Peer Support Evaluation

#### DR LIZA HOPKINS & NEIL THOMAS

DAPS: Digitally-assisted peer support

#### RACHEL BARBARA-MAY & TESS MCGRANE

Evaluation of the experience and impact of Single Session Family Therapy

RACHEL BARBARA-MAY  
The EDGE: Eating Disorder program Evaluation

DR TOBY WINTON-BROWN  
A General Practitioner Survey on youth mental health services in south east Melbourne

#### SARAH DAVENPORT

Evaluation of an Acceptance and Commitment Therapy Group (ACT) intervention for young people with a psychotic disorder

## Staying Safe with Trauma

### CHIEF INVESTIGATOR

Pam Hellema

### ASSOCIATE INVESTIGATORS

Professor Jayashri Kulkarni  
Associate Professor Sandra Keppich-  
Arnold  
Dr Stuart Lee  
Alanna Lorenzon  
Catherine Bennett

### FUNDING

\$10,000 – Victorian Women's Benevolent  
Trust

### AIM OF PROJECT

Develop a written resource and facilitated mutual education and support group to build the knowledge and skills of people with a trauma history to understand how this past experience impacts their current wellbeing and what they can do to reduce associated distress.

### BACKGROUND

Research has highlighted that traumatic experiences in childhood contribute to the emergence of various serious mental illnesses. Exposure to events experienced as traumatic in the hospital or care environments in which people are treated for acute mental illness can further exacerbate trauma-associated distress and hamper recovery. To improve how people with a trauma history are offered support while admitted to Alfred Psychiatry's adult inpatient unit, the Staying Safe with Trauma project was developed. This provided a facilitated education group and education brochure exploring: what is trauma, how trauma affects us and how to cope with and stay safe with trauma while in hospital and the community.

### INCLUSION/EXCLUSION CRITERIA

Participants in the evaluation of the Staying Safe with Trauma group were: at least 18 years of age, had participated in at least one group, and were determined by their treating team to be capable of providing informed consent for research participation.

### METHODOLOGY

A mixed-method design was used, with an audit conducted to identify participant characteristics and themes summarising discussion content. Participants were also invited to complete an anonymous feedback questionnaire assessing their experience of group participation and its impact.

### PROJECT STATUS

The evaluation of the pilot of the Staying Safe with Trauma group has been completed. The positive findings and feedback from consumers and group facilitators has led to the commitment to continue the group on the adult inpatient unit and explore expansion of the group to consumers in the community. The Staying Safe with Trauma Consumer Brochure has also been finalised with consumer and staff input and will be made available to consumers accessing Alfred Psychiatry care.

## Care after a suicide attempt in the Alfred Emergency and Trauma Centre

### CHIEF INVESTIGATOR

Evan Symons

### ASSOCIATE INVESTIGATORS

Associate Professor Sandra Keppich-  
Arnold  
Associate Professor Simon Stafrace  
Dr Stuart Lee  
Dr Roxy Tsui  
Phillipa Thomas  
Steve Ellen  
De Villiers Smit

### FUNDING

\$32,364 – Vincent Chiodo Foundation

### AIM OF PROJECT

Describe the frequency, demographics, clinical and care features of patients presenting to the Alfred Emergency and Trauma Centre (E&TC) following a suicide attempt over a 3-month period and examine how provided care compares to published literature and practice guidelines.

### BACKGROUND

Suicide and its related behaviours have a large impact on individuals, families and society in Australia and worldwide. In Australia, 7.8 deaths occur by suicide on average, each day. Due to the potential harm or threat to life associated with a suicide attempt, emergency hospital care is often required. The nature and quality of received care can impact on the short- and longer-term outcomes for people following a suicide attempt.

### INCLUSION/EXCLUSION CRITERIA

All episodes involving a patient aged 18 years and older and presenting to The Alfred E&TC following an identified suicide or self-harm attempt or experiencing suicidal ideation were included in this study.

### METHODOLOGY

A retrospective audit design was utilised to first identify all eligible episodes. A more detailed audit was then conducted to identify characteristics of included patients, outcomes following the presentation, and the extent to which specified aspects of recommended practice were present during the episodes.

### PROJECT STATUS

Final project auditing is currently being conducted. Initial findings are being used to inform the development of new approaches to suicide prevention for people accessing Alfred Health care.

## RESEARCH

# MENTAL HEALTH SERVICE RESEARCH

### SELECTED PROJECTS

## Discovery College Evaluation

### CHIEF INVESTIGATOR

Dr Liza Hopkins

### ASSOCIATE INVESTIGATORS

Lara Nikitin  
Andrew Foster  
Glenda Pedwell

### FUNDING

Headspace

### AIM OF PROJECT

Evaluate the implementation and impact of Discovery College, a co-produced learning platform in which young people with a mental illness and mental health professionals develop, share and participate in courses aimed at building knowledge, skills and confidence in managing mental illness and its consequences.

### BACKGROUND

In 2015, the South-east Melbourne headspace Youth Early Psychosis Program (YEPP) which is operated through Alfred Health, established a Discovery College. The first program of its type in Australia, mental health professionals and young people with a lived experience of mental illness, co-produce courses which include topics such as “Mindfulness”, “Taking Charge of Your Own Health” and “Self and Identity”. Staff also receive co-delivered training to improve their understanding and expertise promoting recovery in young people with mental illness. This evaluation was conducted to understand the development, implementation and impact of a recovery-focused Discovery College.

### INCLUSION/EXCLUSION CRITERIA

Young people who participate in a Discovery College course, and mental health professionals who co-facilitate or provide care to Discovery College course participants.

### METHODOLOGY

The project took a mixed methods approach to data collection and analysis. Key informant and group interviews were conducted with staff and other project stakeholders. Online questionnaires and individual interviews were also conducted with young people enrolled in Discovery College and change in perceived attitude and confidence in managing illness and associated consequences before and after course participation was also measured.

### PROJECT STATUS

While evaluation has not yet been completed, data collected to date has shown that the Discovery College is a growing and highly regarded program which empowers young people, engages family and friends and enlightens professional staff.



Members of the Alfred Child and Youth Mental Health Service and Headspace Research Working Group. From left: Nandi Abdalla, Helen Jeges, Toby Winton-Brown, Lara Nikitin, Glenda Pedwell and Dr Liza Hopkins.

## RESEARCH

# PERCEPTUAL & CLINICAL NEUROSCIENCE LABORATORY

## OUR TEAM

### TEAM LEADER/CHIEF INVESTIGATOR

Dr S Miller

### RESEARCHER

Dr P Law



Dr Steven Miller



Dr Phillip Law

The Perceptual and Clinical Neuroscience Laboratory Research Team is headed by Dr Steven Miller, a clinician in occupational and pain medicine, and a researcher in clinical neuroscience, visual neuroscience and consciousness science. The lab is engaged in basic science and clinical research and has also recently entered the virtual research environment, with wide national and international collaboration for its new Binocular Rivalry Online (BRO) project. The lab has a strong clinical translation focus for both its visual neuroscience and brain stimulation themes.

In preparation for the BRO project, the lab has recently concluded a large study on the psychophysics of binocular rivalry in controls and subjects with bipolar disorder. An additional arm of this work was eye movement research in control and bipolar subjects. This work was the subject of a PhD thesis by Dr Phillip Law. Other clinical work of the lab includes examination of vestibular neuromodulation as a novel, safe, and inexpensive therapy, to treat persistent pain conditions (and other clinical disorders). Finally, Dr Miller has performed detailed analyses of empirical and conceptual foundations of consciousness science, proposing new foundations for this nascent discipline.

## 2016 HIGHLIGHTS, AWARDS & DISTINCTIONS

Dr Miller and his team have progressed work on two awarded seed funding grants from Monash Institute of Medical Engineering and an awarded grant from Defence Health Foundation. This work has involved collaboration with Monash Faculty of Information Technology and Monash Arts Design and Architecture and is detailed below. Dr Miller published a high profile Commentary article in the international journal, *Bipolar Disorders*, calling for widespread assessment of the simple brain stimulation technique of caloric vestibular stimulation in a wide variety of psychiatric and neurologic disorders, drawing on recent large-scale meta-analyses of neuroimaging studies.

## COLLABORATIONS

Collaborating centres for the Binocular Rivalry Online project include Monash Faculty of Information Technology (Dr K. Ellis), QIMR Berghofer Medical Research Institute (Prof N. Martin, Dr T. Ngo), Queensland Brain Institute (A/Prof M. Wright), Black Dog Institute (Prof P. Mitchell), Bipolar Disorder Research Network (Prof N. Craddock/ Dr X. Caseras; UK) and Institute of Psychiatric Phenomics and Genomics (Prof T. Schulze; Germany). Eye movement research is in collaboration with Dr Caroline Gurvich. Current collaborators for the CVS work include Monash Arts Design and Architecture (Prof D. Flynn) and Monash Engineering (Dr A. Nunn), and for the completed CVS study in preparation for publication included Dr T. Ngo, Dr W. Barsdell, A/Prof C. Arnold, Dr M. Chou, Dr P. New, S. Hill, Dr A. Nunn, A/Prof D. Brown and Prof S. Gibson.

**Investigating binocular rivalry in healthy individuals and bipolar disorder: Excluding confounds and optimising methods for large-scale endophenotype studies**

**RESEARCHERS**

Dr P. Law, Dr T. Ngo, Dr C. Gurvich, Dr B. Paton, Dr S. Miller

**FUNDING**

Narsad Young Investigator Grant \$60,000 over 2 years (2013-2015)

**AIM**

This project aimed to examine binocular rivalry in healthy individuals and subjects with bipolar disorder to ascertain which stimuli are most suitable for subsequent use in large-scale clinical and genetic endophenotype studies.

**BACKGROUND**

The project builds on earlier work by Miller and colleagues showing the rate of binocular rivalry to be slow in bipolar disorder. The project also determined that eye movements do not confound the slow binocular rivalry rate trait. Sixty control subjects and 20 subjects with bipolar disorder were assessed.

**CURRENT STATUS**

The project is now complete and generated a data paper in 2015, with three further data papers being prepared in 2016 for submission in 2017. This work was the subject of a PhD thesis submitted by P. Law in 2016.

**Genetics of binocular rivalry**

**RESEARCHERS**

Dr S. Miller, Dr T. Ngo, Dr P. Law, A/Prof M. Wright, Prof N. Martin

**COLLABORATORS**

Prof P. Fitzgerald, Prof M. Berk, Prof P. Mitchell, Dr X. Caseras, Prof T. Schulze, Prof N. Craddock

**FUNDING**

Narsad Young Investigator Grant \$60,000 over 2 years (2013-2015)

**AIM**

This long-running project based at QIMR Berghofer in Queensland (since 2000) aims to examine the genetics of the binocular rivalry trait, having previously shown the trait to be substantially heritable. Data collection now includes over 1250 twins and analysis of associations between binocular rivalry rate and various phenotypic characteristics is now underway, as well as of the genetic basis of the trait.

**CURRENT STATUS**

Publications are expected from this work in 2017 and the project is continuing.

**Binocular rivalry online**

**RESEARCHERS**

Dr S. Miller, Dr P. Law, Dr K. Ellis

**COLLABORATORS**

A/Prof M. Wright, Prof N. Martin

**FUNDING**

Defence Health Foundation (\$25,000)  
Monash Institute of Medical Engineering (\$20,000)

**AIM**

This project aims to move the testing of binocular rivalry to the online environment so as to facilitate the very large sample sizes (N=1000's to 10,000's) required to assess the clinical and genetic endophenotype utility of the trait.

**BACKGROUND**

The project builds on the two projects listed above and funding was utilised in 2016 for building of the prototype website for this work.

**CURRENT STATUS**

In collaboration with Monash Faculty of Information Technology, major technical challenges were overcome in 2016 with respect to prototype development including changing of the platform from Flash to HTML5. Preliminary user-interface testing also occurred in 2016 with resulting prototype refinements. Roll-out and quality assurance of the online test is expected in 2017.

## RESEARCH

# PERCEPTUAL & CLINICAL NEUROSCIENCE LABORATORY

## SELECTED PROJECTS

### The constitution of phenomenal consciousness: Toward a science and theory

#### RESEARCHER

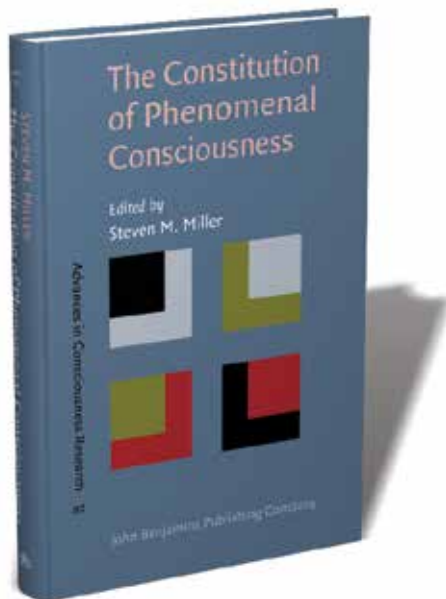
Dr S. Miller

#### FUNDING

Nil

#### BACKGROUND

This project ran over several years and aimed to examine the theoretical and empirical foundations of consciousness science. This was achieved by garnering a large number of national and international authors to contribute papers on such issues to a volume edited, and contributed to, by Miller which was published in 2015. In 2016 this work was cited prominently in a Nature Reviews Neuroscience article on consciousness science.



### Vestibular neuromodulation in persistent pain and other clinical conditions

#### Initial stage

#### RESEARCHERS

Dr S. Miller, Dr T. Ngo, Dr W. Barsdell

#### COLLABORATORS

A/Prof C. Arnold, Dr M. Chou, Dr P. New, Dr S. Hill, Dr A. Nunn, A/Prof D. Brown and Prof S. Gibson

#### FUNDING

Victorian Neurotrauma Initiative

#### Second stage

#### RESEARCHERS

Dr S. Miller, Prof D. Flynn, Dr A. Nunn

#### FUNDING

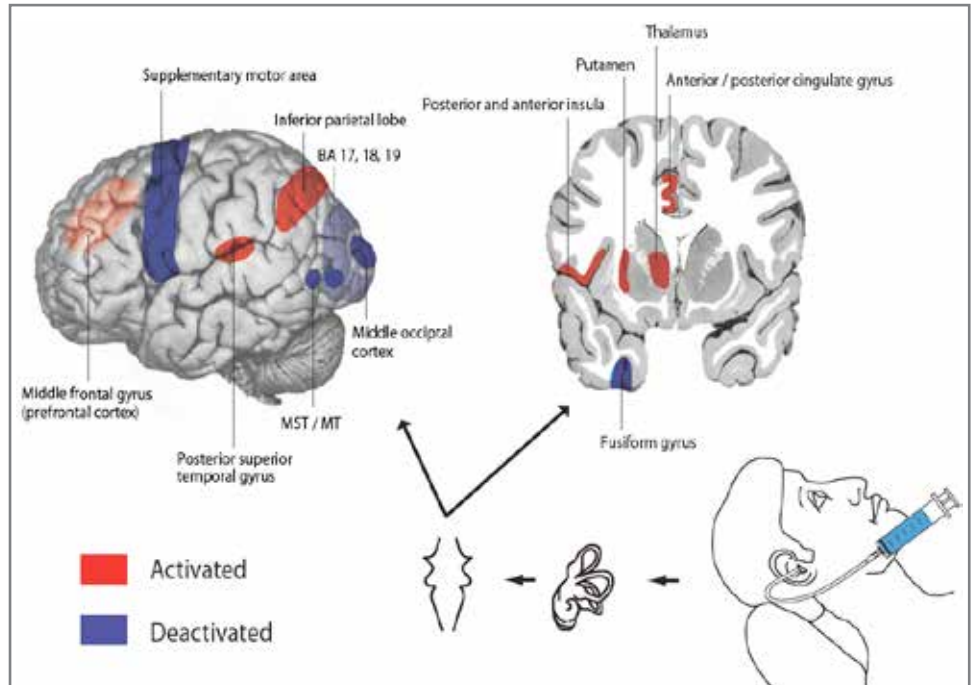
Monash Institute of Medical Engineering, \$55,000.

#### AIM

This long running project (since 2007) aims to examine the therapeutic efficacy of caloric vestibular stimulation, a simple, safe and inexpensive neuromodulation technique. The initial focus has been on neuromodulation of persistent neuropathic pain conditions and the first effectiveness trial of the technique in 34 patients has been completed with promising results. The trial will be submitted for publication in 2017.

#### CURRENT STATUS

Caloric vestibular stimulation is being applied in further clinical trials of pain conditions. A commentary article was published in 2016 on the clinical therapeutic potential of this brain stimulation technique in the journal, Bipolar Disorders.





#### CHIEF INVESTIGATORS

Adjunct Professor Brian Lithgow  
 Professor Jayashri Kulkarni  
 Professor Paul Fitzgerald  
 Associate Professor Jerome Maller

#### ASSOCIATE INVESTIGATORS

Dr Roger Edwards  
 Professor Brian Blakley  
 Dr Mandana Modirousta  
 Dr Behzad Mansouri

#### STUDENT RESEARCHERS

Abed Suleiman  
 Merangiz Ashiri  
 Corey Bosecke  
 Zeinab Dastghieb  
 Amber Garrett

#### TEAM OVERVIEW

During 2016, the Team's focus has been in four key activities: Neurophysiological Studies, Data Analysis, Technology Development /Specification, Grants.

As shown in the highlights, all activities have progressed the verification of the EvestG Technology towards the goal of Validation in randomised controlled clinical trials. These are to commence in mid-2017, after having successfully raised funding for this critical stage.

#### 2016 HIGHLIGHTS

Over the 2015/16 period, Neurophysiological animal and modelling studies research undertaken by Adjunct Professor Brian Lithgow and Professor Brian Blakley (ENT) in Canada, has increased our understanding of the anatomical sources and pathways of vestibular signals and their characteristics – not least in the signal components and the neuro-physiology under-pinning their generation.

mTBI studies were undertaken by AS, BL, ZB and ZM to produce pilot data shown in figure 1. These pilot data point to long and short term PCS being distinguishable and distinguished from controls. Based on these data the CRC-P (below) was justified. Clinical measurement program has been hibernated for the 12 months while the past results have been thoroughly analysed and drafted into manuscripts for

peer-review and subsequent publication. Four papers are drafted on classification of mTBI (AS, BL, ZD, ZM), Modelling spontaneous vestibular activity (BL, BB, ZM), classification of Bipolar Disorder (BL, AG, JK, PF, CG, JM, ZM) and separation of Bipolar disorder and Major depressive disorder (BL, MM, JK, PF, ZM). In addition, the Technology development team have been documenting the specifications for a re-engineered EvestG System that will be built and commissioned during 2017.

Finally, the Team prepared and submitted an application to the Commonwealth Department of Industry, Innovation and Research for one of the 2nd Round Cooperative Research Centre-Project Grants, which at time of this publication has been successful and been awarded \$2.2 million. The name of the CRC-P is the "CRC-P for Tech-enabled Pathways of Care for Head Trauma" and .will commence around June 2017.

#### COLLABORATIONS

Professor Zahra Moussavi Canadian Chair of Bioengineering University of Manitoba. Adjunct Professor Brian Lithgow, Depart of Bio-Engineering, University of Manitoba Professor Brian Blakley (ENT) Dr Mandana Modirousta (Psychiatrist) Dr Behzad Mansouri (Neurologist) Dr Roger Edwards Neural Diagnostics Pty Ltd, Melbourne, Victoria

## RESEARCH

# COLLABORATIVE COMMERCIAL RESEARCH EVestG™

## SELECTED PROJECTS

### FEATURE CASE STUDY

#### Application of EVestG™ to detect changed vestibular neural function associated following concussion/mild Traumatic Brain Injury

### CHIEF INVESTIGATORS

Professor Jayashri Kulkarni  
Associate Professor Jerome Maller  
Adjunct Professor Brian Lithgow

### LIST OF RESEARCHERS

Dr Roger Edwards  
Dr Behzad Mansouri (Neurologist)  
Abed Sulieman

### FUNDING

CRC-P Program \$2.2M  
CRC-P Participants \$5.9M  
Neural Diagnostics Pty Ltd, GE  
Healthcare Pty Ltd, and MAPrc

### AIM

Development of Technology for the faster, objective detection and monitoring of severity of symptoms of Concussion, Head Trauma and their complications related to sports and other accidents.

This project seeks to develop affordable and efficient care pathways for concussion and head trauma treatment extending from the playing field to recovery by verifying and/or validating the ability of innovative electrophysiological and magnetic-based neuro-technologies to measure changes in the brain after injury, including changes in cognitive function and/or the emergence of psychological symptoms.

### BACKGROUND

Accurately detecting concussive injuries and monitoring functional recovery or any emergence of Major Depression (MD) is slow, subjective and is associated with high levels of misdiagnosis. Its global health cost burden exceeds \$200Bn annually, and \$2Bn in Australia.

Electrovestibulography, EVestG™, was the ABC Invention-of-the-Year in 2010, and in 2015 the Research Team was one

of the Eureka Award Finalist for Excellence in Multidisciplinary Science,

The Team has now over 8 peer-reviewed publications with evidence that the Technology can objectively detect and diagnose people with changed brain function. Specifically, EVestG is unique in its ability to measure function of deep-brain structures associated with the balance system and regions of interest associated with concussion with an information-rich signal bandwidth 100 times wider than electroencephalography.

The Team has hypothesised that it may have a role in a pathway of care for concussion, as Loss-of-Balance and cognitive inattention are the first observed symptoms and the last to resolve. In addition, the literature suggests that psychological issues, such as the emergence of Major Depression, occurs in around 50% of all injuries, which MAPrc's previous Proof-of-Concept research indicates EVestG can discriminate with around 80% accuracy.

Further, early results on the application of EVestG measurement on people recovering from mTBI [shown below], gave the EVestG Team confidence that it was measuring a significant and potentially diagnostic response associated with

recovery from mTBI, and combined with its early Proof-of-Concept results published in 2015, may also be able to detect comorbid aspects of the emergence of Post-concussive syndrome, such as Major Depression. (Lithgow et al (2015)).

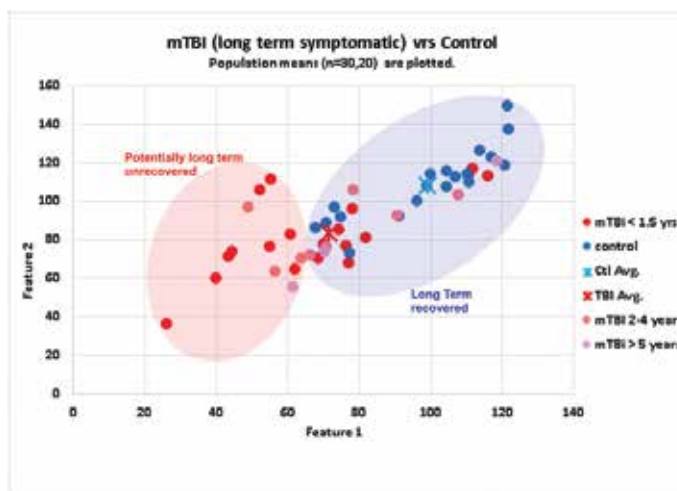
### METHODOLOGY

Correlation of EVestG measurements, with 3T MR imaging, and Neuropsychological assessments (SCAT5, etc.)

### PROJECT STATUS

While, early EVestG proof-of-concept data has been analysed, increased data sets are required to be built prior to undertaking randomised blinded studies.

Commencing in June 2017, this CRC-P will work towards the verification and validation of objective biomarkers of brain function changes following concussion as detected by EVestG, TMS and 3T-MRI, and in the process develop care pathways using combinations of the 3 devices to achieve rapid, objective screening of concussion on the field of combat, work or sport using a portable and affordable TMS device, with the injured then referred to clinics for further objective evaluation and monitoring of recovery with EVestG and/or 3T-MRI.



Plot supplied by Abed Sulieman as part of his PhD and recent publication submission

**CLINICIANS**

Professor Jayashri Kulkarni  
Dr Caroline Thew  
Dr Aife Worsley  
Dr Shainal Nathoo

**CLINIC COORDINATORS**

Cindy Yu  
Michaela Corr

The Women's Mental Health Clinic provides a tertiary medical, psychiatric and endocrine consultation service and new treatment approaches for women experiencing a range of mental illnesses, including schizophrenia, schizoaffective disorder, bipolar affective disorder, borderline personality disorder, menopause and menstrual-related depression and anxiety.

The clinic operates on the principle of empowerment of our clients, and we combine physical health examinations

with mental health assessments. We also provide an information and education service for the treating clinicians involved with our clients. Importantly, an assessment letter with new management suggestions is sent to the referring doctor and the woman herself, to further her central role in her own management. We also encourage her to bring family members and friends to the consultation so that an education process is undertaken, not only with our client but also with her loved ones.

**WMH Clinic Patient Testimonials 2016**

"The staff were kind, understanding, on the same wave length, did not judge me. Exceptional people in every way – I have never had better counselling."

"We really just really wanted to let you know the difference your dedication, research and work does make to not only the patient's lives but also the extended family unit."

"I felt the doctors were genuinely interested in my unique symptoms and addressed them well. I have never received insight into the effects of my hormones on my mental health, and vice versa, and I am already feeling better after following some of the advice I received."

"Made me feel at ease and that there was hope that things would get better."

"The Doctor listened intently to my history and was very positive with her plan of what would be most helpful for me."

"Not just life-changing, but the method of bringing all the areas of expertise together meant I felt I was in very capable hands."

"This has been a really great experience from beginning to end, all your staff and doctors have been so helpful and kind."

"The Doctors showed empathy and interest in my condition. They made me feel at ease and gave me hope that things would get better."

"Affordable and accessible to those in real need."

"The whole team was amazing and your help is very much appreciated."

Kind, professional team."

"It is so refreshing to come across a practitioner who knows their stuff."

"This Clinic saved my life, no one else had understood"

## CLINICS THE VOICES CLINIC



### TEAM LEADER

Associate Professor Neil Thomas

### TEAM

Dr Rachel Brand  
Elissa Moore,  
Imogen Bell

The Voices Clinic is a specialist psychological treatment and research clinic for people who hear voices or have similar experiences. The clinic provides consultation to people who experience persisting hallucinatory experiences such as hearing voices, and offers courses of sessions of psychological therapy approaches to help people self-manage these experiences as effectively as possible. Provision is integrated with training of postgraduate clinical psychology students from Swinburne University of Technology, and with research to develop new therapeutic approaches. As part of a program of research into developing more targeted interventions for persisting hallucinations, we support five PhD students conducting research on processes and intervention approaches that will advance treatment.

As well as researching psychological therapies, the clinic conducts research on the experience of voices, on

adaptation to hearing voices, and on their causes and mechanisms. Our team has been collaborating with researchers internationally to develop a better understanding of what voices are like across different clinical and nonclinical groups, and to develop better assessments. Our international collaborations include some of the world's leading hallucination research centres including the University of Durham, Sussex University, University of Bergen, and University Medical Centre Utrecht, as well as with the voice hearer-led International Hearing Voices Network. We are also part of the International Consortium on Hallucinations Research.

The clinic is led by Associate Professor Neil Thomas, an expert on psychological therapy for voices, as part of the Cognitive Neuropsychiatry Lab headed by Professor Susan Rossell.



## BRAIN STIMULATION

### Training programs at MAPrc

#### Brain Stimulation Training Programs at MAPrc

[www.tmscourse.com](http://www.tmscourse.com)

Therapeutic Brain Stimulation Team has been providing comprehensive clinical and research training in brain stimulation techniques since 2013. Our training programs have been developed to cater for both researchers and clinicians.

The Brain Stimulation Course for Researchers has been designed for research students and post-doctoral researchers who are new to techniques such as TMS (transcranial magnetic stimulation) and tDCS (transcranial direct

current stimulation), as well as for those with more experience who wish to use advanced brain stimulation methodologies such as integrating TMS with EEG (electroencephalograph).

The Clinical TMS Certification Course provides training in the provision of TMS for the treatment of Major Depression. This course has been designed for medical and nursing graduates, with options for those new to TMS as well as those with previous TMS experience.

In 2016 we conducted three training courses.

These comprehensive and intensive courses included a series of didactic lectures given by experts in the use of TMS for clinical and research purposes, as well as hands-on training and assessment.

These courses were attended by clinicians and researchers from Australia, Mauritius, New Zealand, and Malaysia.

Demand for the courses has been growing over the years from both clinicians and researchers, in line with the expansion of TMS treatment services and interest in TMS research.

## EDUCATION AND TRAINING

# MEDICAL STUDENT TEACHING

YEAR 4

### Undergraduate MBBS Medical Teaching: Monash University MBBS Year 4 Medicine of the Mind MED4190

**CLINICAL SITE CO-ORDINATOR**  
Professor Paul Fitzgerald

**ASSISTANT CLINICAL SITE CO-ORDINATOR**  
Dr Leo Chen

**CLINICAL SITE ADMINISTRATOR**  
Anne Crawford



Professor Paul Fitzgerald



Dr Leo Chen



Anne Crawford

The MAPrc Medicine of the Mind team is responsible for teaching psychiatry and psychological medicine into the Monash University MBBS course at Monash University's Central Clinical School which is located at the Alfred Hospital. Our team provides the interface between the clinical teaching of the host hospital and the university course administration. Our mission is to deliver a seamless education in psychiatry and related disciplines to the undergraduate medical course.

We direct the MBBS Year 4 students' clinical placements with Alfred Health for the Year 4 Psychological Medicine teaching program.

Over the course of 2016 we organised the psychiatry clinical placements for 70 Year 4 MBBS students with Alfred Psychiatry. Our students gain wide-ranging experience in Psychiatry on the inpatient wards at the Alfred, with the Community Mental Health Service clinics, Malvern Private Hospital's Drug and Alcohol Addiction Recovery Treatment program, the Victoria Clinic, and the Aged Psychiatry Department at Caulfield Hospital.

This is a 9-week clinical placement program that emphasises clinically based learning and teaching. Students are embedded within clinical teams and expected to play an active role. Clinical staff and students are provided with clear guidelines about the students' roles and responsibilities. Medicine of the Mind also involves psychiatry registrars in its teaching program to foster peer learning.

As well as direct clinical experience, our teaching program also comprises:-

- **A didactic teaching program** which utilises the extensive knowledge and teaching expertise of senior academics within Alfred Psychiatry to conduct topic-based tutorials which familiarize students with critical concepts and disorders. This program also includes specialist Community Health teaching sessions.

- **A series of PEERLS tutorial sessions** which have replaced traditional case-study-based workshops. PEERLS (Professionalism, Ethics, Evidence-base, Roles, Legal issues, Systemic issues) tutorials are patient-based and have been developed to help students integrate clinical experiences with theory. They are led by a clinician or visiting expert, rather than a generic tutor, and involve the tutor sharing his/her knowledge and experience.

The current structure of the program reflects a constant review and remodelling process which aims to achieve several things: to research new and vibrant models for teaching psychiatry; to encourage, recruit and reward vibrant teachers; to use staff and materials more efficiently; and to smooth the process by which students acquire the psychology and psychiatry knowledge they will need to be doctors.

Medicine of the Mind continues to identify opportunities to improve students' learning experience. Student feedback and assessment indicates that these initiatives are having dramatic effects in increasing satisfaction with the course and quality of learning.

In 2016 we began an association with Malvern Private Hospital. Each of our Year 4 MBBS students attends for a week-long clinical placement with the residential Drug and Alcohol Addiction Recovery Treatment program. This contact with recovering addicts allows our students the opportunity to see positive outcomes in this field. Students have found this program to be very rewarding.

**Monash University MBBS Year 5  
MED5091  
Advanced clinical practice 1  
Psychiatry Selective/Specialty**

**CLINICAL SUPERVISOR**

Professor Jayashri Kulkarni

**ADMINISTRATIVE SUPPORT**

Michaela Corr

Monash University Year 5 MBBS medical students are required to complete a final year Advanced Clinical Practice 1 unit. The aim of this unit is to broaden their knowledge and skills in areas of clinical practice of their own choosing in a series of six-week clinical placements.

Students who nominate to undertake a Year 5 Psychiatry Specialty or Selective at the Alfred Hospital have their time split between shadowing Professor Jayashri Kulkarni at her clinical work (particularly the MAPrc Women's Mental Health Clinic), and supervision under a Consultant and a Registrar on the Alfred Hospital Psychiatry Inpatient Unit.

Under Professor Jayashri Kulkarni's supervision the students give a weekly case presentation, attend the Women's Mental Health team weekly case meeting, and assist the team by following up pathology test results.

In 2016, once again, we had ten students complete their MED5091 Psychiatry selective or specialty with Professor Jayashri Kulkarni.

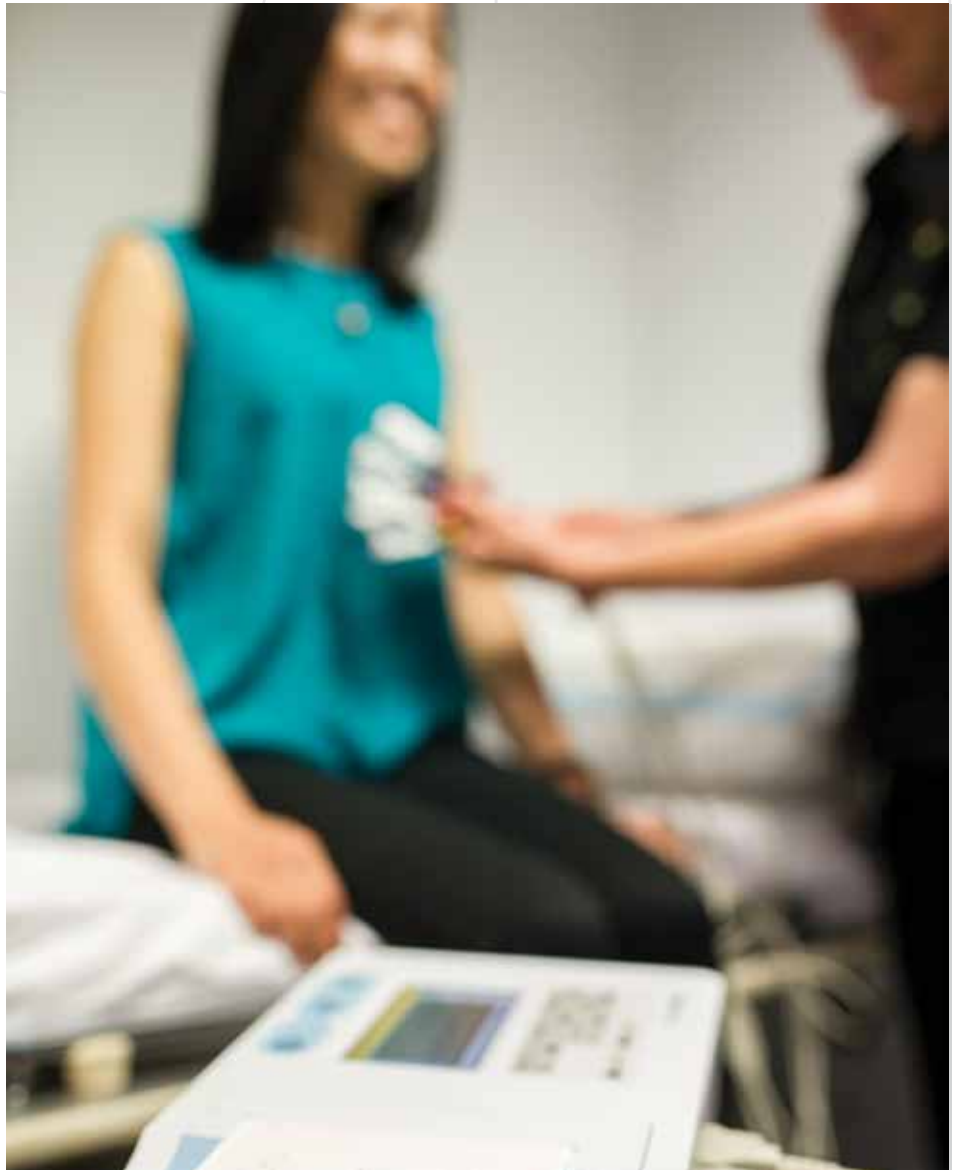
Three of these 2016 MBBS final year students were co-authors on published papers in peer-reviewed journals.

**Jessica Lee**

Lee, J & Kulkarni, J 2016, 'The borderline paradox' Australian & New Zealand Journal of Psychiatry. DOI: 10.1177/0004867416670521

**Nuha Khan**

Khan, N, Gavrilidis, E & Kulkarni, J 2016, 'Tibolone treatment for perimenopausal depression: Three cases' Australian & New Zealand Journal of Psychiatry, vol 50, no. 12, pp. 1213-1214. DOI: 10.1177/0004867416655877



**John Smythe**

Worsley, A, Smythe, J & Kulkarni, J 2016, 'A case of perimenopausal depression' Australian & New Zealand Journal of Psychiatry, vol 50, no. 11, pp. 1109. DOI: 10.1177/0004867416671597

**Bachelor of Medical Science (Honours)**

The Monash University Bachelor of Medical Science (Honours) is a 12 month degree programme for MBBS students and graduates. The program introduces students to research practice by embedding them in a research setting with Australian and internationally recognised researchers. The students

learn skills relating to data analysis and the communication of scientific ideas via oral presentations and a written thesis. The Bachelor of Medical Science (Honours) program offers candidates a range of projects across an array of research streams, matching student interests to projects respectively.

MAPrc offers BMedSci students a broad array of research projects to choose from. In 2016 our senior researchers supervised five Bachelor of Medical Science (Honours) students at our centre.

## FUNDRAISING & COMMUNITY ENGAGEMENT

### 2016 ACQUIRE LEARNING DE CASTELLA RUN 2 MEND MINDS

The de Castella Run held each year on the last Sunday in August is our major fundraising event. Over 1600 runners registered in 2016.

The run creates it's own unique atmosphere of friendliness and shared caring purpose, to raise money to help people suffering from mental illnesses.

Set along the scenic Kew Boulevard, this very special day is fun for the whole family. Events included the Vision PT 5km walk/ run, Mizuno 10km and Nostra Homes 15km running events. There was also

a Run Ready athletics program for kids aged 3-10 years. Post event participants can enjoy the Mind & Body Expo of stalls such as free massage, free yoga, a MAPrc cake stall, petting zoo, music and face painters.

The Vision Personal Training crew were there to motivate participants with a warm up at the start line. Lululemon supported the run with a colourful uplifting cheer squad positioned along the course to entertain participants.

We were very pleased with the resulting \$75k dollars raised. The run is organised through the combined efforts of the Old Xaverians' Athletics Club and MAPrc.

MAPrc has been privileged to partner this amazing community event for the last 6 of it's 36 year history. Donations and fundraising outcomes contribute vital income which is used in the cost of research participants, equipment, extra treatment programs for patients and scholarships for PhD students to undertake vital mental health research at MAPrc.

*Thank you to our sponsors, partners and participants for making a difference to mental health outcomes for families, patients and the wider community.*

Want to join in next year?  
Then visit our website  
[www.decastellarun.com.au](http://www.decastellarun.com.au)



The de Castella Run held each year on the last Sunday in August is our major fundraising event.

## FUNDRAISING & COMMUNITY ENGAGEMENT

### DONATIONS & FUNDRAISING

As a not for profit research and teaching centre, MAPrc increasingly relies on donations and fundraising to generate funds to help us achieve our goals and outcomes. We are extremely grateful to all those who have donated to MAPrc either directly or via one of our fund raising events. While these donations make up a relatively small proportion of our total annual budget, they are critical funds that support a wide range of activities which would otherwise be unfunded. Some of these include;

- Supporting our many post graduate research students and their projects
- Generation of pilot data (from small versions of a full study) which is required for submission to most competitive research grant schemes
- Top up funding for MAPrc funded

projects where the amount awarded in a grant might not cover the full cost of completing a project or trial

- Dissemination of research findings at conferences and in refereed journals
- MAPrc special projects and events

We are forever grateful to all those who donated to MAPrc during 2016.

### MENTAL HEALTH WEEK 2016

Every year, the 10th of October marks World Mental Health Day. MAPrc was proud to be a part of the Mental Health Week Launch event on Tuesday the 11th of October at the Deakin Edge Theatre in Federation Square.

Co-ordinated by the Mental Health Foundation of Victoria, the event provided a number of activities including

community festivals, art exhibitions, music, theatre and seminars — all in the name of broadening our community's understanding of mental health issues and reducing the stigma that is all too often attached to mental illnesses.

The MAPrc team were a strong presence at the launch. As the only research centre participating, staff were ready to answer questions and educate attendees on the range of studies at the centre and the different approaches and developments in our research.

Awareness around mental health is growing but more focus needs to be placed on how to fix these existing conditions which impact not only the individuals suffering from mental illness but their families, carers and the community at broad.





Cindy Yu

We are also incredibly grateful to all the wonderful people who volunteer their time to support MAPrc, both at our many external community events, and on-site at MAPrc, assisting with the day to day operations of the Centre. As a not-for-profit organisation, volunteers provide MAPrc with the ability to achieve more and therefore make a bigger impact on the lives of people living with mental illness. Our volunteers come from a wide range of backgrounds, and range from members of the general community to undergraduate

medical, and other students. Whether it be the one volunteer who assists us with entering the backlog of data for a current research project, or the 150+ volunteers who enable us to hold an event as big as the de Castella Run 2 Mend Minds, we couldn't do it without you!

MAPrc is also proud of the work of our large number of Research Affiliates who, although not employed by us, are a critical part of our research team. Our Affiliates include health professionals employed

in clinical roles within the Alfred Health Service who choose to become involved in supporting a particular research project of interest, as well as researchers from other organisations. We are able to acknowledge them as valuable members of our wonderful research team with a Monash University Affiliate appointment. Other affiliates have input into MAPrc teaching activities and again often perform these roles in addition to their paid appointments in departments outside MAPrc.

**To all our volunteers and affiliates, we thank you for helping to mend minds**

# FINANCIAL STATEMENT

JANUARY 1 – DECEMBER 31  
2014 – 2016

INCOME			
CATEGORY	2014	2015	2016
Higher Degree Supervision & Teaching	\$625,300	\$446,093	\$563,966
Competitive Research Grant Funding	\$1,740,780	\$1,775,151	\$982,437
Commercial Research Funding	\$597,700	\$405,068	\$743,428
Government / Institutional Grants	\$1,779,610	\$1,588,017	\$1,866,653
Short Courses / Conferences	\$98,140	\$140,753	\$312,759
MAPrc Clinics Revenue	\$71,510	\$71,060	\$62,760
Fund Raising & Donations	\$101,920	\$113,035	\$71,623
Partnerships	-	\$175,000	\$181,460
<b>TOTAL</b>	<b>\$5,014,260</b>	<b>\$4,364,117</b>	<b>\$4,804,694</b>
EXPENDITURE			
CATEGORY	2014	2015	2016
Salary Related Costs	\$2,906,200	\$2,794,551	\$3,509,676
Infrastructure / Administration	\$415,720	\$340,780	\$588,471
Direct Research Costs	\$590,380	\$663,908	\$446,223
Depreciation	\$5,230	\$16,683	\$14,263
Institutional Overheads & Charges	\$1,043,820	\$723,874	\$932,604
<b>TOTAL</b>	<b>\$4,962,070</b>	<b>\$4,539,797</b>	<b>\$5,561,037</b>
<b>RESULT</b>	<b>\$52,900</b>	<b>\$175,680</b>	<b>(\$686,543)</b>

## Notes:

1. Reported deficit for the calendar year 2016 reflects expenditure of grants awarded in previous years greater than new funding received from all sources.
2. Competitive research grant funding includes NH&MRC, ARC and other government and philanthropic grants
3. Commercial income includes industry related research contracts and revenue from clinical trials conducted on behalf of pharmaceutical company sponsors
4. Government / Institutional grants include the Victorian Department of Health funding for academic positions at Alfred Health and other operating / infrastructure funding, as well as Monash University dispersed federal government funding generated on the basis of i) category one competitive research dollars ii) HDR supervision and iii) MBBS undergraduate teaching activities by MAPrc
5. Institutional Overheads and Charges refers to Monash University central, faculty and school charges for central support and services provided to MAPrc.

## Financial Report Summary

MAPrc is a joint Centre of Monash University and Alfred Health, resulting in MAPrc finances being split across both Alfred Health and Monash University finance systems, creating a degree of complexity in managing and reporting on the Centre's finances. The report above is an integrated Alfred Health / Monash University report of MAPrc financial activity for the 2016 calendar year reported in broad categories of income and expenditure. Overall MAPrc recorded expenditure greater than income of \$686,543. The main drivers were;

i) A large amount of research funding received in 2015 was carried forward for expenditure in 2016, and ii) An increase in salary related costs. In 2016 MAPrc acquired the Caulfield Hospital Aged Psychiatry Clinical Trials Unit which included several new medical and research staff members. Funding received from trials being conducted by the Caulfield team increased the commercial research funding for MAPrc, but revenue generated was less than salaries paid. It is anticipated this unit will generate substantially more revenue in 2017.

## 2016 Highlights

### Competitive Research Grant Funding

In 2016 there was a reduction in competitive research grant revenue. Competitive research grants are comprised predominantly of project grants and Fellowships from NH&MRC and ARC. There were no new NH&MRC or ARC grants commencing in 2016 while two existing grants concluded in 2015. This resulted in a reduction in grant funding received. Competitive research grants are extremely challenging to attain and the significant size of each grant means finishing one or two grants, or commencing one or two grants in a given year, significantly alters the total funding received from this source.

### Commercial Research Funding

There was an increase in commercial research funding in 2016. This represents funding received from companies such as pharmaceutical on treatment device companies. In 2016, MAPrc merged the Aged Clinical Trials team based at Caulfield Hospital (mainly conducting trials in dementia) into the MAPrc Psychopharmacology / Industry Sponsored Trials Unit. This resulted in increased revenue from pharmaceutical company sponsored trials along with increased salary related and other costs associated with conducting the additional clinical trials.

### Government/Institutional Grants Vs Institutional Overheads & Charges

Alfred Health provide rent and facilities funding to MAPrc, and subsidise a small proportion of the Centre's operational costs. This makes up a portion of the Government / Institutional Grants revenue reported. Monash University collect infrastructure funding from the federal government based on research grant performance, higher degree supervision and teaching activities. The University pass on in full the infrastructure MAPrc generates through these activities to support operational costs. The University then applies levies at central level, faculty level and School level to cover Institutional and Overhead costs.

### Short Courses / Conference

In 2016 MAPrc ran an increased number of short courses in the use of transcranial magnetic stimulation (TMS) for treating depression to clinicians and researchers as well as conferences in women's mental health and brain stimulation resulting in increased revenue from course fees and conference registration fees and sponsorship.

### Partnerships

MAPrc partners include Swinburne University and Healthscope along with several non-financial partner organisations in which collaborative research and clinical activities are conducted.

## 2016 RESEARCH GRANTS & FUNDING

NHMRC		CHIEF INVESTIGATOR/S	AMOUNT (\$) RECEIVED IN 2016	YEARS OF FUNDING & TOTAL FUNDING FOR DURATION OF GRANT	ADMINISTERING INSTITUTION
Women's Mental Health Research	Adjunctive memantine for the treatment of borderline personality disorder	J Kulkarni, M Berk, S Rao, S Quirk, S Gwini	nil	2017 – 2019 \$900,000	Monash University
Therapeutic Brain Stimulation Research	APP1105089 Ketamine therapy among patients with treatment-resistant depression: a randomised, double-blind, placebo-controlled trial.	CIA C Loo, P Mitchell, P Glue, PB Fitzgerald, N Glozier, K Lapidus, D Hadzi-Pavlovic, A Somogyi, V Galvez	\$628,305	2016 – 2018 \$2,069,380	Monash University
	APP1077859 Deep brain stimulation in the treatment of severe depression.	PB Fitzgerald, R Segrave, R Bittar	\$226,655	2015 – 2019 \$961,353	Monash University
	APP1078567 Advancing novel brain stimulation treatment for severe depression. Practitioner Fellowship	PB Fitzgerald	\$110,287	2015 – 2019 \$551,435	Monash University
	Repetitive transcranial magnetic stimulation treatment of auditory hallucinations in psychotic disorders: a clinical and neurobiological investigation	M Kaur, PB Fitzgerald	\$35,000	2016 – 2020 \$314,644	Monash University
	GNT9000389 The development of a portable neurophysiological assessment suite for cognitive function. Equipment Grant	M Bellgrove, G Egan, M Rosa, M Yucel, S Rajaratnam A Fornito, K Cornish P Fitzgerald, F Mansouri, T Chong B Johnson, A Morris N Rogasch, L Smith S Sundram, S Velandai		2016 \$130,000	Monash University
	APP1112611 Repetitive transcranial magnetic stimulation treatment of auditory hallucinations in psychotic disorders: a clinical and neurobiological investigation. NHMRC Early Career Fellowship	M Kaur, PB Fitzgerald	\$35,000	2016-2020 \$314,644	Monash University
Neuropsychiatry	A randomised trial examining the effectiveness of sympathetic nervous inhibition in alleviating the metabolic side effects of antipsychotic medications in patients with schizophrenia	G Lambert		\$461,250	Baker IDI
	Interactions between the serotonin transporter and sympathetic nervous system activity in patients with major depressive disorder understanding the link between the brain and the heart	G Lambert		\$509,250	Baker IDI
Mental Health Service Research	Skill building interventions to address barriers to social inclusion for people with schizophrenia	S Lee	\$62,928	2015 \$251,715	Alfred University
AUSTRALIAN RESEARCH COUNCIL (ARC)		CHIEF INVESTIGATOR/S	AMOUNT (\$) RECEIVED IN 2016	YEARS OF FUNDING & TOTAL FUNDING FOR DURATION OF GRANT	ADMINISTERING INSTITUTION
Therapeutic Brain Stimulation Research	The development and testing of a device to enhance the application of transcranial magnetic stimulation. ARC Linkage Grant:LP130100448	PB Fitzgerald Partner Investigator: Warwick Fifield Grey Innovation	\$74,360	2013 - 2016 \$581,643	Monash University

# 2016 RESEARCH GRANTS & FUNDING

MONASH UNIVERSITY GRANTS		CHIEF INVESTIGATOR/S	AMOUNT (\$) RECEIVED IN 2016	YEARS OF FUNDING & TOTAL FUNDING FOR DURATION OF GRANT	ADMINISTERING INSTITUTION
Women's Mental Health Research	Too stressed to think clearly? How microarray gene expression profiling can inform us about stress and cognition. Monash - Platform Access grant	C Gurvich	\$8,700	2016 \$8,700	Monash University
	AMREP Collaborative Seed Grant Stress, genes and cognition	Dr C Gurvich Dr K Bozaoglu	\$4000	2016 \$4000,	Monash University
Therapeutic Brain Stimulation Research	Design and Testing of a Highly Novel Implantable Magnetic Nerve and Brain Stimulation Device. Monash University, Interdisciplinary Research (IDR) program. Monash - SGS	P Fitzgerald M Premaratne M Harrison, A Benci M Armstrong, R Rajan	\$190,000	2015 - 2016 \$250,000	Monash University
	SGS16-0310 Neurocognitive Training for Depression. The BrightSide Project	R Segrave (ECR) PB Fitzgerald (Mentor)	\$49,999	2016 \$49,999	Monash University
Perceptual and Clinical Neuroscience	Development and roll-out of an online visual test for bipolar disorder in large-scale clinical and genetic studies. Monash Institute of Medical Engineering Seed Fund	Dr S Miller Dr K Ellis	\$6,666	2017 \$6,666	Monash University
	Non-invasive neuromodulation of persistent pain and allodynia using caloric vestibular stimulation. Monash Institute of Medical Engineering Seed Fund	Dr S Miller Prof D Flynn Dr A Nunn	\$18,333	2017 \$18,333	Monash University
OTHER UNIVERSITIES		CHIEF INVESTIGATOR/S	AMOUNT (\$) RECEIVED IN 2016	YEARS OF FUNDING & TOTAL FUNDING FOR DURATION OF GRANT	ADMINISTERING INSTITUTION
Cognitive Neuropsychiatry	N-acetyl cysteine in schizophrenia resistant to clozapine: a double-blind randomised placebo-controlled controlled trial targeting negative symptoms. NH&MRC #1098442	D Castle, S Rossell, C Galletly, A Harris, P Francis, D Siskind		2016-2019 \$981,788	University of Melbourne
PCNL	N-acetyl cysteine in schizophrenia resistant to clozapine: a double-blind randomised placebo-controlled controlled trial targeting negative symptoms. NH&MRC #1098442	D Castle, S Rossell, C Galletly, A Harris, P Francis, D Siskind		2016-2019 \$981,788	University of Melbourne
EVestG	Concussion Treatment and Monitoring. MITACS-Cluster Accelerate + MPI	Z Moussavi	\$80,000	2015-2017 \$240,000	University of Manitoba
	EVestG. Neural Diagnostics	Z Moussavi	\$10,000	2016 \$10,000.00	University of Manitoba
TBS	Investigating the efficacy of high-frequency rTMS treatment for Alzheimer's disease. Weston Brain Institute	Z Moussavi	\$347,592	2016-2020 \$1,737,960	University of Manitoba
GOVERNMENT FUNDING		CHIEF INVESTIGATOR/S	AMOUNT (\$) RECEIVED IN 2016	YEARS OF FUNDING & TOTAL FUNDING FOR DURATION OF GRANT	ADMINISTERING INSTITUTION
Women's Mental Health Research	Inpatient Sexual Assault Review and Interviews Mental Health Complaints Commissioner	J Kulkarni J Grigg	\$16,500	2016 \$16,500	Monash University
Psychopharmacology	Vaporising smoking-related harms in people with severe and persistent mental illness: A study of the acceptability of vaporised nicotine products for smoking cessation or long-term substitution. Vic Health	J Kulkarni	\$45,000	2015-2016 \$200,000	Monash University
Mental Health Service Research	Problem Gambling in People Seeking Treatment for Mental Illness. Victorian Responsible Gambling Foundation	D Lubman, N Dowling, J Kulkarni, V Manning, S Lee, S Rodda, R Volberg, S Cosic	\$10,000	2014-2016 \$399,205 (\$10,000 for MAPrc)	Eastern Health
	Statewide High Dependence Unit (HDU) project. Victorian Department of Health and Human Services	P Thomas, S Lee, S Stafrace, R Dube, J Mangels	\$39,886	2015-2016 \$49,632	Alfred Health

## 2016 RESEARCH GRANTS & FUNDING

COMMERCIAL FUNDING		CHIEF INVESTIGATOR/S	AMOUNT (\$) RECEIVED IN 2016	YEARS OF FUNDING & TOTAL FUNDING FOR DURATION OF GRANT	ADMINISTERING INSTITUTION
Women's Mental Health Research	Hyperprolactinemia Review Janssen	J Kulkarni J Grigg	\$108,250	2016 \$108,250	Monash University
	NRAMP. The next 200 Janssen	J Kulkarni	\$50,000	2016 \$50,000	Monash University
PRIVATE PHILANTHROPIC/NOT FOR PROFIT		CHIEF INVESTIGATOR/S	AMOUNT (\$) RECEIVED IN 2016	YEARS OF FUNDING & TOTAL FUNDING FOR DURATION OF GRANT	ADMINISTERING INSTITUTION
Women's Mental Health Research	'Mothers Matter Intervention', a new support service for pregnant women with mental illness. Alfred Felton Bequest Small Grants	H Gilbert	nil	2017-2019 \$19,752	Monash University
	'Mothers Matter Intervention', a new support service for pregnant women with mental illness. Australian Nurses & Midwives Foundation (ANMF)	H Gilbert	nil	2017 \$1,000	Monash University
	Perimenopausal Depression. Alfred Felton Bequest	J Kulkarni	\$300,000	2016-2019 \$300,000	Monash University
	The Allison Project. Wolinski Funding	J Kulkarni	\$300,000	2016-2019 \$300,000	Monash University
Therapeutic Brain Stimulation Research	A RCT of Theta Burst Stimulation for Alzheimer's. Mason Foundation National Medical Program	CIA K Hoy CIB P Fitzgerald	\$59,180	2016-2017 Part Funding Only \$59,180	Monash University
Mental Health Service Research	Peer education and resources to empower women distressed by a trauma history to ask for help. Victorian Women's Benevolent Trust	S Keppich-Arnold, C Bennett, J Kulkarni, S Lee, S Anderson	\$10,000	2016 \$10,000	Alfred Health
	Housing instability and the reason for attending The Alfred Emergency & Trauma Centre. Vincent Chiodo Foundation	S Stafrace, P Thomas	\$23,484	2016-2017 \$23,484	Alfred Health
	Retrospective audit of Patients Attending Alfred Emergency and Trauma Centre Post Suicide or Self-harm. Vincent Chiodo Foundation	E Symons, S Ellen, S Stafrace, R Tsui	\$32,364	2016-2017 \$32,364	Alfred Health
Perceptual & Clinical Neuroscience Laboratory	Advanced characterization of binocular rivalry rate as a risk-indicator endophenotype and diagnostic aid for bipolar disorder. Defence Health Foundation Grants for Medical Research	Dr S M Miller, Prof N G Martin, Dr Trung T Ngo, Prof M Berk, Prof P B Mitchell	\$25,000	2016 \$25,000	Monash University

## JOURNAL ARTICLES

### WOMENS' MENTAL HEALTH RESEARCH TEAM

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- Fitzgerald, P.B. Reduced mu suppression and altered motor resonance in euthymic bipolar disorder: Evidence for a dysfunctional mirror system? *Social Neuroscience*. 2016; 11(1): 60-71.
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- Bailey NW, Lewis, PM, Thomson, RH, Maller, JJ, Junor P, Fitzgerald PB. Does exposure to diagnostic ultrasound modulate human nerve responses to magnetic stimulation? *Ultrasound in Medicine and Biology*. 2016; 42(12); pp 2950-56.
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- Cash, R., Jegatheeswaran, G, Ni Z, Chen, R. Modulation of the direction and magnitude of Hebbian plasticity in human motor cortex by stimulus intensity and concurrent inhibition. *Brain Stimulation*. 2016; In press.
- Chung, S.W., Hill A.T. Rogasch, N.C., Hoy, K.E., Fitzgerald, P.B. Use of theta-burst stimulation in changing excitability of motor cortex: A systematic review and meta-analysis. *Neuroscience and Biobehavioral Reviews*. 2016; 63; pp 43-64.
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- Toh, W.L., Castle, D.J., Rossell, S.L. What is the future for Schneiderian first-rank symptoms (FRS), in the DSM and otherwise? *Australian & New Zealand Journal of Psychiatry*. 2016; 50(9), 831-833.
- Invited commentary**
- Rossell, S.L., Thomas, N., Waters, F. Theme introduction: Advancing our understanding of hallucinations. *Schizophrenia Bulletin*. 2016.
- Letter**
- Bryce, S., Lee, S., Ponsford, J. & Rossell, S.L. A desire for greater clarity when defining 'cognitive remediation' in reviews of treatment efficacy for schizophrenia. *Australian and New Zealand Journal of Psychiatry*. 2016; 50(5), 497.
- Tan, E. J. & Rossell, S. L. "How's it going?" The practical value of assessing quality of life in mental illness. *Australian and New Zealand Journal of Psychiatry*. 2016; In press.
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- Meeting report**
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- Protocol paper**
- Brasier, C., Ski, C.F., Thompson, D.R., Cameron, J., O'Brien, C.L., Lautenschlager, N.T., Gonzales, G., Hsueh, Y.S., Moore, G., Knowles, S.R., Rossell, S.L., Haselden, R., & Castle, D.J. The Stroke and Carer Optimal Health Program (SCOHP) to enhance psychosocial health: *Trials*. 2016; 17(1), 446.
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- Rossell, S.L., Francis, P.S., Galletly, C., Harris, A., Siskind, D., Berk, M., Bozaoglu, K., Dark, F., Dean, O., Liu, D., Meyer, D., Neill, E., Phillipou, A., Sarris, J., & Castle, D.J. N-acetylcysteine (NAC) in schizophrenia resistant to clozapine: A double blind randomised placebo controlled trial targeting negative symptoms. *BMC Psychiatry*. 2016; 16(1), 320.
- Thomas, N., Farhall, J., Foley, F., Rossell, S.L., Castle, D., Ladd, E., Meyer, D., Mihalopoulos, C., Leitan, N., Nunan, C., Frankish, R., Smark, T., Farnan, S., McLeod, B., Sterling, L., Murray, G., Fossey, E., Brophy, L., & Kyrios, M. Randomised controlled trial of a digitally assisted low intensity intervention to promote personal recovery in persisting psychosis: SMART-Therapy study protocol. *BMC Psychiatry*. 2016; 16(1), 312.
- Review**
- Bryce, S., Sloan, E., Lee, S. J., Ponsford, J., Rossell, S.L. Cognitive remediation in schizophrenia: A methodological appraisal of systematic reviews and meta-analyses. *Journal of Psychiatric Research*. 2016; 75, 91-106.
- Howes, O., Castle, D.J., Pantelis, C., Rossell, S.L., Thomas, N., et al. Treatment resistant schizophrenia: Treatment response and resistance in psychosis (TRRIP) working group consensus guidelines on diagnosis and terminology. *American Journal of Psychiatry*. 2016. In press.
- Merrett, Z., Castle, D.J. & Rossell, S.L. Comparing the experience of voices in borderline personality disorder with the experience of voices in a psychotic disorder: A systematic review. *Australian and New Zealand Journal of Psychiatry*. 2016. In press.
- Phillipou, A., Rossell, S.L., Wilding H.E. & Castle, D.J. Randomised controlled trials of psychological and pharmacological treatments for body dysmorphic disorder: A systematic review. *Psychiatry Research*. 2016; 245, 179-185.

## MENTAL HEALTH SERVICE RESEARCH TEAM

- Brennan, A., Warren, N., Peterson, V., Hollander, Y., Boscarato, K., Lee, S. Collaboration in crisis: Carer perspectives on police and mental health professional's responses to mental health crises. *International Journal of Mental Health Nursing*. 2016; 25(5):452-461.
- Daffern, M., Gilbert, F., Lee, S., Chu, C.M. The relationship between early maladaptive schema, psychopathic traits and neuroticism in an offender sample: Evidence for two types. *Clinical Psychologist*. 2016; 20(3):125-128.
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- Hopkins, L., Lee, S.J., McGrane, T., Barbara-May, R. Single Session Family Therapy in Youth Mental Health: Can it help? *Australasian Psychiatry*. 2016. E-pub.
- Pfizer, B., Katona, L., Cleland, H. Beyond flames: Pioneering a psychology role in a State-wide burns service. *InPsych: The Bulletin of the Australian Psychological Society*. 2015; 38(3):10.
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- Pillay, B., Lee, S.J., Katona, L.J., De Bono, S.E., Burney, S., Avery, S. Factors associated with posttraumatic stress symptoms experienced in the acute phase following haemopoietic stem cell transplant. *Bone Marrow Transplantation*. 2016; 51(3):435-437.
- Sands, N., Elsom, S., Corbett, R., Keppich-Arnold, S., Prematunga, R., Berk, M., Considine, J. Predictors for clinical deterioration of mental state in patients assessed by telephone-based mental health triage. *International Journal of Mental Health Nursing*. 2016. E-pub.
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Mental Health Nursing. 2016; 25(1):80-86.

Thomas N, Foley F, Lindblom K, Lee S. Are people with severe mental illness ready for online interventions? Access and use of the Internet in Australian mental health service users. *Australasian Psychiatry*. 2016.

Wasiak, J., Lee, S.J., Paul, E., Shen, A., Tan, H., Cleland, H., Gabbe, B. Female patients display poorer burn-specific quality of life 12 months after a burn injury. *Injury*. 2016; 48(1):87-93.

### PERCEPTUAL & CLINICAL NEUROSCIENCE LABORATORY RESEARCH TEAM

Miller, S.M. Vestibular neuromodulation: stimulating the neural crossroads of psychiatric illness. *Bipolar Disorders*. 2016; 18/Issue 6, Pages 539–543.

### EVESTG™

Brian J. Lithgow, Mehrnaz Shoushtarian [2015]

Parkinson's Disease: Disturbed Vestibular Function and Levodopa; *J Neurol Sci*. 2015; 353(1-2):49-58. - <http://www.ncbi.nlm.nih.gov/pubmed/25899315>

Dastgheib, Z., Lithgow, B., Blakley, B., Moussavi, Z. Application of Vestibular Spontaneous Response as a Diagnostic aid for Meniere's Disease. *J Annals of Biomed Eng.*, 2016; 44(5), 1672-1684.

Lithgow B., Garrett A., Moussavi Z., Gurvich C., Kulkarni J., Maller J. and Fitzgerald P., "Major Depression and Electrovestibulography," *World Journal Biological Psychiatry*, 16(5):334-50, 2015. doi:10.3109/15622975.2015.1014410

Lithgow, B.J and Shoushtarian, M., "Parkinson's disease: disturbed vestibular function and levodopa". *J Neurol Sci*. 2015; 353(1-2):49-58. doi: 10.1016/j.jns.2015.03.050.

Gurvich et al [2013] Vestibular Insights into Cognition and Psychiatry; *Journal of Brain Research*, Volume 1537, 6 Nov 2013, Pages 244–259 <http://www.sciencedirect.com/science/article/pii/S0006899313012134>

Lithgow, B [2012] A Methodology for Detecting Field Potentials from the External Ear Canal: NEER and EvestG™. *Annals of Biomedical Engineering* 2012 Aug; 40(8): 1835–1850. <http://link.springer.com/article/10.1007%2Fs10439-012-0526-3#page-1>

### WOMENS' MENTAL HEALTH RESEARCH

#### Presentations

- Kulkarni J. Presentation: Royal Women's Hospital Grand Round, Family Violence, Australia 10th October, 2016
- Kulkarni J. International Conference on Schizophrenia (ICONS), Chennai, India 8th – 10th October, 2016
- Kulkarni J. Gurvich C. Thomas N. Gilbert H. Grigg J. Worsley A. Thew C. Conference: In Her Shoes, September 2016
- Kulkarni J. International Congress RC Psych, London, UK 27th – 30th June 2016
- Kulkarni J. Invited Speaker: Breakfast talk at King David School "When hormones go haywire and mess with the mind", Australia 17th June, 2016
- Kulkarni J. Invited speaker: St. Vincent Hospital Melbourne, "Women's Mental Health – The Latest", Australia 10th June 2016
- Kulkarni J. Invited speaker: Northern Hospital Psychiatry Team, Australia 30th May, 2016
- Kulkarni J. Invited speaker: Servier National GP Program "Special Issues for Women with Mood Disorders", Melbourne 21st May 2016
- Kulkarni J. Invited speaker: The Melbourne Clinic "Women's Mental Health Time for a New approach", TMC, Australia 18th May, 2016
- Kulkarni J. Invited Speaker: Primary Care Mental Health Conference, Jerusalem, 7th May 2016
- Kulkarni J. Ballarat General Practitioner Presentation, Australia 30th April 2016
- Kulkarni J. Invited speaker: St Kilda Road Staff "Borderline Developments", Australia 15th April 2016
- Kulkarni J. Invited speaker: University of Melbourne Colloquium "Women's Mental Health – New Approaches", Melbourne, Australia 11th April 2016
- Kulkarni J. Round Table discussion: "Investing in Women's Mental Health: Strengthening the Foundations for Women, Families and the Australian Economy" Melbourne 20th April 2016
- Kulkarni J. Invited speaker: "Scholarly Project – how do I begin?" Registrar presentation The Alfred Melbourne, 11th April 2016
- Kulkarni J. Invited speaker: Alfred Psychiatry Medical Staff "The Scholarly Project", Melbourne, Australia 4th April 2016
- Kulkarni J. Invited speaker: International Women's Day Luncheon, "Women's Mental Health- Not A National Priority, Not Good Enough" Melbourne 8th March 2016
- Kulkarni J. Invited speaker: National Practitioners Clinical Meeting, "The Management of Mood Disorders in Women" Melbourne 20th February 2016
- Kulkarni J. Conference presentation: International RANZCP Congress of Psychiatry. RANZCP Clinical practice guideline for schizophrenia and related disorders. Hong Kong – May 8th 2016.
- Kulkarni, J. Conference presentation: Royal College of Psychiatrists International Congress 2016. Psychopharmacology – "Sex hormones and psychosis". London, UK, 24th June 2016.

Kulkarni, J., Gurvich, C., Grigg, J., Thomas, N., Thew, C., Keynote Speakers: In Her Shoes. Women's Mental Health: Melbourne, Australia, 3rd September 2016.

Kulkarni, J. Invited Plenary Speaker: "Special Issues for Women with Psychosis" and "Antipsychotic Medication Safety in Pregnancy", International Conference on Schizophrenia (IConS). Chennai, India. 8th September 2016.

Kulkarni, J. Invited Plenary Speaker: "Special Issues for Women with Psychosis" and "Borderline Personality Disorder: Hormones, Cutting & Despair" and "Perimenopausal Depression: Underrecognised and Underrated", AGES Focus Meeting. Wellington, NZ. 4th November 2016.

### THERAPEUTIC BRAIN STIMULATION TEAM

#### Presentations

- Cash, R., Presentation. "Influence of BDNF on neurophysiology and neuroplasticity". Second Australasian Brain Stimulation Meeting. Melbourne, 28th July 2016.
- Chung, S.W., Presentation. "Intensity-dependent effect of intermittent theta burst stimulation in prefrontal cortex: A TMS-EEG study" Second Australasian Brain Stimulation Meeting, Melbourne, 28th July 2016.
- Emonson, M., Presentation. "Brain Stimulation, Aging and Cognition". Second Australasian Brain Stimulation Meeting. Melbourne. 28th July 2016.
- Fitzgibbon, B., Presentation. "A pilot investigation of therapeutic brain stimulation treatment for fibromyalgia". Australian Pain Society's 36th Annual Scientific Meeting. Perth. 13th March 2016.
- Fitzgibbon, B., Presentation. "Trait personal distress related to increased social pain following left DLPFC brain stimulation; implications for social neuroscience" Australasian Society for Social & Affective Neuroscience Meeting. Sydney. June 2016.
- Fitzgibbon, B., Symposium Presentation. "Understanding and treating persistent pain using non-invasive brain stimulation techniques" Australasian Brain Stimulation Meeting. Melbourne. July 16, 2016.
- Fitzgibbon, B., Invited Speaker: "Transcranial Magnetic Stimulation for pain: overview and future directions." Emerging Themes in Pain Research. AMREP. 20th May 2016.
- Hill, A., Presentation. "Effects of Prefrontal Bipolar and High-Definition Transcranial Direct Current Stimulation on Cortical Excitability, Oscillatory EEG Activity and Working Memory in Healthy Adults" Second Australasian Brain Stimulation Meeting. Melbourne 28th July 2016.
- Hill, A., Presentation. "Neurophysiological and neurocognitive effects of single-session transcranial direct current stimulation over the dorsolateral prefrontal cortex in healthy adults: a TMS-EEG study" 2016 SOBR Symposium. Melbourne. 18th Nov 2016.
- Kaur, M., Presentation. "Stimulating Young Minds: Investigating a Next Generation Treatment for Depression in Youth" Society for Mental Health

Research Conference. Sydney, 7th Dec 2016.

## Facilitators

Hoy, K., Fitzgibbon, B., Workshop: "Creating good mentor-mentee relationships" Science at Shine Dome Event The Academy of Sciences. Canberra. 24th May 2016.

## Data Blitz

Richardson, K., Presentation. "Cortical reactivity in the dorsolateral prefrontal cortex: A ppTMS-EEG study" Second Australasian Brain Stimulation Meeting. Melbourne. 28th July 2016.

## Posters

Cash, R., Poster: "Characterisation of glutamatergic and GABAA mediated neurotransmission in motor and dorsolateral prefrontal cortex using paired-pulse TMS-EEG". Society for Neuroscience. San Diego, 12th November 2016.

Chung, S.W., Poster: "Demonstration of short-term plasticity in the dorsolateral prefrontal cortex with theta burst stimulation: A TMS-EEG study". 6th International Conference on Transcranial Brain Stimulation. Gottingen, Germany, 7th September. 2016.

Coyle, H., Poster: "The relationship between cortical activity and cognitive function after traumatic brain injury". Second Australasian Brain Stimulation Meeting. Melbourne, 28th July 2016.

Fitzgibbon, B., "Preliminary Sham-Controlled Randomised Clinical Trial Outcome of Repetitive Transcranial Magnetic Stimulation Treatment for Fibromyalgia". World Congress of Pain. Yokohama, Japan, September 2016.

Hill, A., "Modulation of Working Memory and Cortical Excitability with Focal 'High-Definition' Transcranial Direct Current Stimulation (HD-tDCS) of the Dorsolateral Prefrontal Cortex". Biological Psychiatry. Atlanta, USA, 12th May 2016.

Kaur, M., "Stimulating Young Minds: Investigating a Next Generation Treatment for Depression in Youth". Second Australasian Brain Stimulation Meeting. Melbourne, 28th July 2016.

## COGNITIVE NEUROTECHNOLOGY

### Presentations

Bell, I., Symposium. "The multiple associations between hearing voices and events in people's lives: Models and implications for psychological therapies/Developing digital interventions for people recovering from psychosis". 8th World Congress of Behavioural and Cognitive Therapies (WCBC). Melbourne, 22th June 2016.

Louise, S., Oral presentation. "Development, acceptability and feasibility of an individual, brief mindfulness-based intervention for voices". International Consortium on Hallucination Research (ICHR). Chicago, USA, 25th September 2016.

Rossell, S., Symposium/Plenary presentation. "Emotional processes in understanding and treating psychosis/ Neuroscience of hearing voices". 10th World Congress of Behavioural and Cognitive Therapies (WCBC). Melbourne, 22th June 2016.

Thomas, L., Oral presentation. "Sustained attention as a

predictor of antisaccade performance in schizophrenia". Australasian Cognitive Neuroscience Society (ACNS). Shoal Bay, 24th November 2016.

Thomas, N., Oral presentation. "Promoting self-management of voices and psychosis: Beyond the bounds of expert therapy". International Consortium on Hallucination Research (ICHR). Chicago, USA, 25th September 2016.

Thomas, N., Symposium. "Emotional processes in understanding and treating psychosis/Developing digital interventions for people recovering from psychosis". 9th World Congress of Behavioural and Cognitive Therapies (WCBC). Melbourne, 22th June 2016.

### Posters

Carruthers, S., "Effects of muscarinic M1 receptor sequence variation on executive function in schizophrenia and healthy controls" Schizophrenia International Research Society (SIRS), Italy. 2nd April 2016.

Carruthers, S., "Muscarinic cortical thinning in schizophrenia" 24th World Congress of Psychiatric Genetics (WCPG), Jerusalem, Israel. 30th October 2016.

Lancaster, S., "Resting state deficits in theta band connectivity in schizophrenia using magnetoencephalography" Schizophrenia International Research Society (SIRS), Italy. 2nd April 2016.

Rossell, S., "An investigation of semantic memory in first-episode psychosis; It's all in the words: lexical processing is impaired in schizophrenia and bipolar mania" Schizophrenia International Research Society (SIRS), Italy. 2nd April 2016.

Rossell, S., "FOXP2 genetic mutation in schizophrenia" 24th World Congress of Psychiatric Genetics (WCPG), Jerusalem, Israel. 30th October 2016.

Sumner, P., "A systematic review of thought disorder in schizophrenia: structural neuroimaging correlates" Schizophrenia International Research Society (SIRS), Italy. 2nd April 2016.

Sumner, P., "Semantic priming and self-reported thought disorder" Australasian Cognitive Neuroscience Society (ACNS), Shoal Bay. 24th November 2016.

Tan, E., "On the relationship between delusions and quality of life in schizophrenia; Understanding the progression of semantic dysfunction in schizophrenia: insights using the schizotypy analogue; Building a neurocognitive profile of auditory verbal hallucinations in schizophrenia; Does functioning and life satisfaction differ for schizophrenia patients with co-morbid depression?" Schizophrenia International Research Society (SIRS), Italy. 2nd April 2016.

Tan, E., "Neurocognition and formal thought disorder in schizophrenia: do impairment profiles differ between symptoms?" Australasian Cognitive Neuroscience Society (ACNS), Shoal Bay. 24th November 2016.

Thomas, L., "The schizotypy factors are a suitable model for the symptoms of schizophrenia" Schizophrenia International Research Society (SIRS), Italy. 2nd April 2016.

Toh, W.L., "Auditory verbal hallucinations (AVHs) in mood disorders: Analysis of the 2010 Survey of High Impact Psychosis (SHIP) data; A multidimensional examination

of delusionality and insight in body dysmorphic disorder versus psychotic disorders" Australasian Cognitive Neuroscience Society (ACNS), Italy. 2nd April 2016.

## MENTAL HEALTH SERVICE RESEARCH

### Presentations

Hopkins, L., "Challenges and truths: Integrating youth peer support workers into a clinical service." 17th International Mental Health Conference, Gold Coast. Aug 2016.

Hopkins, L., "Developing Discovery College: Making a difference for young people through co-produced learning opportunities." The Mental Health Services (TheMHS) Conference, Auckland. Aug 2016.

Northe, V., "Working Together - Making it work for the Client: Rural and Metro Gamblers Help and The Victorian State-wide Mental Health and Problem Gambling Program." National Association for Gambling Studies Annual Conference. Cairns. Nov 2016.

### Posters

Hopkins, L., "What about the rest of the family?" Alfred Health Research Week, Melbourne. 16th Oct 2016.

## EVestG™

Dashtgheib Z., Ranjbar O., Lithgow B. and Moussavi Z. "Comparison of a new ad-hoc classification method with Support Vector Machine and Ensemble classifiers for the diagnosis of Meniere's disease using EVestG signals" IEEE CCECE, May 2016

Lithgow, B., "EVestG and Bipolar Disorder: A Fast Quantitative Classifier-Medication Effects" PCS Healthcare conference. Hungary.

### Conference peer-reviewed full papers

Suleiman A., Lithgow B., Mansouri B. and Moussavi Z., "Investigating the feasibility of EVestG Assessment for screening concussion," IEEE EMBC, pp:3375-3378, doi: 10.1109/EMBC.2015.7319116, 2015.

Lithgow B, and Moussavi Z., "A pilot evaluation of vestibular performance using EVestG following mTBI," IEEE EMS on Neural Engineering Conf, Nov. 2013.

# RESEARCH PROJECTS

WOMEN'S MENTAL HEALTH TEAM RESEARCH PROJECTS	CHIEF INVESTIGATOR/S	PROJECTED END DATE
Depression and the Pill Study	Prof Jayashri Kulkarni	Current
Double-Blind, Placebo Controlled, Randomised Investigation of Ondansetron in Chronic Residual Schizophrenia	Prof Jayashri Kulkarni	Current
Double-Blind randomised investigation of Tibolone as an adjunct to standard antidepressant treatment for relapsed and persistent depression in peri- and post-menopausal women (Tibolone Study)	Prof Jayashri Kulkarni	Current
National Register of Antipsychotic Medication in Pregnancy (NRAMP)	Prof Jayashri Kulkarni	Current
Selective Estrogen Receptor Modulators – A Potential Treatment for Psychotic Symptoms of Schizophrenia in men and women of child bearing age (SERM Studies)	Prof Jayashri Kulkarni	Current
Understanding Borderline Personality Disorder and the Role of Memantine	Prof Jayashri Kulkarni	Current
Vaporising smoking-related harms in people with severe and persistent mental illness: A study of the acceptability of vaporised nicotine products for smoking cessation or long-term substitution	Prof Jayashri Kulkarni	Current
WOMEN'S MENTAL HEALTH STUDENT RESEARCH PROJECTS	INVESTIGATOR/S	PROJECTED END DATE
An investigation of smoking behaviours and treatments in people who experience severe mental illness.	Sacha Filia, PhD	Completed in 2016
Estrogen + Antipsychotic Treatment in schizophrenia	Yi Cheih Wong, Masters	Completed in 2016
Family Violence- Understanding Health Practitioners' current practice, attitudes & beliefs	Han Jie Soh	Current
Investigating ocular-motor correlates of abnormal mirror system functioning in autism	Jacqueline Riddiford, PhD	Current
Investigating the Link between PCOS and Borderline Personality Disorder	Raelene Tan, B Med Sci (Hons)	Completed in 2016
Mood and Hormonal Contraception	Jake Kirk, B Pharma (Hons)	Completed in 2016
New Model of Support and Advocacy for Women with Severe Mental Illness	Heather Gilbert, PhD	Current
Perimenopause and Depression	Freshta Omar, Bmed	Current
Stigma and Schizophrenia: Patient and Health Practitioner Perspectives	James Kirkland, B Med Sci (Hons)	Current
The Relationship between Stress, Anxiety and Memory Cortisol.	Ratu Lucky Nitibaskara, B Med Sci (Hons)	Completed in 2016
Using Accelerometer-Based Compact System as a Diagnostic Tool to Assess and Monitor Drug-Induced Parkinsonism	Denyna Choo, MBBS, Tricia Wong, MBBS	Completed in 2016
Emotional Antisocial Codes, Gender and Stress	Fran Jueres, BPsych Intern	Completed in 2016
THERAPEUTIC BRAIN STIMULATION TEAM RESEARCH PROJECTS	CHIEF INVESTIGATOR/S	PROJECTED END DATE
A2: Accelerated rTMS in the treatment of depression (David)	Prof Paul Fitzgerald	Completed during 2016
An Examination into the Brain Basis of Chronic Pain and Co-Morbid Mental Illness (Sin-Ki)	Dr Bernadette Fitzgibbon	Current
An investigation into the cognitive, psychological and physiological profile of Ultra-runners	Dr Bernadette Fitzgibbon	Current
Deep TMS: Deep rTMS for autism spectrum disorder (Amity & Peter)	Prof Paul Fitzgerald	Current
Fibromyalgia: rTMS for fibromyalgia (Bernie)	Dr Bernadette Fitzgibbon	Current
MST/ECT: A randomised controlled trials of Magnetic Seizure Therapy in Major Depressive disorder	Prof Paul Fitzgerald	Current
Pain Cognition Training and tDCS in fibromyalgia	Prof Paul Fitzgerald	Current
PREDICT: Investigating predictors of response to TMS (Rod)	Dr Bernadette Fitzgibbon	Current
Social support and pain	A/Prof Kate Hoy	Current
TBS for Alzheimer's Disease (Kate)	Prof Paul Fitzgerald	On hold
TBS for Depression: Accelerated Theta Burst TMS in the Treatment of Depression (David)	A/Prof Kate Hoy	Current
THERAPEUTIC BRAIN STIMULATION TEAM STUDENTS RESEARCH PROJECTS	INVESTIGATOR/S	PROJECTED END DATE
Exploring cognition and personality and its role in pain modulation following transcranial Direct Current Stimulation (tDCS)	Dr Bernadette Fitzgibbon, Current (honours project 2017) Ms Laura Knox	Current
Brain Stimulation, Aging and Cognition: Investigating neural plasticity in the young, old and MCI brain (Study One)	Ms Melanie Emonson	Current
Brain Stimulation, Aging and Cognition: Investigating neural plasticity in the young, old and MCI brain (Study Two)	Ms Melanie Emonson	Current

# RESEARCH PROJECTS

Cognitive and neurophysiologic effects of transcranial direct current stimulation: Assessing the impact of concurrent task performance	Mr Aron Hill	Current
Cortical Inhibition and working memory in Schizophrenia	Ms Karyn Richardson	Completed
Enhancing neuroplasticity in the dorsolateral prefrontal cortex using non-invasive brain stimulation	Mr Aron Hill	Current
Enhancing working memory with transcranial direct current stimulation: The impact of combined prefrontal and parietal stimulation	Mr Aron Hill	Current
"Optimising the use of Theta Burst TMS	Mr Sung Wook Chung	Current
<b>COGNITIVE NEUROPSYCHIATRY TEAM STUDENTS RESEARCH PROJECTS</b>	<b>INVESTIGATOR/S</b>	<b>PROJECTED END DATE</b>
A brain imaging study of auditory verbal hallucinations and inhibition in patients with schizophrenia	Toni Pikoos, Honours	Current
A phenomenological study of auditory verbal hallucinations in a non-clinical adult population	Michelle Robertson, Honours	Current
Auditory verbal hallucinations in relation to mood in bipolar disorder and major depressive disorder	Wei Lin Toh, Postdoc	Current
Development and application of trauma-focused intervention for auditory verbal hallucinations	Rachel Brand, PhD	Current
Does visual processing training enhance cognitive remediation therapy outcomes in people with schizophrenia?	Natalia Contreras, PhD	Current
Ecological momentary assessment and intervention to enhance self management of persistent auditory verbal hallucinations	Imogen Bell, PhD	Current
Examining the benefits of cognitive remediation on neurocognitive and functional outcomes in schizophrenia relative to an active control	Shayden Bryce, D.Neuropsych	Current
Genetic variations and dopaminergic contributions to prefrontal cognitive systems in schizophrenia	Caroline Gurvich, Fellow	Current
Investigating factors that influence the efficacy of cognitive remediation therapy in people with schizophrenia	Maree Reser, D.Psych	Current
Neuroimaging correlates of dysfunctional semantic processes in schizophrenic formal thought disorder	Phil Sumner, PhD	Current
Self, attachment and trauma in relation to voices	Monique Scott, PhD	Current
The impact of a mindfulness-based intervention for auditory hallucinations on localised brain activity, attention and perceived symptoms with schizophrenia patients	Stephanie Louise, PhD	Current
The influence of the glutamatergic system on cognition across the schizotypy/schizophrenia continuum	Lizzie Thomas, PhD	Current
The muscarinic cholinergic system and cognition in schizophrenia	Sean Carruthers, PhD	Current
<b>MENTAL HEALTH SERVICE RESEARCH PROJECTS</b>	<b>CHIEF INVESTIGATOR/S</b>	<b>PROJECTED END DATE</b>
A General practitioner survey on youth mental health services in south east Melbourne	Toby Winton-Brown (MAPrc staff: Liza Hopkins)	Current
A Randomised Controlled Trial to Evaluate the Effects of a Self-Help Manual Intervention on Psychological Distress and Quality of Life for Patients Undergoing a Haemopoietic Stem Cell Transplant (SCT)	Sue De Bono (MAPrc staff: Stuart Lee)	Current
Client and referrer feedback following contact with the State-wide Problem Gambling and Mental Health Program	Vicky Northe (MAPrc staff: Stuart Lee)	Current
Cognitive Functioning in Patients with Advanced Lung Disease and following Lung Transplantation	Jane Harris (MAPrc staff: Stuart Lee)	Current
Discovery College Evaluation	Liza Hopkins	Current
Housing instability and the reason for attending The Alfred Emergency & Trauma Centre	Simon Stafrace	Current
Peer education and resources to empower women distressed by a trauma history to ask for help	Pam Hellema (MAPrc staff: Stuart Lee)	Completed
Problem Gambling in People Seeking Treatment for mental illness	Dan Lubman (MAPrc staff: Stuart Lee)	Completed
Prospective assessment of the experience and impact of Rel8 an 8-week social skill training group for people with a psychotic illness	Bronwyn Wauchope (MAPrc staff: Stuart Lee)	Current
Retrospective audit of Patients Attending Alfred Emergency and Trauma Centre Post Suicide or Self-harm	Evan Symons (MAPrc staff: Stuart Lee)	Current
Retrospective audit of people treated with Long-Acting Injectable Treatments (LAIs): Usage Patterns and Outcomes	Anthony de Castella	Completed

# RESEARCH PROJECTS

Review of non-acute bed-based services of MI Fellowship and Alfred Psychiatry	Stuart Lee	Current
Single Session Therapy (SST) evaluation	Rachel Barbara-May (MAPrc staff: Liza Hopkins)	Current
The EDGE - Eating Disorder proGram Evaluation	Rachel Barbara-May (MAPrc staff: Liza Hopkins)	Current
YoPS - Youth Peer Supprt evaluation	Melanie Purkiss (MAPrc staff: Liza Hopkins)	Current
<b>MENTAL HEALTH SERVICE STUDENTS RESEARCH PROJECTS</b>	<b>INVESTIGATOR/S</b>	<b>PROJECTED END DATE</b>
Psychological wellbeing from the perspective of adolescents with vision impairment	Ross Anderson, PhD	Current
The role of self-efficacy in the relationship between cognitive remediation therapy and psychosocial functioning in schizophrenia	Richard Lawrence, BA (Psychology Honours)	Completed
<b>PERCEPTUAL &amp; CLINICAL NEUROSCIENCE LABORATORY RESEARCH PROJECTS</b>	<b>CHIEF INVESTIGATOR/S</b>	<b>PROJECTED END DATE</b>
Binocular Rivalry Online	S. Miller, T. Ngo, P. Law, M. Wright, K. Ellis	Current
Genetics of binocular rivalry	S. Miller, T. Ngo, P. Law, M. Wright, N. Martin, P. Fitzgerald, M. Berk, P. Mitchell, X. Caseras, T. Schulze, N. Craddock	Current
Vestibular neuromodulation in persistent pain and other clinical conditions	S. Miller, T. Ngo, W. Barsdell, C. Arnold, M. Chou, P. New, S. Hill, A. Nunn, D. Brown, S. Gibson	Current

## WOMEN'S MENTAL HEALTH RESEARCH TEAM

### STUDENTS COMPLETED IN 2016

DEGREE	NAME OF STUDENT	NAME OF UNIVERSITY	RESEARCH PROJECT/THESIS TITLE	SUPERVISOR/S
MBBS	Tricia Wong	Deakin University	Using Accelerometer-Based Compact System as a Diagnostic Tool to Assess and Monitor Drug-Induced Parkinsonism	Jayashri Kulkarni
MBBS	Denyna Choo	Monash University	Using Accelerometer-Based Compact System as a Diagnostic Tool to Assess and Monitor Drug-Induced Parkinsonism	Jayashri Kulkarni
Masters	Yi Chieh Wong	Monash University	Estrogen + Antipsychotic treatment in schizophrenia	Jayashri Kulkarni
BMedSci(Hons)	Raelene Tan	Monash University	Investigating the link between PCOS and Borderline Personality Disorder	Jasmin Grigg, Jayashri Kulkarni
BMedSci(Hons)	Ratu Lucky Nitibaskara (Luch)	Universitas Indonesia	Stress, cognition and BDNF gene expression in a healthy cohort	Caroline Gurvich, Lizzie Thomas
Bsc(Hons)	Jake Kirk	Monash University	Molecular and cellular therapy for mild cognitive impairment	Jayashri Kulkarni, Caroline Gurvich

### ONGOING STUDENTS

PhD	Heather Gilbert	Monash University	Model of support for women with severe mental illness	Jayashri Kulkarni, Caroline Gurvich
PhD	Jacqueline Riddiford	Deakin University	Investigating ocular-motor correlates of abnormal mirror system functioning in autism	Caroline Gurvich, Peter Enticott, Joanne Fielding

## THERAPEUTIC BRAIN STIMULATION RESEARCH TEAM

### STUDENTS COMPLETED IN 2016

DEGREE	NAME OF STUDENT	NAME OF UNIVERSITY	RESEARCH PROJECT/THESIS TITLE	SUPERVISOR/S
Biomedical Sci	Greg Roebuck	Monash University	Ultrarunners	Bernadette Fitzgibbon
PhD	Amity Green	Monash University	Schizophrenia Glycine Study	Paul Fitzgerald, R Croft
	Phillip Hall	Monash University	The neuroeconomics of major depression.	Bernadette Fitzgibbon

### ONGOING STUDENTS

DPsych	Karyn Richardson	Monash University	Cortical Inhibition and Working Memory in Schizophrenia	Paul Fitzgerald (50%), Kate Hoy (50%)
	Melanie Emonson	Monash University	Brain Stimulation, Ageing and Cognition	Kate Hoy (70%), Paul Fitzgerald (20%), Nigel Rogasch (10%)
	Oscar Murphy	Monash University	Enhancing cognitive processing in depression: an investigation of non-invasive electrical brain stimulation methods	Rebecca Segrave (50%), Kate Hoy (40%) Dana Wong (10%)
PhD	Aron Hill	Monash University	Investigating the neurobiological and neurocognitive effects of (tDCS)	Kate Hoy (70%), Paul Fitzgerald (30%)
	Hannah Coyle	Monash University	The relationship between cortical activity and cognitive function after	Kate Hoy, Jennie Ponsford
	Rodney Anderson	Monash University	Investigating predictors of response to TMS	Kate Hoy (70%), Paul Fitzgerald (30%)
	Sin-Ki Ng	Monash University	Understanding the role of negative beliefs and emotion regulation in chronic low back pain	Bernadette Fitzgibbon, Paul Fitzgerald, Donna Urquhart, Flavia Cicutinni
	Sung Wook Chung	Monash University	Optimising the use of Theta Burst TMS in Modifying Brain Activity in Prefrontal Cortex	Paul Fitzgerald (50%), Kate Hoy (30%), Nigel Rogasch (20%)
	Xianwei Che	Monash University	Exploring the pathways linking social support to pain perception	Bernadette Fitzgibbon, Robin Cash, Paul Fitzgerald

## COGNITIVE NEUROPSYCHIATRY RESEARCH TEAM

### STUDENTS COMPLETED IN 2016

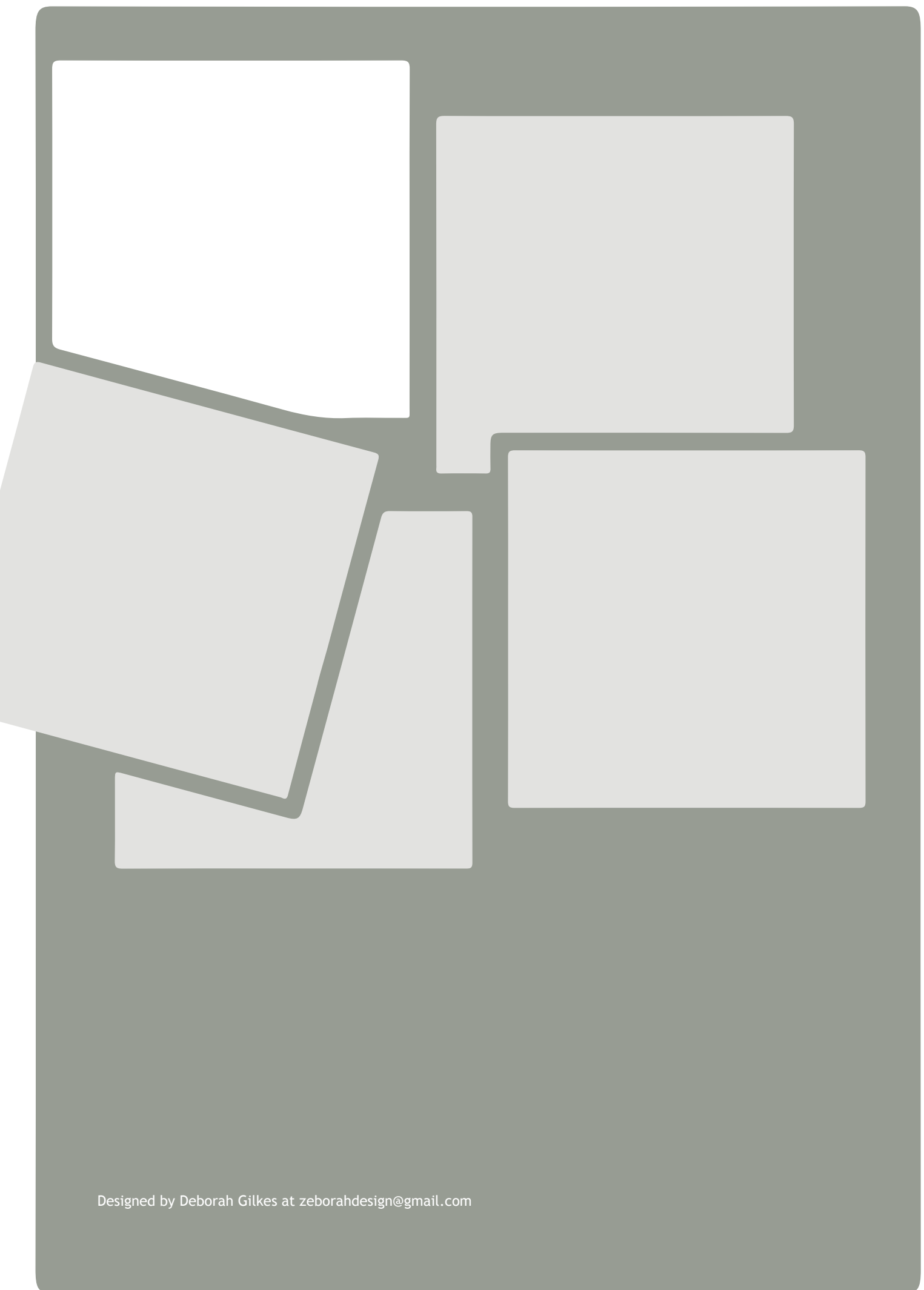
DEGREE	NAME OF STUDENT	NAME OF UNIVERSITY	RESEARCH PROJECT/THESIS TITLE	SUPERVISOR/S
Honours	Toni Pikoos	Swinburne University	A brain imaging study of auditory verbal hallucinations and inhibition in patients with schizophrenia	Susan Rossell, Matthew Hughes, William Woods
PhD	Natalia Contreras	Monash University	Does visual processing training enhance cognitive remediation therapy outcomes in people with schizophrenia?	Susan Rossell

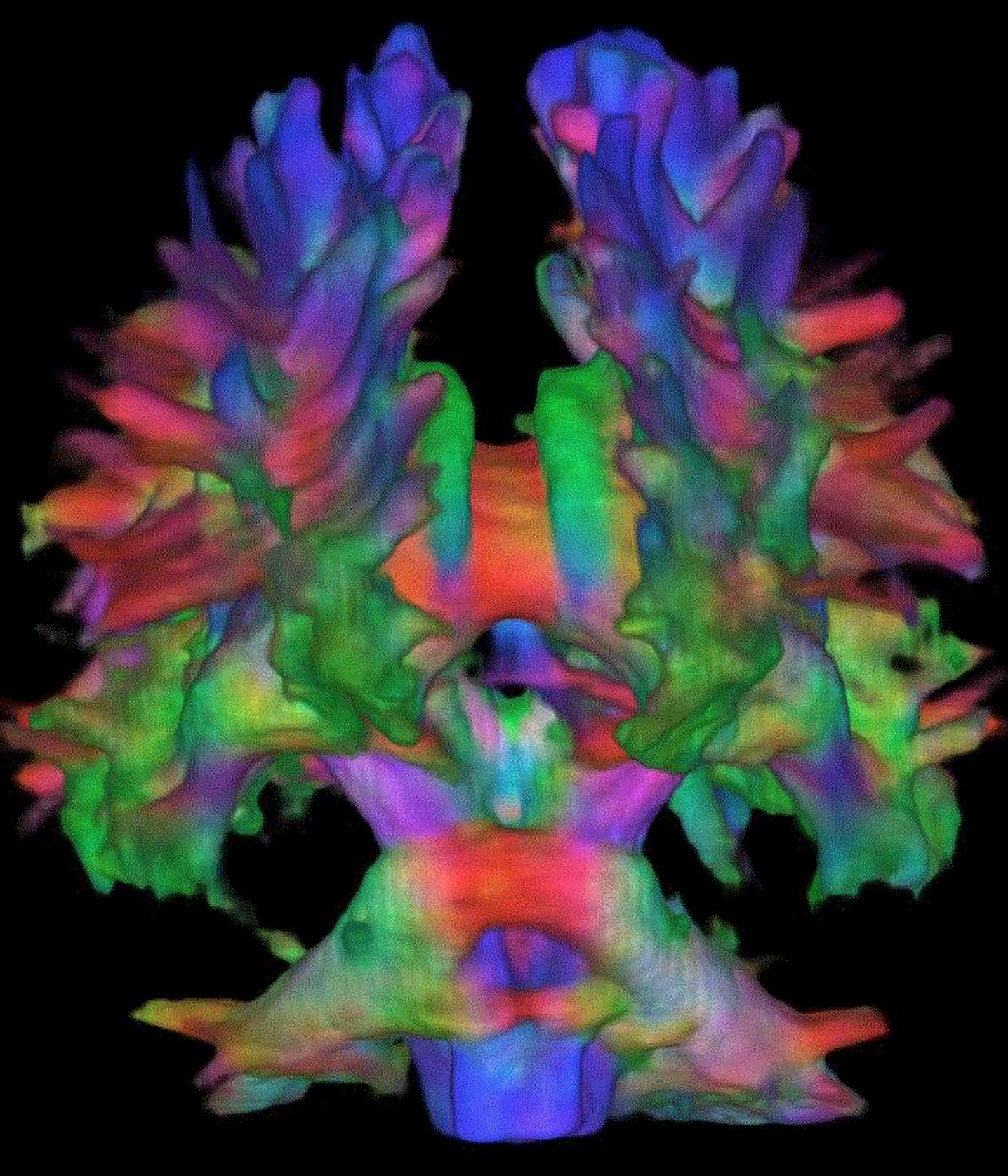
ONGOING STUDENTS				
DEGREE	NAME OF STUDENT	NAME OF UNIVERSITY	RESEARCH PROJECT/THESIS TITLE	SUPERVISOR/S
D.Neuropsych	Shayden Bryce	Monash University	Examining the benefits of cognitive remediation on neurocognitive and functional outcomes in schizophrenia relative to an active control	Jennie Ponsford (50%) Susan Rossell (30%), Stuart Lee (20%)
D.Psych	Maree Reser	Swinburne University	Investigating factors that influence the efficacy of cognitive remediation therapy in people with schizophrenia	Susan Rossell, Neil Thomas
Honours	Michelle Robertson	Swinburne University	A phenomenological study of auditory verbal hallucinations in a non-clinical adult population	Susan Rossell, Wei Lin Toh
PhD	Rachel Brand	Swinburne University	Development and application of trauma-focused intervention for auditory verbal hallucinations	Neil Thomas, Susan Rossell
	Imogen Bell	Swinburne University	Ecological momentary assessment and intervention to enhance self management of persistent auditory verbal hallucinations	Neil Thomas, Susan Rossell
	Phil Sumner	Swinburne University	Neuroimaging correlates of dysfunctional semantic processes in schizophrenic formal thought disorder	Susan Rossell
	Monique Scott	Swinburne University	Self, attachment and trauma in relation to voices	Neil Thomas, Susan Rossell
	Stephanie Louise	Swinburne University	The impact of a mindfulness-based intervention for auditory hallucinations on localised brain activity, attention and perceived symptoms with schizophrenia patients	Neil Thomas, Susan Rossell
	Lizzie Thomas	Monash University	The influence of the glutamatergic system on cognition across the schizotypy/schizophrenia continuum	Caroline Gurvich (50%), Susan Rossell (30%), Kiyomet Bozaoglu (20%)
	Sean Carruthers	Swinburne University	The muscarinic cholinergic system and cognition in schizophrenia	Susan Rossell, Caroline Gurvich
MENTAL HEALTH SERVICE RESEARCH TEAM				
STUDENTS COMPLETED IN 2016				
DEGREE	NAME OF STUDENT	NAME OF UNIVERSITY	RESEARCH PROJECT/THESIS TITLE	SUPERVISOR/S
Psychology (Honours)	Richard Lawrence	Monash University	The role of self-efficacy in the relationship between cognitive remediation therapy and psychosocial functioning in schizophrenia	Stuart Lee, Susan Rossell, Jennie Ponsford
Research Intern	Aimee Donaldson	Deakin University	Review of non-acute bed-based services of MI Fellowship and Alfred Psychiatry	Stuart Lee
	Corinna Campbell	Deakin University	YoPS - Youth Peer Support evaluation	Liza Hopkins
	Jake Iaria	Deakin University	Discovery College Evaluation	Liza Hopkins
ONGOING STUDENTS				
PhD	Ross Anderson	Monash University	Psychological wellbeing from the perspective of adolescents with vision impairment	Narelle Warren, Stuart Lee, Roseanne Misajon
DPSych	Shayden Bryce	Monash University	Comparing the effects of two cognitive remediation programs on neurocognitive and functional outcome in schizophrenia	Stuart Lee, Susan Rossell, Jennie Ponsford
EVESTG RESEARCH TEAM				
ONGOING STUDENTS				
DEGREE	NAME OF STUDENT	NAME OF UNIVERSITY	RESEARCH PROJECT/THESIS TITLE	SUPERVISOR/S
Postdoc	Zeinab Dastghieb	Manitoba University	EVestG for neurodegenerative disorders	Z. Moussavi & B Lithgow
MSc	Corey Bosecke	Manitoba University	EVestG and Anxiety	Z. Moussavi & B Lithgow
PhD	Abed Suleiman	Manitoba University	EVestG and mTBI	Z. Moussavi & B Lithgow
	Merangiz Ashiri	Manitoba University	Visual Stimulation and EVestG	Z. Moussavi & B Lithgow

Special thanks to the large team of dedicated, intelligent and wonderfully good humoured people that have contributed to putting this report together.

**IMAGES**

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