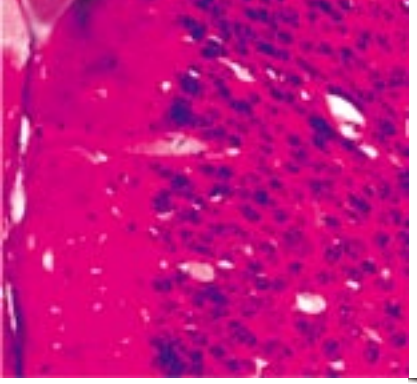
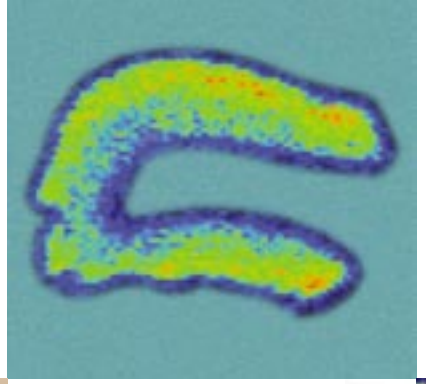
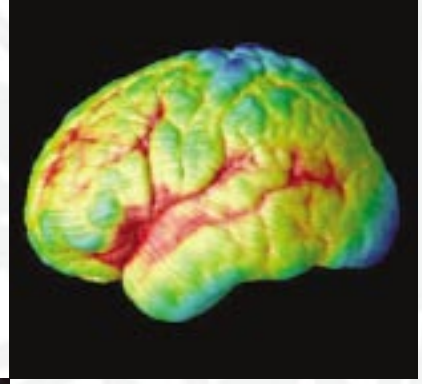
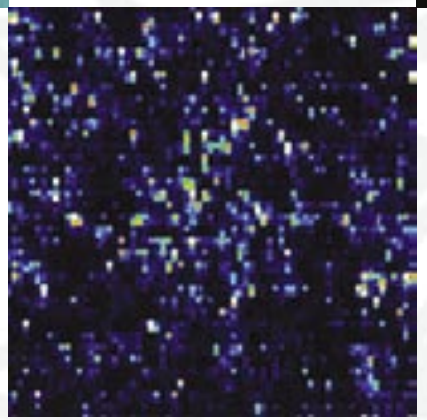
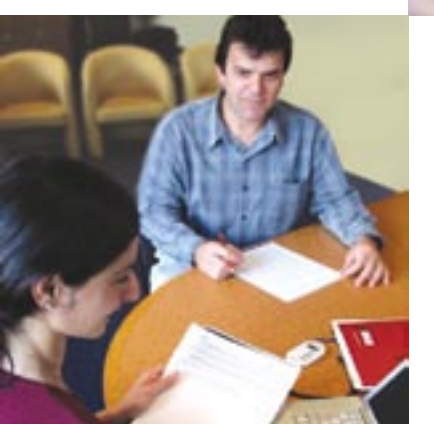










NISAD

Schizophrenia Research

ANNUAL REPORT 2006

Schizophrenia is a medical brain disorder which is the third leading cause of human disability worldwide.

One in every hundred people will develop schizophrenia.

Families often conceal schizophrenia because it is one of the most socially stigmatising of all illnesses.

Onset usually occurs between the ages of 15 and 25. 30% attempt suicide. 5% succeed.

Schizophrenia often leads to unemployment, drug abuse, family trauma, homelessness, and imprisonment.

Schizophrenia costs the Australian community around $2 billion each year.

Schizophrenia can arise in any family.

NISAD is supported by NSW Health and is a National Health and Medical Research Council Accredited Independent Research Institute.

Contents

NISAD is the only Australian institute entirely dedicated to finding the answer to schizophrenia.

NISAD researchers are at work in most Australian schizophrenia research centres.

In 2006, NISAD initiated Australia's first University Chair of Schizophrenia Research.

A national network of schizophrenia research

NISAD Chairman Peter Maher

NISAD has traveled a considerable distance over the last ten years and this last year is unsurpassed in terms of innovation and progress. The appointment of Professor Cynthia Shannon Weickert as the NISAD Chair of Schizophrenia Research, in partnership with the University of New South Wales and the Prince of Wales Medical Research Institute, will substantially enhance NISAD's program, but more importantly will have a significant impact on the national landscape in this complex field of research.

In addition, the success of a NISAD-led coalition of NSW, Queensland and WA researchers achieving a major grant from the National Health and Medical Research Council to establish the Australian Schizophrenia Research Bank (ASRB) will strengthen the research community's ability to make major inroads into the causes of schizophrenia. The generosity of the Pratt Foundation has now seen this Bank become truly national by enabling Victorian researchers to come on board and has brought the capacity of the Bank to a new level. Both of these achievements were conceived and realised not as stand alone innovations, but as further necessary components in NISAD's plan of integrated research.

Along with NISAD's other research projects, these new initiatives have only been made possible by the support of Government, corporate and individual sponsors, and charitable foundations (listed in this Report).

Building a sustainable future for schizophrenia research is a key priority for the Board. As Chair, I look forward to building stronger and increasingly meaningful partnerships with the corporate sector. This disease is best defined as a disease of lost opportunity. The opportunities associated with youth; an education, friendships, relationships, careers are often stripped away. Schizophrenia is the third leading cause of human disability. Our capacity to achieve greater understanding and to improve the quality of life for those at risk goes to define and measure us as a society.

To that end, a particular highlight for the year was 'Spark of Genius 2006'. Held at the Sydney Town Hall with the attendance of more than 600 guests and 42 genii, $250,000 was raised. An outstanding evening and an outstanding show of support which as a result will return in 2007. I also wish to highlight the invaluable role played by the many corporate sponsors of the event who are acknowledged in this report and pay special thanks to the Macquarie Bank Foundation as principal sponsor.

The 2005 'Sponsors and Supporters Lunch' was once again generously hosted by NISAD Board member and CEO of AMP Andrew Mohl, in the AMP Board room. On behalf of the Board I would like to extend our appreciation to NSW Health Minister, John Hatzistergos MLC for making the occasion his first public engagement as Health Minister. The New South Wales Government continues to provide critical support to NISAD for which we are extremely grateful.

On behalf of the entire NISAD team I want to thank Peter Dempsey, who has served NISAD as Chairman since 2003. His Chairmanship added measurably to the Institute's growth and status as a key player in both the national and international schizophrenia research effort. While taking over as Chairman, I am delighted to report that he has continued to provide his valuable support as a Board member.

Finally, I wish to acknowledge the NISAD researchers who are an intensely committed group of individuals and with whom genuine hope lies for the one in one hundred young Australians who will develop schizophrenia. Our ability as an organisation to truly nurture, encourage and foster the world class research which this team is delivering is ultimately what we are accountable for.

Replacing stigma with understanding

Executive Director
Debbie Willcox

One of our 600 guests at the 2006 'Spark of Genius' event was a mental health nurse who had spent a career caring for patients in psychiatric hospitals. She had been moved to tears because she remembered what it used to be like when mental illness was hidden away and never spoken of. The spectacle of so many people gathered together to help schizophrenia research was, for her, like a dream come true. It was certainly a dream come true for NISAD to see so many celebrities, media personalities and corporate leaders assembled in Sydney Town Hall on NISAD's behalf. These 'sparks of genius' are listed in this Annual Report, and I warmly thank every one of them for supporting us.

During its 10 years of operation, NISAD has contributed to the worldwide movement to raise public awareness of mental health issues and to banish stigma. The Institute's scientific research results have built a greater understanding of this complex disorder and have delivered many new findings to bring us closer to prevention and cure. In raising support for this research, NISAD has spread awareness of schizophrenia issues in government, corporate and private sectors. Time after time, we have met people who have family members affected by the illness, but who did not know they could do something about it by helping NISAD.

In 2005, NISAD published Australia's first public health poster about schizophrenia, alerting family members to the early symptoms, and thereby increasing the chances that young people experiencing onset of the illness receive early intervention treatment. I thank NSW Health for funding the poster, and the Mental Illness Fellowship of Australia for mobilising their State branches to distribute it nationwide.

Another NISAD initiative came to fruition in 2006 when Prof. Cynthia Shannon Weickert accepted NISAD's invitation to become Australia's first University Chair of Schizophrenia Research. Everyone involved with this unique appointment is delighted to help establish a dynamic new research centre around her proven expertise and charismatic leadership. It is also a dramatic example of the enigma of schizophrenia that Cyndi has a twin brother who suffers from the illness.

I join with our new Chairman Peter Maher in thanking Andrew Mohl and AMP for once again hosting our 'Sponsors and Supporters Lunch', and Greg Pickhaver, Andrew O'Keefe, Kerry Chikarovski, Sally Loane, Bruce Hawker and Dr Maryanne O'Donnell for making the 2005 'Cocktails & Consciousness' event so memorable.

It is still true to say that if public and corporate support for medical research was distributed in proportion to the numbers of people seriously affected by specific diseases, schizophrenia would be much higher up on the priority list. While support for schizophrenia research has improved over the last decade, this illness still does not receive the wider concern warranted by the numbers of people it damages. With this in mind, I particularly applaud the generosity and understanding NISAD has received from its current sponsors and supporters. Without their ongoing help, NISAD's ability to make significant advances in research would be greatly diminished. I also thank the NSW Government, particularly NSW Health and the Ministry of Science and Medical Research. We appreciate the strong support from the officers within both these agencies.

With such help over the last 10 years, we have been able to develop the momentum to initiate, in 2006, the NISAD Chair of Schizophrenia Research, and the Australian Schizophrenia Research Bank. Together with our many ongoing research projects, these landmark achievements signal that the Institute is making solid advances in its mission to unravel the mystery of schizophrenia.

10 years on and going strong

Scientific Director Prof. Vaughan Carr reviews NISAD's first decade

Up to the early 1990s, there was little schizophrenia research being undertaken in NSW. The few investigators involved were poorly resourced, and had minimal access to research infrastructure. All this started to change in 1991 when Dr Stanley Catts led a group of scientists, clinicians and concerned parent-carers to propose the formation of an institute dedicated to developing world-class standards of schizophrenia research in NSW. With the backing of key groups such as the Schizophrenia Fellowship of NSW, the NSW Labor Council and the Construction Forestry Mining Energy Union, NISAD presented a strong case for State Government support, which was ultimately awarded in 1995.

The first years of operation were focused on establishing the necessary infrastructure. The **NISAD Schizophrenia Research Register**: a database of patients and family members willing to participate in research; the **NSW Tissue Resource Centre**: a 'bank' of post-mortem brains; the **'Gift of Hope' Brain Donor Program**: allowing people to authorize post-mortem donations; the **Hunter DNA Bank**: a database of the DNA profiles of schizophrenia patients, their families and others, and the **NISAD Virtual Brain Bank**: a library of MRI brain scans from people with schizophrenia at various stages of their illness.

These NSW research facilities have since been so successful in supporting world-class research that NISAD has this year attracted NHMRC and Pratt Foundation funding to expand elements of them into a national facility called the **Australian Schizophrenia Research Bank** – in collaboration with researchers from Queensland, Western Australia and Victoria.

Under the successive Scientific Directorships of Professors Stan Catts, Philip Ward and myself, the Institute and its affiliated scientists have been awarded over $15 million in external grant funding, supporting original research producing 140 published scientific papers and 400 presentations at national and international scientific conferences. The 'hands on' laboratory work that produces such papers is often carried out by research higher degree students (e.g. Honours, Masters, PhD) preparing to become the senior scientists of the future. To nurture such researchers, and to attract the best minds into schizophrenia research, NISAD has to date provided support to around 75 students, 35 of whom have already achieved their degrees.

What are the most significant discoveries NISAD has made in its first decade?

NISAD and affiliated scientists have played a vital role in many recent findings of Australian schizophrenia research. A few highlights of these include:

- Using a new fMRI brain scanning technique to demonstrate, for the first time in the one image, a correlation between areas of reduced regional cortical thickness and impaired brain function in first-episode schizophrenia;
- Identifying differences in the brain's auditory processing (known as mismatch negativity), which has been proposed as a biological marker of vulnerability to schizophrenia;
- Using a new computer-based remediation tool to demonstrate improved recognition of facial expressions of emotion in schizophrenia, with increased visual attention to important facial features, suggesting the utility of computer training tools in remediation of facial emotion recognition impairments;
- Discovery that blood lymphocytes can be used to identify distinct gene expression profiles within schizophrenia, which may be useful in the development of a biological basis for subtype classification for the disorder;
- Discovery of similar patterns of reduced brain activation in first episode schizophrenia patients and chronic cannabis users during performance of a planning task, suggesting the possibility of overlapping or shared pathology in these conditions;
- Discovery of significant alterations to cannabinoid, muscarinic, glutamate and serotonin receptors in the cingulate cortex, suggesting this brain region may be a site of primary pathological change in schizophrenia.

In addition to cutting-edge research results, NISAD has this year established Australia's first University Chair of Schizophrenia Research – in partnership with the University of New South Wales and the Prince of Wales Medical Research Institute. We welcome Prof. Cyndi Shannon Weickert, and look forward to the development of a dynamic new research centre in developmental neurobiology under her leadership.

Ten years on, all NISAD contributors and supporters can feel proud of the achievements made to date. With an increasing national collaborative research focus, together with the commencement of the NISAD Chair of Schizophrenia Research, NISAD is advancing well on its mission to find the means to prevent and cure schizophrenia.

The year 2005-2006

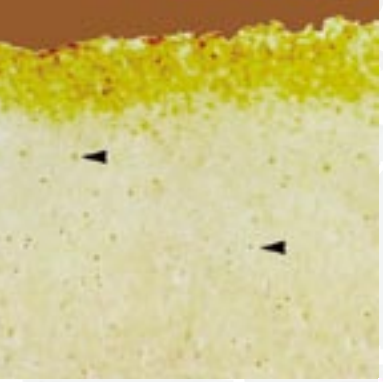
Reviewing the year 2005-2006 also shows just how far NISAD has come. During this year NISAD has supported 47 research higher degree students and has seen 10 such degrees awarded. The Institute now directly employs over 30 staff and has engaged in collaborative research with as many as 68 other institutions in Australia and overseas.

NISAD's key infrastructure initiatives have continued to grow in size through the recruitment of more than 230 new volunteers.

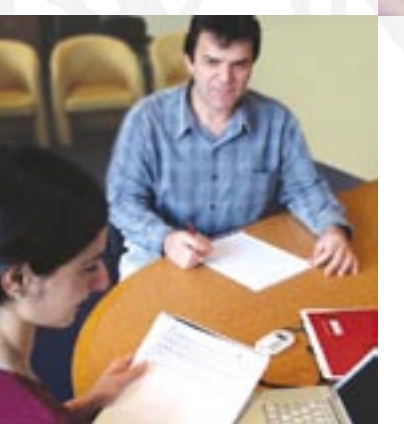
In terms of productivity, the past year resulted in 50 peer-reviewed publications and 97 scientific conference presentations. NISAD was awarded $2.1 million in research grants, including its first NHMRC funding, the enabling grant that supports the Australian Schizophrenia Research Bank.

The immediate future of NISAD will be largely shaped by two initiatives. The first is the redefinition of the Institute's scientific direction, which arose out of a consultative process following a series of scientific summits held in 2005. An organising theme for this has been formulated, namely, schizophrenia as a developmental abnormality in neuronal migration, synaptogenesis, myelination and cortical connectivity. Within this theme, the Institute's aim is to relate abnormal neurocognitive and psychopathological processes to genetic, molecular and cellular neuroscience. The second initiative is the appointment of the NISAD Professor of Schizophrenia Research in the field of developmental neurobiology of cognition and behaviour pertaining to schizophrenia.

Thus, NISAD is now very well placed to make a major contribution in advancing its mission and the future looks to be charged with exciting possibilities.



Creating the resources which enable schizophrenia research to happen



Since 1996, NISAD has worked to develop the infrastructure resources necessary for world class schizophrenia research in NSW: the **NISAD Schizophrenia Research Register**, a database of patients and their relatives willing to participate in research; the **Hunter DNA Bank**, a library of DNA profiles of patients and relatives, and the **NISAD 'Gift of Hope' Brain Donor Program**, allowing people to donate their brains for research after death. NISAD also supports the **NSW Tissue Resource Centre**, the major Australian source of postmortem brain tissue.

In 2005–06, 230 new volunteers joined NISAD's programs, bringing the total number to 1,750. The Register and the NSW Tissue Resource Centre supported 30 research projects across Australia and internationally.

The Australian Schizophrenia Research Bank

The success of NISAD's infrastructure programs was a key factor in attracting funding from the National Health and Medical Research Council, and subsequently from the Pratt Foundation, to establish a national schizophrenia research bank. Participating centres include:

Brisbane: University of Queensland, Queensland Centre for Mental Health.
Sydney: University of Sydney, Garvan Institute of Medical Research.
Newcastle: University of Newcastle, Centre for Mental Health Studies, Hunter Area Pathology Service.
Melbourne: University of Melbourne, Melbourne Neuropsychiatry Centre.
Perth: University of Western Australia, Centre for Clinical Research in Neuropsychiatry.
Orange: Centre for Rural and Remote Mental Health.

NISAD has now begun the 5-year task of setting up the network to recruit 2,000 schizophrenia sufferers and 2,000 controls. Brain scans, blood samples and clinical information will be obtained to compile a unique database, of enormous value to Australian and international researchers.

Establishing Australia's first university Chair of schizophrenia research

"This is a story of the Shannon twins born in September in San Angelo, Texas in the sixties. The boy and girl twin were healthy, happy and well-loved as children, until adolescence hit. As teens, one twin embraced life and socialized and dated; the other twin embraced solitude and withdrew from friends. Both twins started college. One twin made the deans list, the other dropped out. One twin listened to rock music; the other twin heard unpleasant voices. One twin continued college; the other twin entered a mental institution with the subsequent diagnosis of schizophrenia. One twin suffered from adverse reactions to antipsychotic medication, the other twin suffered, too. One twin decided something more must be done for people with this horrible disease, and she dedicated her life to this pursuit."

Prof. Cyndi Shannon Weickert

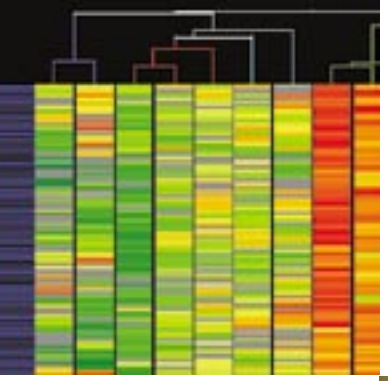
After a national and international search for the best candidate, NISAD is delighted that Prof. Cynthia (Cyndi) Shannon Weickert has accepted the appointment as Australia's first Chair of Schizophrenia Research. Cyndi graduated with a BA in Biology and Psychology, earned a Ph.D in Biomedical Science, trained in the Neuropathology of Schizophrenia, and became Chief of the MiNDS Unit at the National Institute of Health in Washington DC. She will commence her position as NISAD Chair of Schizophrenia Research in December 2006 – a position created by NISAD in partnership with the University of NSW, and the Prince of Wales Medical Research Institute.

The NISAD Chair of Schizophrenia Research

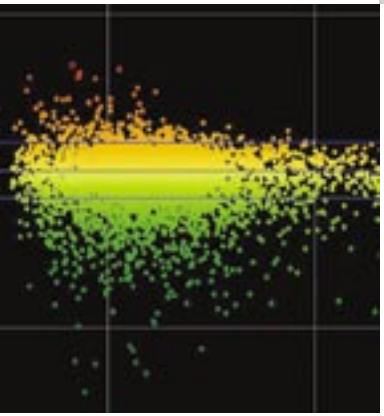
Cyndi's research is focused on determining how normal brain development gets derailed in schizophrenia. She has published several landmark findings which have shifted the attention of worldwide research onto the role of growth factors and hormones in the development of the illness. From December 2006, Cyndi will direct the development of a dynamic new NISAD research centre based at the Prince of Wales Medical Research Institute, and utilising the full range of NISAD research resources.

Cyndi brings not only her expertise, but also her passion to Australia, and she shares in the hope of all NISAD supporters for better treatment for all who suffer from schizophrenia, including her twin brother, David.

NSW HEALTH UNSW PRINCE OF WALES MEDICAL RESEARCH INSTITUTE NISAD Schizophrenia Research



Cracking the genetic code of schizophrenia. Who is at risk?



Although most cases of schizophrenia arise in families with no medical history of the illness, genetic risk has long been established. Individuals are more likely to develop schizophrenia if they have a relative with the illness, and the closer the relative, the greater the risk. During 2005 – 06, NISAD's ongoing genomic research has delivered a number of valuable results:

Gene profiling for tailored treatment

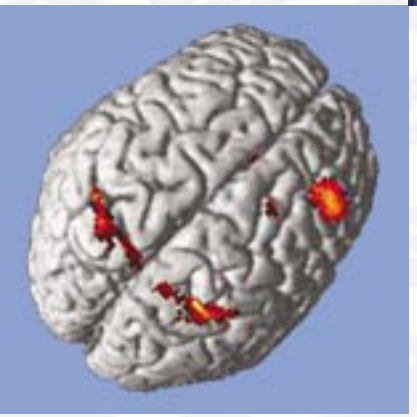
NISAD researchers at the University of Newcastle designed a preliminary investigation to discover if an individual's schizophrenia subtype could be identified from a genetic profile obtained from a simple blood sample. 18 brain-related genes significantly altered in schizophrenia were identified. When individual gene profiles were grouped by age, gene expression profiles varied for different age groups. Such gene expression profiling from blood samples may in the future provide a template for individually 'tailored' treatments, and larger scale studies on the same lines may lead to a diagnostic tool to assess at-risk status in the early phases of the illness.

Genetic abnormalities in the amygdala

Using post mortem tissue from the NSW Tissue Resource Centre, the University of Newcastle team also examined gene expression in the amygdala – a key emotion management centre of the brain. Among other differences, genes involved in presynaptic function (which assist in regulating communication between brain cells) were found to be consistently altered in the schizophrenia samples. These results are the first evidence that genes involved in presynaptic mechanisms in the amygdala are implicated in the development of schizophrenia.

Differences in the protein building blocks of the brain

Genes are the blueprints for producing the proteins that build the body. A NISAD-supported team at the University of Sydney has investigated proteins in the anterior cingulate cortex (a brain area that plays an important role in normal cognition), finding significant differences which suggest how schizophrenia alters brain anatomy and function.



Why is heavy smoking and drug use endemic to schizophrenia?

Whereas schizophrenia is a devastating disorder by itself, the high occurrence of comorbid substance use with this illness poses a very real challenge to clinicians and researchers. Up to 80 percent of patients smoke tobacco, and 50 percent meet criteria for substance abuse and/or dependence. NISAD scientists have continued to investigate these associations:

Breaking the cycle of cigarette and cannabis smoking

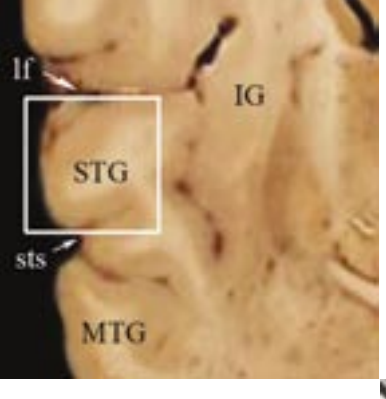
NISAD researchers at the Centre for Mental Health Studies, Newcastle, recruited 298 schizophrenia patients to test an intervention for smoking involving nicotine replacement therapy, motivational interviewing and cognitive behaviour therapy. Results found a strong relationship between treatment session attendance and smoking reduction, with half of those who completed the intervention program achieving a 50 percent or greater reduction in daily cigarette consumption. A similar study was conducted to test the effectiveness of cognitive behaviour therapy against cannabis, alcohol and/or amphetamine use. Modest short-term improvements in cannabis use support further trials investigating more comprehensive interventions.

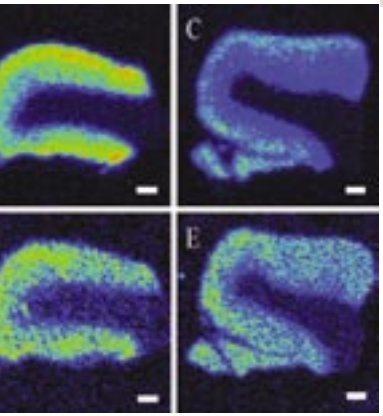
The link between cannabis, psychosis and fatty acids

A NISAD supported team at the University of Wollongong has shown that cannabis use in schizophrenia patients affects blood levels of fatty acids in relation to stress. While promising from the point of view of developing dietary interventions, which may help protect stabilised patients from relapse, further research with larger numbers is needed.

Cannabis and psychosis change brains in the same way

Preliminary results from a collaborative Newcastle and Sydney study using fMRI brain scans indicate similar patterns of reduced brain activation in first episode schizophrenia patients who do not use cannabis and chronic cannabis users who do not have schizophrenia. This suggests the possibility of a shared pathology in these conditions.





NISAD's Beta Imager speeds up research results a thousand fold

With funding raised by the Wollongong City Council and the Illawarra business and general community, NISAD purchased and installed a $200,000 Beta Imager in the University of Wollongong. The only machine of its type in the Southern Hemisphere, the Beta Imager is being used to scan cellular differences in post mortem brain tissue, delivering research results in hours, which used to take months.

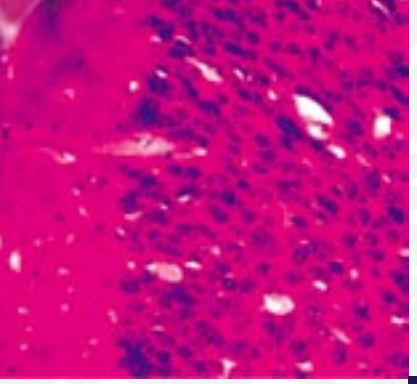
A possible new source of schizophrenia medication

Current anti-psychotics are based on modulating the dopamine system in the brain, and are known to produce side effects. There remains an urgent need to discover additional means of reducing the symptoms of the illness, and to move towards treatments which restore normal brain function, not just suppress symptoms. NISAD's Wollongong research team have used the Beta Imager to discover a significant deficit in muscarinic receptors in the superior temporal gyrus (a brain area strongly implicated in schizophrenia) in brain tissue from people with schizophrenia. Increasing evidence suggests that muscarinic receptor-based medications may provide a valuable additional treatment for the illness.

Pin pointing where the damage is done

Another Beta Imager study at Wollongong showed for the first time that the posterior cingulate cortex area in brain tissue from people with schizophrenia had 40 percent more NMDA neuroreceptors than did healthy brains. As similar differences in the *anterior* cingulate cortex have been directly linked to disorders such as obsessive-compulsive, bipolar, depression, autism, and schizophrenia, the new study has provided further evidence that changes in the two regions of the cingulate cortex are key causes of severe mental illness.

In thanking all supporters of the community effort which achieved the Beta Imager purchase, the Wollongong research centre's director Prof. Xu-Feng Huang said, "The Beta Imager makes our research so much quicker. The enormous time saving allows us to explore and test our ideas more creatively, knowing that we will very quickly find out whether we are on the right track or not."



How animals are helping to fight a uniquely human illness

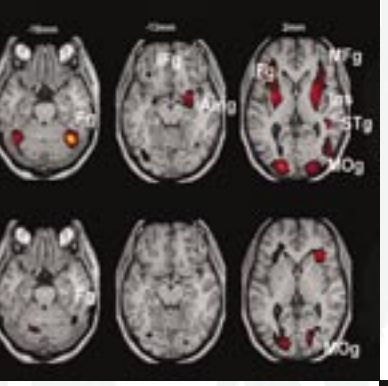
While schizophrenia is a uniquely human disorder, many important features of the illness can be recreated in animal models, enabling experimental studies which could not be conducted using human subjects. Studying changes in a rat's development, behaviour and brain function/structure after altering specific genes, for example, sheds light on the role those genes may play in human development and behaviour. This is possible because the rat and human genomes are 90 percent identical. NISAD's ongoing animal studies research has achieved a number of valuable findings in 2005-06:

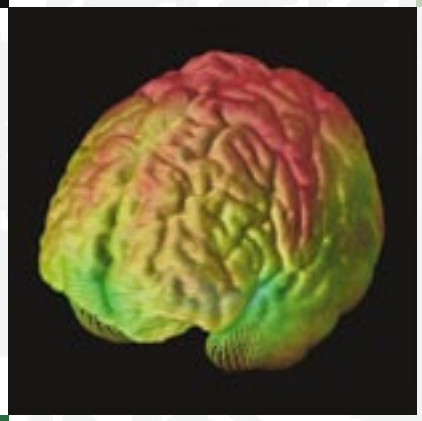
Does schizophrenia start with sensory deprivation?

Epidemiological studies have suggested that schizophrenia is a neurodevelopmental disorder originating in the prenatal or neonatal period. Along with brain structural and functional abnormalities, the illness is characterised by reduced pain sensitivity. Following this 'clue', NISAD scientists at the University of Newcastle tested the hypothesis that the illness may originate with a chronic deficit in the neurons which send sensory information to the brain during its development. Newborn rats were treated to produce significant loss of sensory ('afferent') neurons, and their behaviour and brain structure examined. A range of abnormalities were found in the treated rats' brains, which were remarkably similar to those found in the brains of humans with schizophrenia. This suggests a promising new model for the cause of schizophrenia.

What causes the side effects of antipsychotic medications?

Long-term therapy with antipsychotic medications is generally successful in treating schizophrenia symptoms, but can produce undesirable side-effects such as abnormal movements, and obesity, which can lead to diabetes. NISAD researchers at the Garvan Institute and the University of Sydney conducted a collaborative three-stage study which demonstrated behavioural, metabolic and protein changes in a group of anti-psychotic treated rats. Results found that medication had caused changes in expression of brain proteins which triggered cellular metabolic dysfunction and oxidative stress, which may be linked to the abnormal movements observed in the behavioural studies. Insulin and glucose tolerance abnormalities linked to diabetes were also found. Along with these results, this study provided a valuable animal model of antipsychotic drugs in action for use in further research.





Looking inside the brain with new neuroimaging technologies

Over the last few decades, innovations in technology such as functional magnetic resonance imaging (fMRI) have opened up new horizons for schizophrenia research, and it is largely due to these new technologies that we now know schizophrenia to be a brain disorder which alters not only how the mind functions but also the anatomy of the brain itself. NISAD scientists have used these neuroimaging techniques to good effect in 2005–06:

The NISAD Virtual Brain Bank

In 2002, NISAD introduced into Australia the new 'brain atlasing' imaging technique from the Laboratory of Neuro-Imaging (LONI) at the University of California Los Angeles. After adapting the LONI software, NISAD began to assemble a collection of schizophrenia-related brain scans. The NISAD Virtual Brain Bank is now a growing database of three-dimensional digital images of brains, currently including over 200 scans. In 2005, the Australian Research Council awarded funding to help this initiative expand into the world's biggest online facility of its kind.

Investigating the origins of emotional misidentification

For family members, one of the most upsetting characteristics of schizophrenia is how it sometimes changes a normally responsive and empathetic person into a detached stranger, incapable of accurately recognising the emotional expressions of others. NISAD scientists at the University of Newcastle combined fMRI brain scanning and ERPs (measurement of the brain's electrical activity) to investigate how the brain's processing of emotion is affected in schizophrenia. A facial emotion recognition task measured by these techniques showed that the facial emotion perception by schizophrenia patients was already disrupted before their brains' emotion-recognition circuitry was activated. This suggests that patients may benefit from remediation strategies that target the earliest stages of visual perception.

The missing grey matter

Many studies have confirmed that schizophrenia causes reductions in the brain's grey matter in chronic patients. A NISAD-supported study at the Brain Dynamics Centre, Westmead Hospital, set out to discover which brain areas were most affected by using MRI to scan the brains of first-episode schizophrenia patients. Results confirmed that an overall grey matter loss was already present in first-episode patients, with regions of maximal deficit in the parietal and frontal lobes.

Devising new training methods to counter the disabilities of schizophrenia

Misinterpreting or not recognising the emotions and facial expressions of others is one of the most socially debilitating symptoms of schizophrenia. Even patients who are managing their symptoms well with the help of regular medication sometimes have trouble with interpersonal relations, because of an inability to 'read' subtle facial signals. Recent studies have indicated that this inability is linked to an abnormally restricted visual scanning of faces - an involuntary characteristic of the illness.

Scan path training for a better life

A pilot study by a NISAD-supported team at the Macquarie Centre for Cognitive Science used the Micro Expression Training Tool (METT) to see if schizophrenia patients could improve their facial expression recognition skills. Participants were shown a series of face images, each expressing a particular emotion, while their visual scan paths were recorded with an EYELINK gaze-monitoring system. Results demonstrated a significant improvement in expression recognition after patients had learned to look at the faces in a less restricted fashion. The Macquarie team is now developing a much larger study to identify cognitive and clinical predictors of successful remediation. The outcome has the potential to deliver a new remedial treatment program of enormous value to schizophrenia sufferers.

Psychosis, cannabis and eye movement

NISAD scientists at the University of Newcastle began a study examining face scanning/processing abnormalities in schizophrenia patients, applying similar techniques to those used by the Macquarie team. However, this study includes a group of patients who are long-term cannabis users. By comparing the scanpaths and facial expression recognition performances of cannabis users and non-users, the research team hopes to shed light on the drug's cognitive effects, and on the deficits in interpersonal behaviour associated with such drug use and schizophrenia.

Government, Corporate, Community and Private investment in NISAD

Whilst schizophrenia remains an often misunderstood illness, increasing numbers of individuals and organisations are joining forces to help realise NISAD's vision. We gratefully acknowledge the support of NSW Health, and the commitment of our partners, sponsors and supporters who mobilised their talents, influence and good will to back NISAD's research in 2005–06.

EVENTS

NISAD's three annual events offer our supporters the opportunity to demonstrate their commitment to schizophrenia research by attending inspiring and entertaining social occasions. 2005–06 established a new benchmark for the numbers of high profile people who chose to attend. Some are featured on these pages, and all are acknowledged on page 23.

■ **'Spark of Genius' – *now a landmark gala event on the Sydney calendar***

In March 2006, 42 of Australia's most inspiring personalities volunteered to host tables at the 'Spark of Genius' event held in Sydney Town Hall. More than 600 guests attended the glittering evening to "celebrate the human mind" in the most entertaining way possible, and more than $250,000 was raised for NISAD's research programs. (*'Spark of Genius 2007' will be held on 18 May)*

■ **'Cocktails & Consciousness' – *the NISAD Society members' annual event***

Over 150 NISAD Society members and their guests gathered in the Galleria of the Garvan Institute in October 2005 to enjoy an evening of entertainment, including the light-hearted debate, "Your brain: it makes you think, doesn't it?" by a panel of invited speakers.

■ **'Business Leaders Lunch' – *to thank NISAD's Partners and Sponsors***

In August NISAD Board Member and CEO of AMP Andrew Mohl once again hosted our annual lunch in the AMP Board Room. A large gathering of corporate and community partners heard from the Hon. John Hatzistergos MLC in his first public engagement as NSW Minister for Health. The occasion also served to launch NISAD's new DVD, 'Protecting Future Generations From Schizophrenia'.

PUBLIC AWARENESS

■ The 'HeadLines' publication

Three editions of 'HeadLines' were published in the year 2005-2006, and the publication can now claim a readership of 15,000. By providing plain-language reports of research results and regular updates on fund-raising initiatives and opportunities, 'HeadLines' plays a valuable role in maintaining and increasing public support for schizophrenia research.

■ Early Intervention Poster

In 2005, NISAD launched Australia's first public education poster displaying medical information to alert families to early symptoms of schizophrenia. Launched by NISAD Patron, Her Excellency Professor Marie Bashir AC, the poster has been distributed nationwide with the help of State branches of the Mental Illness Fellowship of Australia.

■ Schizophrenia Awareness Banners

With the help of our long-time supporters the Construction Forestry Mining Energy Union, and many construction companies, large scale NISAD banners were displayed on Sydney construction sites throughout 2005. In Schizophrenia Awareness Week '05, and during the month of 'Spark of Genius '06', NISAD street banners were displayed throughout the Sydney CBD.

INVESTMENT

■ Corporate Partnerships

While support for NISAD continues to grow via new partnerships with prestigious organisations, the Institute's need for long-term corporate partnerships remains vital. NISAD's mission, with its focus on youth, and pioneering agenda, offers unique synergies with the most forward-thinking corporate objectives. For our current partners, see page 23.

■ Workplace Giving

Facilitated by Australian Charities Fund, NISAD's three workplace giving programs enable thousands of employees to donate from pre-tax pay with automatic deductions. Such programs offer opportunites for everyone to contribute to the research which will protect future generations from developing schizophrenia. *Please nominate NISAD for your organisation's workplace giving program.*

■ Private Investment

NISAD owes much to the committed individuals who invest in our research, including those who give to our two Annual Appeals, and the individual sponsors of scholarships.

For further information on any of these activities, please contact:
Lee Drury - Manager Corporate and Community Partnerships
(02) 9295 8407 or l.drury@nisad.org.au

Scientific Panels and Members

NISAD Research Council

Professor Vaughan Carr
Scientific Director (Chair)

Dr Martin Cohen
Convenor, Psychopharmacology and Therapeutics Research Panel

Mr Daren Draganic
NISAD Research Manager

Professor Clive Harper
Co-Convenor, Schizophrenia Research Infrastructure Panel

Professor Graham Johnston
Co-Convenor, Neurobiology Research Panel

Dr Carmel Loughland
Co-Convenor, Schizophrenia Research Infrastructure Panel; NISAD Scientific Employee Representative

Professor Pat Michie
Board Representative

Associate Professor Ulrich Schall
Convenor, Cognitive Neuroscience Research Panel

Professor Peter Schofield
Co-Convenor, Neurobiology Research Panel

Cognitive Neuroscience Research Panel

Dr Jo Badcock
University of Western Australia

Dr Michael Breakspear
Prince of Wales Medical Research Institute

Dr Bill Budd
University of Newcastle

Dr Linda Campbell
University of Newcastle (from February 2006)

Professor Vaughan Carr
NISAD Scientific Director

Dr Martin Cohen
University of Newcastle

Professor Max Coltheart
Macquarie University

Mr Gavin Cooper
NISAD System Administrator

Dr Pritha Das
NISAD Senior Research Officer

Mr Daren Draganic
NISAD Research Manager

Dr Allison Fox
University of Western Australia

Dr Ross Fulham
University of Newcastle

Dr Melissa Green
Macquarie University

Dr Anthony Harris
Westmead Hospital

Dr Pat Johnston
University of Newcastle

Dr Frini Karayanidis
University of Newcastle

Dr Marion Kellenbach
NISAD Research Coordinator (until February 2006)

Dr Robyn Langdon
Macquarie University

Dr Carmel Loughland
NISAD Senior Research Fellow

Dr Gin Malhi
Prince of Wales Medical Research Institute

Mr Damien Mannion
NISAD Research Assistant (from April 2006)

Ms Kathryn McCabe
NISAD Research Assistant

Professor Pat Michie
University of Newcastle

Mr Paul Rasser
NISAD Senior Research Officer

Dr Tamara Russell
Macquarie University

Associate Professor Ulrich Schall
University of Newcastle (Convenor)

Dr Nadia Solowij
University of Wollongong

Dr Tirupati Srinivasan
University of Newcastle

Assistant Professor Paul Thompson
University of California Los Angeles

Dr Juanita Todd
University of Newcastle

Mr Thomas Whitford
Westmead Hospital

Associate Professor Lea Williams
Westmead Hospital

Neurobiology Research Panel

Dr Jonathon Arnold
University of Sydney

Dr Murray Cairns
NISAD Senior Research Officer

Professor Vaughan Carr
NISAD Scientific Director

Associate Professor Loris Chahl
University of Newcastle

Dr Albert Chetcuti
NISAD Research Officer

Dr Mary Collins
University of Sydney

Dr Irina Dedova
NISAD Senior Research Officer

Dr Chao Deng
University of Wollongong

Mr Daren Draganic
NISAD Research Manager

Ms Liesl Duffy
NISAD Research Assistant

Professor Clive Harper
University of Sydney

Dr Jasmine Henderson
University of Sydney

Associate Professor Herbert Herzog
The Garvan Institute of Medical Research (from February 2006)

Dr Tina Hinton
University of Sydney

Professor Xu-Feng Huang
University of Wollongong

Professor Graham Johnston
University of Sydney (Co-Convenor)

Dr Tim Karl
NISAD Research Officer

Dr Marion Kellenbach
NISAD Research Coordinator (until February 2006)

Associate Professor Izuru Matsumoto
University of Sydney

Professor David Pow
University of Newcastle

Professor Peter Schofield
Prince of Wales Medical Research Institute (Co-Convenor)

Professor Rodney Scott
Hunter Area Pathology Service

Dr Sinthuja Sivagnanasundaram
NISAD Senior Research Officer

Dr Yean Yeow Tan
NISAD Research Officer

Dr Paul Tooney
University of Newcastle

Dr Bryce Vissel
The Garvan Institute of Medical Research

Dr Katerina Zavitsanou
Australia Nuclear Science and Technology Organisation

Psychopharmacology and Therapeutics Research Panel

Associate Professor Amanda Baker
University of Newcastle

Professor Vaughan Carr
NISAD Scientific Director

Dr Martin Cohen
University of Newcastle (Convenor)

Mr Daren Draganic
NISAD Research Manager

Ms Jo Gorrell
NISAD Research Officer (until June 2006)

Dr Melissa Green
Macquarie University

Dr Anthony Harris
Westmead Hospital

Dr Marion Kellenbach
NISAD Research Coordinator (until February 2006)

Dr Carmel Loughland
NISAD Senior Research Fellow

Ms Kathryn McCabe
NISAD Research Assistant

Ms Bev Moss
NISAD Research Officer (until June 2006)

Dr Louise Nash
Royal North Shore Hospital (until June 2006)

Dr Tamara Russell
Macquarie University

Dr Nadia Solowij
University of Wollongong

Dr Helen Stain
Centre for Rural and Remote Mental Health

Schizophrenia Research Infrastructure Panel

Ms Lisa Azizi
NISAD Clinical Assessment Officer

Ms Margaret Boyes
NISAD Research Officer (until December 2005)

Dr Bill Budd
University of Newcastle (until November 2005)

Professor Vaughan Carr
NISAD Scientific Director

Dr Irina Dedova
NISAD TRC Coordinator

Mr Daren Draganic
NISAD Research Manager

Associate Professor Jo Duflou
Department of Forensic Medicine

Ms Therese Garrick
University of Sydney

Ms Alisa Green
University of Sydney (until June 2006)

Professor Clive Harper
University of Sydney (Co-Convenor)

Dr Anthony Harris
Westmead Hospital

Dr Marion Kellenbach
NISAD Research Coordinator (until February 2005)

Ms Gali Lawrence
NISAD Clinical Assessment Officer

Mr Terry Lewin
University of Newcastle

Ms Yen Lim
NISAD Tissue Donor Program Coordinator (from July 2005)

Dr Carmel Loughland
NISAD Senior Research Fellow (Co-Convenor)

Associate Professor Izuru Matsumoto
University of Sydney

Ms Amanda North
NISAD Research Assistant (until November 2005)

Dr Sarah Russell
NISAD Clinical Assessment Officer (until November 2005)

Professor Rodney Scott
Hunter Area Pathology Service

Ms Donna Sheedy
University of Sydney

Dr Latha Srinivasan
NISAD Senior Research Officer (from June 2006)

Ms Nina Sundqvist
NISAD Research Assistant (from February 2006)

Dr Paul Tooney
University of Newcastle

Ms Rebecca Wilson
NISAD Clinical Assessment Officer (from January 2006)

Publications

The following publications were supported by NISAD via direct funding and/or infrastructure support.

Andresen R, Caputi P, Oades L. The Stages of Recovery Instrument: Development of a measure of recovery from serious mental illness. *Australian and New Zealand Journal of Psychiatry* (in press).

Aubrey K, Vandenberg R, Clements J. Dynamics of forward and reverse transport by the glial glycine transporter, GLYT1b. *Biophysical Journal* 2005; 89: 1657-1668.

Azizi L, Garrick T, Harper C. Brain donation for research: strong support in Australia. *Journal of Clinical Neuroscience* 2006; 13: 449-452.

Badcock J, Maybery M. Common or distinct deficits for auditory and visual hallucinations? (commentary). *Behavioural and Brain Sciences* 2005; 28: 757-758.

Baker A, Bucci S, Lewin T, Kay-Lambkin F, Constable P, Carr V. Cognitive-behavioural therapy for substance use disorders among people with psychotic disorders: randomised controlled trial. *British Journal of Psychiatry* 2006; 188: 439-448.

Baker A, Richmond R, Haile M, Lewin T, Carr V, Taylor R, Constable P, Jansons S, Wilhelm K, Moeller-Saxone. Characteristics of smokers with a psychotic illness and implications for smoking interventions. *Psychiatry Research* (in press).

Baker A, Richmond R, Haile M, Lewin T, Carr V, Taylor R, Jansons S, Wilhelm K. Randomised controlled trial of a smoking cessation intervention among people with a psychotic disorder. *American Journal of Psychiatry* (in press).

Blair I, Chetcuti A, Badenhop R, Scimone A, Moses M, Adams L, Craddock N, Green E, Kirov G, Owen M, Kwok J, Donald JK, Mitchell P, Schofield P. Positional cloning, association analysis, and expression studies provide convergent evidence that the cadherin gene FAT contains a bipolar disorder susceptibility allele. *Molecular Psychiatry* 2006; 11: 372-383.

Boey D, Lin S, Karl T, Baldock P, Lee N, Enriquez R, Couzens M, Slack K, Dallmann R, Sainsbury A, Herzog H. Peptide YY ablation in mice leads to the development of hyperinsulinaemia and obesity. *Diabetologia* 2006; 49: 1360-1370.

Bowden N, Weidenhofer J, Scott R, Schall U, Todd J, Michie P, Tooney P. Preliminary investigation of gene expression profiles in peripheral blood lymphocytes in schizophrenia. *Schizophrenia Research* 2006; 82: 175-183.

Breakspear M, Bullmore E, Aquino K, Das P, Williams L. The multiscale character of evoked cortical activity. *Neuroimage* 2006; 30: 1230-1242.

Carr V, Lewin T, Neil A. What is the value of treating schizophrenia? *Australian and New Zealand Journal of Psychiatry* (in press).

Chetcuti A, Adams L, Mitchell P, Schofield P. Altered gene expression in mice treated with the mood stabilizer sodium valproate. *International Journal of Neuropsychopharmacology* 2006; 9: 267-276.

Clark D, Dedova I, Cordwell S, Matsumoto I. A proteome analysis of the anterior cingulate cortex grey matter in schizophrenia. *Molecular Psychiatry* 2006; 11: 459-470.

Clunas N, Ward P. Auditory recovery cycle dysfunction in schizophrenia: a study using event related potentials. *Psychiatry Research* 2005; 136: 17-25.

Dallmann R, Steinlechner S, Hörsten S, Karl T. Stress-induced hyperthermia in the rat: comparison of classical and novel recording methods. *Laboratory Animals* 2006; 40: 186-193.

Deng C, Huang XF. Decreased density of muscarinic receptors in the superior temporal gyrus in schizophrenia. *Journal of Neuroscience Research* 2005; 81: 883-890.

Deng C, Huang XF. Increased density of GABA-A receptors in the superior temporal gyrus in schizophrenia..*Experimental Brain Research* 2006; 168: 587-590.

du Bois T, Deng C, Bell W, Huang XF. Fatty acids differentially affect serotonin receptor and transporter binding in the rat brain. *Neuroscience* 2006; 139: 1397-1403.

du Bois T, Deng C, Huang XF. Membrane phospholipid composition, alterations in neurotransmitter systems and schizophrenia. *Progress in Neuropsychopharmacology and Biological Psychiatry* 2005; 29: 878-888.

Felmingham K, Kemp A, Williams L, Das P, Hughes G, Peduto A, Bryant R. Rostral anterior cingulate activity increases with improvement of post-traumatic stress disorder following exposure-based treatment. *Psychological Science* (in press).

Garrick T, Howell S, Terwee P, Redenbach J, Blake H, Harper C. Brain donation for research - who donates and why? *Journal of Clinical Neuroscience* 2006; 13: 524-528.

Garrick T, North A, Glaw X, Harper C. The diagnosis is critical for psychiatric brain banks: an inter-rater reliability study (letter). *Australian and New Zealand Journal of Psychiatry* 2006; 40: 606-607.

Huang XF, Deng C, Zavitsanou K. Neuropeptide Y mRNA expression levels following chronic olanzapine, clozapine and haloperidol administration in rats. *Neuropeptides* 2006; 40: 213-219.

Huang XF, Han M, Huang X, Zavitsanou K, Deng C. Olanzapine differentially affects 5-HT2A and 5-HT2C receptor mRNA expression in the rat brain. *Behavioural Brain Research* (in press).

Ide M, Ohnishi T, Murayama M, Matsumoto I, Yamada K, Iwayama Y, Dedova I, Toyota T, Asada T, Takashima A, Yoshikawa T. Failure to support a genetic contribution of AKT1 polymorphisms and altered AKT signaling in schizophrenia. *Journal of Neurochemistry* (in press).

Iwazaki T, McGregor I, Matsumoto I. Protein expression profile in the striatum of acute methamphetamine-treated rats. *Brain Research* 2006; 1097: 19-25.

Johnston P, Devir H, Karayanidis F. Facial emotion processing in schizophrenia: no evidence for a negative emotion specific deficit using a differential deficit design. *Psychiatry Research* 2006; 143: 51-61.

Johnston P, Stojanov W, Devir H, Schall U. Functional MRI of facial emotion recognition deficits in schizophrenia and their electrophysiological correlates. *European Journal of Neuroscience* 2005; 22: 1221-1232.

Karayanidis F, Nicholson R, Meem L, Michie P, Schall U. Switching between univalent task-sets in schizophrenia: ERP evidence of an anticipatory task-set reconfiguration deficit. *Clinical Neurophysiology* (in press).

Karl T, Burne T, Herzog H. Effect of Y1 receptor deficiency on motor activity, exploration, and anxiety. *Behavioural Brain Research* 2006; 167: 87-93.

Karl T, Duffy L, O'Brien E, Matsumoto I, Dedova I. Behavioural effects of chronic haloperidol and risperidone treatment in rats. *Behavioural Brain Research* (in press).

Karl T, Herzog H. Behavioural profiling of NPY in aggression and neuropsychiatric diseases. *Peptides* (in press).

Lagopoulos J, Gordon E, Ward P. Differential BOLD responses to auditory target stimuli associated with a skin conductance response. *Acta Neuropsychiatrica* 2006; 18: 105-114.

Lagopoulos J, Malhi G, Shnier R. A fibre-optic system for recording skin conductance in the MRI scanner. *Behaviour Research Methods* 2005; 37: 657-664.

Langdon R, Coltheart M, Ward P. Empathetic perspective-taking is impaired in schizophrenia: evidence from a study of emotion attribution and theory of mind. *Cognitive Neuropsychiatry* 2006; 11: 133-155.

Langdon R, Corner T, McLaren J, Coltheart M, Ward P. Attentional orienting triggered by gaze in schizophrenia. *Neuropsychologia* 2006; 44: 417-429.

Langdon R, Corner T, McLaren J, Ward P, Coltheart M. Externalizing and personalizing biases in persecutory delusions: the relationship with insights and theory of mind. *Behaviour Research and Therapy* 2006; 44: 699-713.

Lin E, Lee N, Slack K, Karl T, Duffy L, O'Brien E, Matsumoto I, Dedova I, Herzog H, Sainsbury A. Distinct endocrine effects of chronic haloperidol or risperidone administration in rats. *Neuropharmacology* (in press).

Loughland C, Lewin T, Carr V, Sheedy J, Harris A. RBANS neuropsychological profiles within schizophrenia samples recruited from non-clinical settings. *Schizophrenia Research* (in press).

Loughland C. Depressed and Anxious: The Dialectical Behaviour Therapy workbook for Overcoming depression and anxiety (book review). *Drug and Alcohol Review* 2005; 24: 572-573.

Malhi G, Lagopoulos J, Owen A, Ivanovski B, Shnier R, Sachdev P. Reduced activation to implicit affect induction in euthymic bipolar patients: an fMRI study. *Journal of Affective Disorders* (in press).

McKay R, Langdon R, Coltheart M. Need for closure, jumping to conclusions, and decisiveness in delusion-prone individuals. *Journal of Nervous & Mental Disease* 2006; 194: 422-426.

McKay R, Langdon R, Coltheart M. Paranoia, persecutory delusions and attributional biases. *Psychiatry Research* 2005; 136: 233-245.

McKay R, Langdon R, Coltheart M. The defensive function of persecutory delusions: an investigation using the implicit association test. *Cognitive Neuropsychiatry* (in press).

McKay R, Langdon R, Coltheart M. The Persecutory Ideation Questionnaire. *Journal of Nervous and Mental Disease* (in press).

Monterrubio S, Solowij N, Meyer B, Turner N. Fatty acid relationships in former cannabis users with schizophrenia. *Progress in Neuropsychopharmacology and Biological Psychiatry* 2006; 30: 280-285.

Monterrubio S, Solowij N. Chronic stress and adaptation (letter). *American Journal of Psychiatry* 2006; 163: 553.

Newell K, Deng C, Huang XF. Increased cannabinoid receptor density in the posterior cingulate cortex in schizophrenia. *Experimental Brain Research* (in press).

Newell K, Zavitsanou K, Huang XF. Ionotropic glutamate receptor binding in the posterior cingulate cortex in schizophrenia patients. *NeuroReport* 2005; 16: 1363-1367.

Newell K, Zavitsanou K, Jew S, Huang X. Alterations of muscarinic and GABA receptors in the posterior cingulate cortex in schizophrenia. *Progress in Neuropsychopharmacology and Biological Psychiatry* (in press).

Newson P, Lynch-Frame A, Roach R, Bennett S, Carr V, Chahl L. Intrinsic sensory deprivation induced by neonatal capsaicin treatment induces changes in rat brain and behaviour of possible relevance to schizophrenia. *British Journal of Pharmacology* 2005; 146: 408-418.

Nicholson R, Karayanidis F, Bumak E, Poboka D, Michie P. ERPs dissociate the effects of switching task-sets and task-cues. *Brain Research* 2006; 1095: 107-123.

Nicholson R, Karayanidis F, Poboka D, Heathcote A, Michie P. Electrophysiological components associated with anticipatory task-switching processes. *Psychophysiology* 2005; 42: 540-554.

O'Brien E, Dedova I, Duffy L, Karl T, Matsumoto I. Effects of chronic risperidone treatment on the striatal protein profiles in rats. *Brain Research* (in press).

Paulik G, Badcock J, Maybery M. The multifactorial structure of the predisposition to hallucinate and associations with anxiety, depression and stress. *Personality and Individual Differences* (in press).

Rossell S, David A. Are semantic deficits in schizophrenia due to problems with access or storage? *Schizophrenia Research* 2006; 82: 121-134.

Russell T, Chu E, Phillips M. A pilot study to investigate the effectiveness of emotion recognition remediation in schizophrenia using the Micro-Expression Training Tool. *British Journal of Clinical Psychology* (in press).

Russell T, Reynaud E, Herba C, Morris R, Corcoran R. Do you see what I see? Interpretations of intentional movement in schizophrenia. *Schizophrenia Research* 2005; 81: 101-111.

Russell T, Reynaud E, Pietura K, Benson P, Zelaya F, Giampietro V, Brammer M, David A, Phillips M. Neural responses to dynamic expressions of fear in schizophrenia. *Neuropsychologia* (in press).

Russell T, Tchanturia K, Rahman, Q, Schmidt U. Sex differences in Theory of Mind: a male advantage on Happe's 'Cartoon' task. *Cognition and Emotion* (in press).

Sainsbury A, Bergen H, Boey D, Bamming D, Cooney G, Lin S, Couzens M, Stroth N, Lee N, Lindner D, Singewald N, Karl T, Duffy L, Enriquez R, Slack K, Sperk G, Herzog H. Y2 / Y4 receptor double knockout protects against obesity due to a high-fat diet or Y1 receptor deficiency in mice. *Diabetes* 2006; 55: 19-26.

Schleimer S, Johnston G, Henderson J. Novel oral drug administration in an animal model of neuroleptic therapy. *Journal of Neuroscience Methods* 2005: 146: 159–164.

Senior C, Russell T, Gazzaniga M (eds). Methods in Mind. *MIT Press* 2006.

Silverstein S, Uhlhass P, Essex B, Halpin S, Schall U, Carr V. Perceptual organization deficits in first episode schizophrenia and ultra-high risk states. *Schizophrenia Research* 2006; 83: 41-52.

Solowij N, Monterrubio S. Cognitive and neuropsychiatric consequences of endocannabinoid signaling dysfunction (letter). *Neuropsychopharmacology* 2006; 31: 471-472.

Solowij N. EMCDDA Insights 6: An overview of cannabis potency in Europe (book review). *Drug and Alcohol Review* 2005; 24: 291-293.

Startup M, Startup S. On two kinds of delusion of reference. *Psychiatry Research* 2005; 137; 87-92.

Teubner M, Nixon J, Rasser P, Bottema M, Clark R. Source localisation in a real human head. *Brain Topography* 2005; 17: 197-205.

Tooney P, Anderson W, Lynch-Frame A, Chahl L. The effects of haloperidol treatment on the distribution of NK1 receptor immunoreactive neurons in the guinea pig brain. *Neuroscience Letters* 2005; 383: 155-159.

Weidenhofer J, Bowden N, Scott R, Tooney P. Altered gene expression in the amygdala in schizophrenia: Up-regulation of genes located in the cytomatrix active zone. *Molecular and Cellular Neuroscience* 2006; 31: 243-250.

Weidenhofer J, Yip J, Zavitsanou K, Huang XF, Chahl L, Tooney P. Immunohistochemical localisation of the NK1 receptor in the human amygdala: preliminary investigation in schizophrenia. *Progress in Neuropsychopharmacology and Biological Psychiatry* (in press).

Wheeler D, Dixon G, Harper C. No differences in calcium-binding protein immunoreactivity in the posterior cingulate and visual cortex: schizophrenia and normal controls. *Progress in Neuropsychopharmacology and Biological Psychiatry* 2006; 30: 630-639.

Whitford T, Farrow T, Gomes L, Brennan J, Harris A, Williams L. Grey matter deficits and symptom profile in first-episode schizophrenia. *Psychiatry Research: Neuroimaging* 2005; 139: 229-238.

Whitford T, Grieve S, Farrow T, Gomes L, Brennan J, Harris A, Gordon E, Williams L. Progressive grey matter atrophy over the first 2–3 years of illness in first-episode schizophrenia: A tensor-based morphometry study. *Neuroimage* (in press).

Williams L, Das P, Liddell B, Kemp A, Rennie C, Gordon E. Mode of functional connectivity in amygdala pathways dissociates level of awareness for innate signals of fear. *Journal of Neuroscience* (in press).

Research Grants

NISAD Grants

The following grants were awarded to NISAD scientists and administered by NISAD.

Carr V, Scott R, Tooney P, Loughland C, Draganic D. Schizophrenia DNA Bank. Australian Rotary Health Research Fund Project Grant, 2006 ($59,750).

Carr V, Schall U, Scott R, Jablensky A, Mowry B, Michie P, Catts S, Henskens F. The Australian Schizophrenia Research Bank (ASRB). NHMRC Enabling Grant, 2006-2010 ($1,750,000).

Carr V, Willcox D. NISAD Chair of Schizophrenia Research. Thyne Reid Charitable Trusts, 2005-2007.

Karl T. Conditional NPY Y1 receptor deficient mice – a potential new animal model for schizophrenia? NARSAD Young Investigator Award, 2006-2008 ($81,000).

Matsumoto I, Draganic D, Sivagnanasundaram S, Dedova I, Carr V. ElectrophoretIQ3TM Electrophoresis Platform for Schizophrenia Research. Cecilia Kilkeary Foundation, 2005 ($9,000).

Willcox D, Draganic D. NISAD Neurobiology Program. The Henderson Foundation, 2006-2007 ($20,000).

NISAD-Supported Grants

The following grants were awarded to NISAD researchers and administered by their host institutions. NISAD infrastructure support played a key role in the award of this funding.

Arnold J. An animal model of genetic vulnerability to cannabis-induced psychosis. Clive and Vera Ramaciotti Establishment Grant, 2006 ($29,000).

Chahl L, Zavitsanou K. Receptor changes in brain tissue of rats treated as neonates with capsaicin – testing a putative new animal model of schizophrenia. Australian Institute of Nuclear Science and Engineering Grant, 2006-2007 ($18,540).

Chetcuti A, Schofield P. Analysis of gene expression in a mouse model of schizophrenia. The Rebecca Cooper Foundation, 2006 ($9,368).

Deng C. The effect of antipsychotic drugs on the density of neuropeptide Y receptors in the brain stem of rats. University of Wollongong Health & Behavioural Science Small Grant, 2006 ($5,000).

Deng C. Schizophrenia and muscarinic receptor gene expression in the superior temporal gyrus. University of Wollongong URC Small Grant, 2005 ($18,954).

Deng C, Zavitsanou K, Huang XF, Katsifis A, Nguyen V. Phencyclidine induced apoptosis in the brain: implications for schizophrenia. Australian Nuclear Science and Technology Organisation AINSIE Grant, 2005-2006 ($21,160).

Deng C. Noldus ethovision video tracking software for automation of behavioural experiments. Clive and Vera Ramaciotti Foundation Equipment Grant, 2005 ($25,000).

Green M. Remediation of facial emotion perception in psychotic disorders. NARSAD Young Investigator Award, 2006-2007 ($41,000).

Henskens F, Johnston P, Rasser P, Ward P, Schall U, Thompson P, Michie P, Carr V. Development of a software grid for data sharing associated with the NISAD Virtual Brain Bank. ARC E Research Special Initiatives Grant, 2005-2006, ($95,254).

Huang XF. NMDA receptor hypofunction during perinatal brain development: implications for schizophrenia. University of Wollongong Health & Behavioural Science Seeding Grant, 2006 ($5,000).

Karayanidis F, Michie P. The spatial and temporal dynamics of motor and cognitive inhibition in schizophrenia: An fMRI and ERP study. Hunter Medical Research Institute Grant, 2006 ($12,600).

Karl T. NPY Y1 and Y2 receptor mediated aggression. DFG Postdoctoral Fellowship, 2006 ($50,000).

Karl T. Effects of NPY and its Y1 receptor on stress-induced motor activity and anxiety. DFG Travel Grant, 2006 ($4,000).

Kelly B, Stain H, Carr V, Beard J, Fragar L, Lewin T. Mental health and wellbeing in rural and remote NSW. NHMRC Project Grant, 2006-2008 ($717,750).

Startup M, Carr V, Baker A, Schall U, Stain H. The effectiveness of cognitive behaviour therapy for young people at risk of serious mental disorders. NHMRC Project Grant, 2006-2008 ($606,475).

Solowij N. Effects of comorbid cannabis use and schizophrenia on memory, apathy and executive functioning. University of Wollongong Health & Behavioural Science Small Grant, 2006 ($4,000).

Research Students

DEGREES AWARDED

NISAD supported the following students who were awarded higher degrees.

Doctor of Philosophy

Dr Judith Weidenhofer
University of Newcastle, 2006

Masters (Science / Clinical Psychology)

Ms Adele Sedgman
University of Newcastle, 2006

Honours

Ms Danielle Clark
University of Sydney, 2005

Ms Madeleine Hinwood
University of Newcastle, 2005

Ms Gabrielle McQueen
University of Newcastle, 2005

Ms Wan Yi Ng
University of Sydney, 2005

Ms Elizabeth O'Brien
University of Sydney, 2005

Ms Jen O'Reilly
University of Sydney, 2005

Ms Natalie Potter
University of Wollongong, 2005

Ms Siobahn Quinn
University of Newcastle, 2005

NISAD Summer Student Scholars

Ms Caroline Beattie
Macquarie University

Ms Nicole Caixeiro
University of Sydney

Ms Julijana Eftimovska
University of Wollongong

Ms Ching-Wen Hsu
University of Wollongong

Ms Maryam Nesvaderani
University of Sydney

Ms Thai Vinh Nguyen
University of Newcastle

Mr Mikail Rubinov
Prince of Wales Medical Research Institute

Mr David Van der Weyde
University of Newcastle

Ms Katrina Weston
University of Wollongong

Information on Directors

Vaughan Carr
Executive Director
Scientific Director of NISAD, Professor of Psychiatry, Director Centre for Mental Health Studies, Faculty of Health University of Newcastle, Past President Australasian Society for Psychiatric Research.
Board Member since 2004

Stanley Victor Catts
Non-Executive Director
Founding Chair of NISAD 1995-1999. Professor of Hospital & Community Psychiatry, University of Queensland, and Royal Brisbane and Women's Hospital. Fellow Royal Australian and New Zealand College of Psychiatrists, Member of Scientific Advisory Committee
Board Member since 1995. Chairman 1995 -1999

Matthew Cullen
Non-Executive Director
Co-President of McKesson Asia-Pacific Pty Ltd and Visiting Medical Officer St Vincent's Hospital Sydney. Fellow Royal Australian and New Zealand College of Psychiatrists, Member Australian Institute of Company Directors, and Associate Fellow Australian College of Health Service Executives. Previously Member NSW Mental Health Review Tribunal and Board Member Schizophrenia Fellowship of NSW.
Board Member since 28 April 2004

Peter Dempsey
Chairman, Non-Executive Director
Director, Monadelphous Ltd, advisor to a range of private companies; formerly Chief Executive Officer Baulderstone Hornibrook Group.
Board member since 2001, Chairman 2003 to 2006.

Peter James Maher
Chairman, Non-Executive Director
Group Head of Macquarie Bank Ltd's Financial Services Group. Current Chairman of Macquarie Equities, board member of Macquarie Investment Management Ltd and board member of the Investment & Financial Services Association. General Manager of the Marketing Group, Westpac from April 1997 to October 2000, prior to 2000 General Manager at DB Breweries.
Board member since 2003. Appointed Chairman 2006.

Janet McDonald
Non-Executive Director
Advisory Council of Cancer Australia appointed 2006. Chair National Breast Cancer Board since 2003 - 2006: Member since 1997. Member Drug Utilisation Sub-Committee since 2002, Trustee Powerhouse Museum of Applied Arts and Science 1995-2003, former Member Centenary Institute. Cell Biol, RPAH Central Sydney Area Health Service. Chairman Sydney Breast Cancer Foundation. Royal Hospital for Women Adv. Cl. Royal Hosp for Women Aust. Theatre for Young People. Dep. Chrmn NSW Women's Adv. Cl. Convr NSW Women's Adv. Cl Women's Health Cmtee and Arts Cmtee. Member Central Sydney Area Health Service Board. Benevolent Society NSW. NSW MammographicScreening Adv. Cl. NSW Cervical Cancer Task Force. NSW Ministerial Adv. Cmtee on Women's Health. The Australian Brandenburg Chamber Orch. 'Vienna' Hunter's Hill Trust Bicentennial Project. Trustee National Breast Cancer Foundation. Recipient Centenary Medal 2003.
Board Member since 13 July 2005

Rita Mallia
Non-Executive Director
Senior Legal Officer / Co-ordinator for Construction Forestry Mining Energy Union, formerly Workers Compensation Officer. Director of NSW Dust Disease Board, Member of Construction Industry Reference Group, Director of MEND Rehabilitation Services Pty Ltd.
Board Member since 2003

Patricia Michie
Non-Executive Director
Professor of Psychology, School of Psychology, Faculty of Science and Information Technology, University of Newcastle; Acting Deputy Head of Faculty and Assistant Dean, Research, Faculty of Science and Information Technology, University of Newcastle; Adjunct Professor in the School of Psychiatry & Clinical Neuroscience, University of Western Australia.
Board member since 2000.

Andrew Mohl
Non-Executive Director
Managing Director and Chief Executive Officer, AMP Limited since October 2002. Previous roles in AMP included Managing Director, AMP Financial Services and Managing Director, AMP Asset Management. Worked with ANZ for ten years including Group Chief Economist and Managing Director, ANZ Funds Management. Worked with Reserve Bank of Australia 1978-1986 including Deputy Head of Research. Chairman of the Investment and Financial Services Association 2001 and 2002.
Board member since 2002.

(Cont. overleaf)

Irene Moss

Non-Executive Director

Previously Commissioner, Independent Commission Against Corruption (1999-2004), Ombudsman NSW (1995 - 1999), Magistrate (1994-1995), Federal Race Discrimination Commissioner, Human Rights and Equal Opportunity Commission (1986-1994). Officer in the General Division of the Order of Australia (AO) 1995.

Board member since 27 April 2005

Trish Oakley

Non-Executive Director & Company Secretary

Partner, Meridian Media (strategic communications and issues management). Chief of Staff, Andrew Refshauge's Office, NSW Government (1995-1999), Press Secretary and Political Strategist for Dr Refshauge as Deputy Leader of the Opposition (1990-1995), former Journalist, Australian Broadcasting Corporation.

Board member since 2001.

Christos Pantelis

Non-Executive Director

Foundation Professor of Neuropsychiatry and Scientific Director of the Melbourne Neuropsychiatry Centre at The University of Melbourne and Melbourne Health. Honorary Principal Research Fellow at the Howard Florey Institute and the Centre for Neuroscience Victoria. Awarded the Selwyn-Smith Medical Research Prize from The University of Melbourne. Board Member of the Mental Illness Fellowship of Victoria (since 2004). Member of the Scientific Advisory Council of Neurosciences Victoria (since 2006). Member of Editorial Boards of Australian & New Zealand Journal of Psychiatry, Journal of Cognitive Neuropsychiatry, International Review of Psychiatry, Schizophrenia Research and Early Intervention in Psychiatry.

Board Member since 2004

Alexandra Rivers

Non-Executive Director

Psychologist, former lecturer, (Special Education), Faculty of Education, University of Sydney, Registered Physiologist NSW, Member Guardianship Tribunal, NSW, Guardian ad Litern, Children's Court, NSW, Guardian ad Litern, Administrative Decisions Tribunal NSW, Vice President Schizophrenia Fellowship of NSW, Board Member Mental Health Council of NSW, Board Member, Aboriginal Education Council of NSW, Governing Committee Member Australian Consumers Health Forum, Carer.

Board Member since 2003

Deborah Willcox

Executive Director

Executive Director of NISAD; Director, NSW Health Partnership Project. Formerly a Registered Nurse and Intensive Care Clinical Nurse Specialist. Completed a Diploma in Law with the Legal Practitioners Admission Board. A policy adviser to the New South Wales Minister for Health and subsequently, Chief of Staff to the Deputy Premier, Minister for Planning, Minister for Housing and Minister for Aboriginal Affairs. Most recently, Solicitor (in training) with Abbott Tout Solicitors, Sydney in the area of employment and industrial relations law. Other interests; President Assistance Dogs Australia.

Board Member since 2004

Finance

The abridged consolidated financial position accounts and financial performance for the year ended 30 June 2006 have been prepared from audited financial statements, passed by the Board of Directors, who are responsible for the presentation of those financial statements and the information they contain. For a better understanding of the scope of the audit by KPMG, this report should be read in conjunction with KPMG's report on the unabridged financial statements. This report may be obtained from:

NISAD Schizophrenia Research
384 Victoria Street
Darlinghurst NSW 2010
Ph: (02) 9295 8407

Financial Performance for the year ended 30 June 2006:

Income	**2006**	**2005**
Fundraising	785,524	572,085
External grant income	1,520,803	1,548,282
Sundry income	29,707	36,609
Total	2,336,034	2,156,976
Less Expenses		
Research	1,727,044	1,549,296
Marketing & Fundraising	494,710	449,500
Administration	322,189	263,083
Total	2,543,943	2,261,879
Net Surplus(loss)	(207,909)	(104,903)
Opening retained earnings	971,785	1,076,688
Closing retained earnings	763,876	971,785
Retained earnings	763,876	971,785

Grants, Partnerships, Sponsorships, Supporters

Government

Government Partner

NSW Health

Government Support

National Health and Medical Research Council (NHMRC)

NSW Ministry for Science and Research

Parliamentary Friends of Schizophrenia

Private Foundations and Sponsors

Australian Rotary Health Research Fund

Cecilia Kilkeary Foundation

Henderson Foundation

National Alliance for Research on Schizophrenia and Depression, USA (NARSAD)

M.C. Ainsworth

Pratt Foundation

Peter & Ellie Hunt

Ron & Peggy Bell Foundation

Thyne Reid Charitable Trust

Corporate

Partnerships

Construction Forestry Mining Energy Union (CFMEU)

Macquarie Bank Foundation

Ramsay Health Care

ASX-Reuters Charity Foundation

Paint A Rainbow Foundation

Pro Bono Partnerships

AMP

KPMG

Ernst & Young

Singleton Ogilvy & Mather

Sponsorships

Abigroup

Australand Holdings

Baulderstone Hornibrook

Bradcorp

Chubb

Hungerford Hill Wines

Janssen-Cilag

Leighton Holdings

Lundbeck

Paynter Dixon

St. George Foundation

Workplace Giving Programs

ABN-AMRO

Deutsche Bank

Insurance Australia Group

Wollongong City Council

Corporate Support

Blue Scope Steel

Bovis Lend Lease

Bonacci Group

Bradcorp Holdings

Built Up Interiors

Citilink Construction Group

Coverforce

Dalma Formwork Australia

Deacons Law

Hawker Britton

HD Projects

Jones Condon

Karabiner Access

Martin Place Chambers

Meridian Media

McKesson Asia Pacific

Onsite Construction Group

QBE Australia

Sage Allan

Smorgon Steel Group

Westfield Group

Winston Langley

Community and Private Support

Community Support

ARAFMI

Australian Charities Fund

Charities Aid Foundation (CAF)

Eastern Suburbs Leagues Club

Kurri Kurri Lions Club

Mental Illness Fellowship of Australia

Rotary Club of North Sydney

Our Lady's Nurses of the Poor

Schizophrenia Fellowship of NSW

Shortland Waters Golf Club

Dedications and In Memoriam

Norma Alati

Jason Barnes

Graham Glover

Bruce Goodman

Jacinta Green

Ronald Muir

Private Supporters

Justice Graham Barr

Robert Bellamy

Robert Benkhauser

Tony & Nina Bleasdale

Igor Cikes

(Cont...)

Private Supporters (cont..)

Peter Coleman
Dr Merlin Crossley
Stephen Ellison
Dr Denise Fleming
Thomas Henley
Carlo & Anne Habib
Thomas Jucovic
Anna Katzmann
Steve Lowndes
Con Micos
N & C Minogue
Frances Powell
Joan Prichard
Paul Taylor
L Shaddock
Peter Salt
Bryan & Fiona Shedden
Karen Sykes
Susan Swan
Jill Wran

NISAD Society Members

Steve & Lee Alley
Vicki Austin
Karen Behrens
Darren Berry
Anne Black
Helen Blethyn
Dan Blyde
Kevin Bowering
Tony Bray
Brian Brooker
Don Bulgin
Kriselda Lee Burnett
Carly Burnham
Dr Charles Campbell
Hazel Clarke
Pamela Cochrane
Demian Coorey
Matthew Cullen
Peter Davidson
Ian Davidson
Ann Devine
Nancy Dickman
Lee Drury
Mary Dowler
Michael Doyle
Peter FitzSimons
Gregory & Mary Forster
Graziella Garrett
Jack & Judy Gibson
Tracey Goddard
Valerie Hargreaves
Andrew Harper
Gillian Hill
Yvonne Holbeche
Carolyn Huckel
Rod Hughes
Ellie Hunt
John Iwanicki
Abraham James
Zrinka Johnston
Susan Jones
Stephanie Julienne
Grahame Kelly
Will Lavender
Carmela Lavezzari
Lindsay Leeser
Tibor Lendvai
Jason Lu
Sean Macken
Rita Mallia
Peter & Dolores Marles
Jim McBride
Pauline McGarvey
Courtenay Middleton
Carmel McKeough
Denise Moss
Suzanne Muldoon
Bhadra Munasiri
Nerida Neale
Jane Needham
John Nielsen
Peter Nooteboom
Trish Oakley
Michael O'Carroll
Monica O'Loughlin
Dr . Bruce & Dorothy Peterson
Peter Philpott
Peter & Joan Pinkewich
Warwick Richards
Sadie Robertson
John Robson
Jonathan Rogers
Michael Roper
Paul Ruiz
Henry & Keena Savage
Penny Shore
Damien Stenmark
Trent Sydney
Joshua Ton
Priscilla Veit
Steven Vidal
Muneesh Wadhwa
Joan Wakeford
Keith Warren
Jason West
Dick & Judy Whitehead

John Whitworth
Peter Williams
Margaret Willings
Gillian Wolff
Richard Woodward

NISAD Friends

Ann Dent
D & B Dyer
Amanda Fazio
Alan & Joyce Jackson
Allan Johansson
April Kohlmann
Belinda Lewis
Abelia May
Vickie McFadden
Duncan & Mirrel Ropper
Susan Sheather
Jean Spiers
Janet Sprigge
Gillian Sutherland

■ 'Spark of Genius'

Principal Sponsor

Macquarie Bank Foundation

Major Partners

702 ABC Sydney
City of Sydney
Hungerford Hill
ICMI Speakers and Entertainers
InterContinental Sydney
GE Lighting
Smartcar
St. George Bank
Telstra Friends

Sponsors

AMP Foundation
Aerialize - Sydney Aerial Theatre
Bright Print
Coca-Cola Amatil
Construction Forestry Mining Energy Union
Lindt
Marie Claire
Nudie
Staging Connections
Staging Rentals
Sticky
Sydney Props Specialists
The Real Mexico
The Forum Group

'Sparks of Genius'

John Anderson
Andrew Banks
Bernie Banton AM
Ron Barassi
Jason Benjamin
Linda Burney MP
Rob Carlton
Kerry Chikarovski
Martin Coombes
Andrew Denton
Justice Marcus Einfeld AO QC
Adam Elliot
Professor Allan Fels AO
Peter FitzSimons
Jackie Frank
Pru Goward
Bill Granger
David Helfgott
Tim Jarvis
Gael Jennings
Justice Michael Kirby AC CMG
Euan MacLeod
Nigel Marsh
Reg Mombassa
Clover Moore MP
Steve Mortimer OAM
Allan Moss AO
Tony Mowbray
Dr Jack Mundy AO
George Negus
Richard Neville
Kerry O'Brien
James O'Loghlin
Tim Pethick
Andrew Refshauge
Julia Ross
Adam Spencer
Keith Suter
Margaret Throsby AM
Max Walker
Lisa Wilkinson
Dr Robyn Williams AM

■ 'Cocktails & Consciousness'

Sponsors

Exhibition Hire Service
Hungerford Hill
Sydney Props Specialists

Panel Members

Prof. Vaughan Carr
Kerry Chikarovski
Bruce Hawker
Sally Loane
Dr Maryanne O'Donnell
Andrew O'Keefe
Greg Pickhaver (H.G. Nelson)

Neuroscience Institute of Schizophrenia and Allied Disorders

384 Victoria Street, Darlinghurst, NSW 2010.

Telephone: (02) 9295 8407 Facimile: (02) 9295 8415 Email: nisad@nisad.org.au

Website: www.nisad.org.au