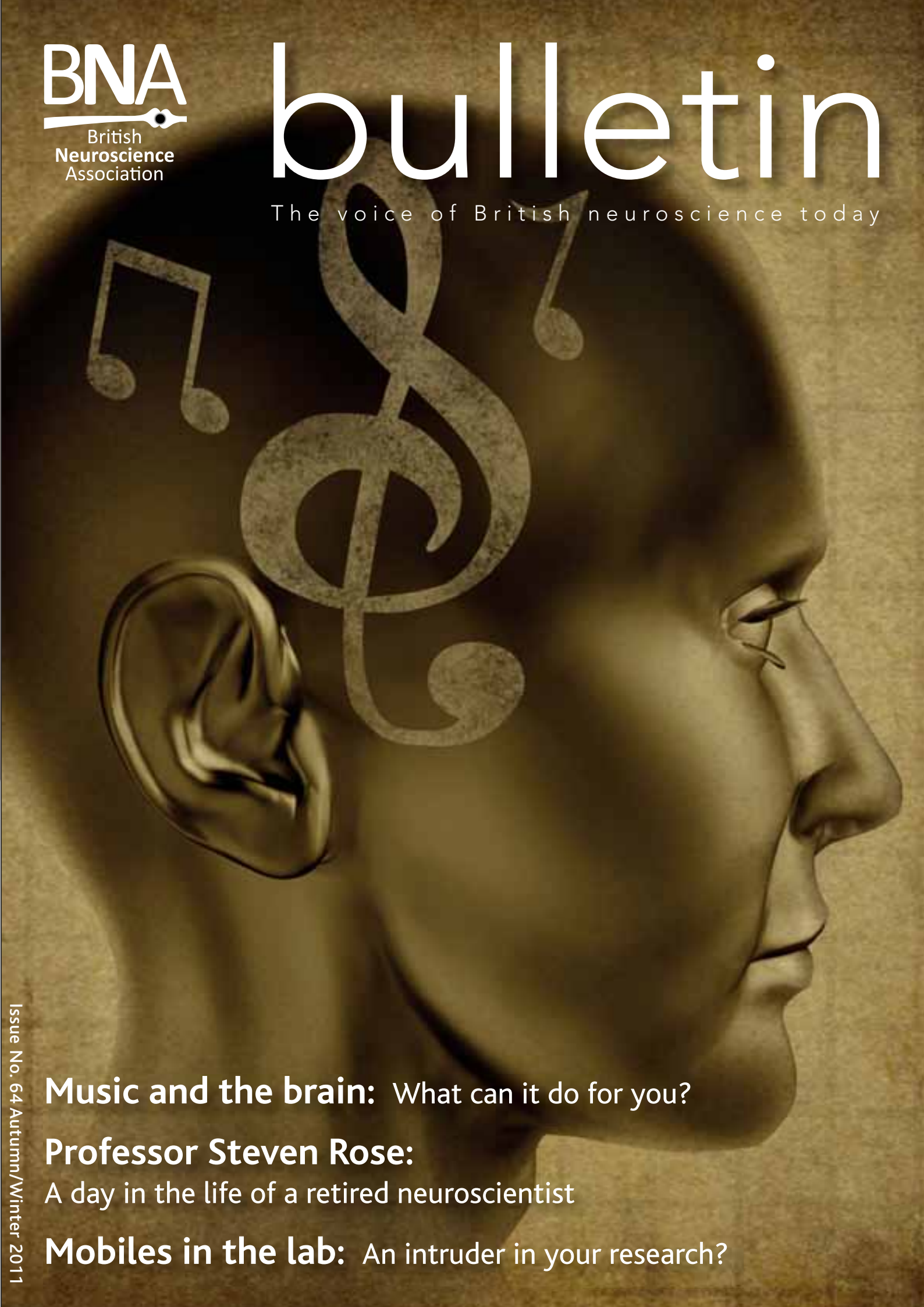
BNA
British Neuroscience Association

bulletin

The voice of British neuroscience today



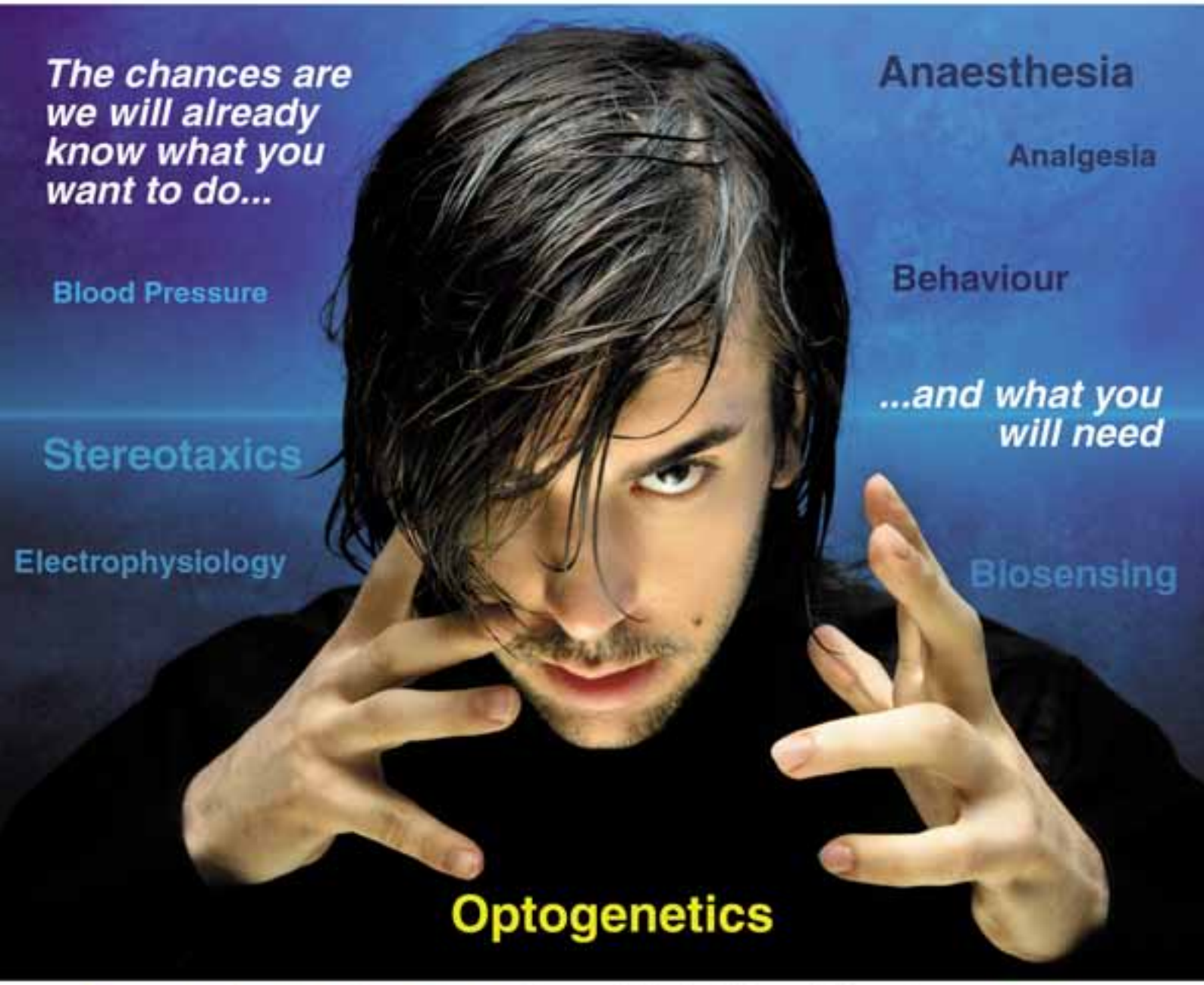
Music and the brain: What can it do for you?

Professor Steven Rose:
A day in the life of a retired neuroscientist

Mobiles in the lab: An intruder in your research?

Issue No. 64 Autumn/Winter 2011

World Precision Instruments



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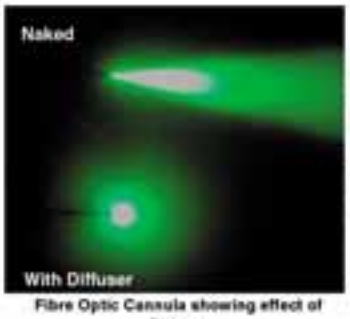

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Welcome

I would like to take this opportunity to introduce myself as the new Editor of the Bulletin but first and foremost I would like to thank Anne Cooke for fulfilling the role for the past three issues as well as being the person who gathered together and organised most of the content within this issue. Without Anne's dedication and continued support this issue may not have come to fruition. I would also like to thank Yvonne Allen for, as always, making a huge effort in putting this issue together at such a busy time.

I cannot help noticing lately a sense of bringing the neuroscience community and the public together especially in engaging the younger generation of neuroscientists to be (p11 and 43). It was certainly fortuitous that the Edinburgh Film, Neuroscience, and Music Festivals all overlapped allowing a sort of cross-over of events and enabling the public to ponder the impact of neuroscience in entertainment (p32-33 and 40). After all who considers what the brain might be up to whilst one is watching a film or listening to their favourite piece of music? (...perhaps some people do! p27-31).

What is particularly great to see are the number of symposia being held around the whole of the UK with help from BNA funding. Meetings have been held up and down the country from one-day local meetings, seminar programmes, public engagement open days, annual conferences and science festivals. Events that could not have taken place without the continued support and effort of all the BNA members that take part.

Kate Haddley

Spring issue: COPY DEADLINE = 30th March 2012

Are you interested in submitting items for the Spring edition?

Are you interested in writing, drawing, doing photography, poetry or anything else for BNA? Email: BNAbulletin@bna.org.uk - to find out how. All enquiries very welcome.

Advertising in the Bulletin: please contact office@bna.org.uk for advertising rates and submission criteria. Printed adverts and insert distribution both available; special rates for various packages.

Events and notices: email office@bna.org.uk

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On the cover: Music brain representing musical artist mind and composer conductor. CREDIT: SKYPIXEL/Dreamstime.com

Acknowledgements: The Bulletin, as always, would not be possible without its many wonderful contributors - see 48.

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BNA NEWS & UPDATES

WELCOME TO NEW COMMITTEE APPOINTMENTS

Anne King: Education and Continuing Professional Development Secretary

Attila Sik: Publications Secretary

Four new appointments have recently been made to the National Committee, and thanks to everyone who voted. Anne King, Reader in Neuroscience at the University of Leeds, rejoins the Committee after a few years' absence and becomes the **Education and Continuing Professional Development Secretary**, succeeding Dr Lucy Annett. Anne has been a long-time supporter of the BNA and her research interests involve CNS mechanisms of pain. She is also the Leeds Local Group Representative.

Professor Attila Sik (University of Birmingham) was elected unopposed to one of three newly created posts on the National Committee. His role is **Publications Secretary**, and as Attila is on the Advisory Board of Brain Structure and Function, and has academic posts in Canada and Chile, as well as studying for an MBA at Warwick Business School, he is well positioned to raise the profile of the BNA internationally.

Felicity Gavins: Early Career Representative

Jenni Harvey: Equal Opportunities Representative

Dr Felicity Gavins joins the Committee as **Early Career Representative** and her task will be to ensure that the voices of neuroscience students of all ages are heard by the rather more mature (in terms of age) members of BNA Council and Committee. Felicity is a Senior Research Lecturer at Imperial College London with interests in cerebral microvasculature and the public understanding of neuroscience research. Her nomination was also unopposed.

Dr Jenni Harvey has been an active member of the BNA for 20 years and is the Local Group Representative for Dundee, where she is a Senior Lecturer in Neuroscience with a research interest in the hormonal regulation of synaptic plasticity. Jenni was elected to the post of **Equal Opportunities Representative** where she will contribute to the creation of forward-looking policies for the BNA and others

MEMBERSHIP MATTERS!

The administration of BNA membership has recently been taken in-house following three years with Portland Customer Services. Work on the BNA website carried out by Arvind Shah at Esscotti Ltd. has created a user-friendly interface where members can check the basic information held on the BNA database. Members can also create a profile (**see http://www.bna.org.uk/profiles**) and plans are in place to create a members directory so that members with similar interests can locate each other and network more efficiently. If you haven't already done so, please login and check your details.

FROM THE SECRETARY Bruno Frenguelli

Dear Colleagues,

Welcome to the latest edition of BNA Bulletin.

As you will see from the picture on the right there have been a few changes at BNA HQ over the past few months, which have been a very busy time for your BNA.

Earlier this year we had the spectacularly successful BNA Biennial Meeting in Harrogate, which attracted more delegates than ever before. The efforts for BNA 2011 were spearheaded by the then BNA President, Prof Trevor Robbins, and ably abetted by Arciris Garay-Arevalo and Hannah Critchlow in the BNA office in Cambridge and to whom we owe a great many thanks for their sterling work. Trevor is now Past President, a position he will occupy for two years, and Arciris and Hannah have recently left the BNA – temporarily we hope – to go on maternity leave and to curate Naked Neuroscience, respectively. We wish them both well.

BNA 2011 was an excellent launch pad for BNA 2013 - The Festival of Neuroscience – which will be the biggest meeting the BNA has hosted, and which will involve a large number of partner Societies including The Physiological Society and The British Pharmacological Society. Scheduled for April 2013, held at The Barbican Centre in London and presided over by BNA President, Professor David Nutt we hope to attract over 2000 delegates, which will cement the position of BNA as the voice of UK neuroscience, and a major player on the EU and International neuroscience scene.

Talking of Presidents, BNA is very pleased to welcome the new BNA President Elect – Professor Russell Foster of Oxford University. Russell is a very well known and distinguished UK neuroscientist whose interests revolve around circadian and visual neuroscience. Russell will officially take over as BNA President at the Festival of Neuroscience and will preside over BNA 2015.

Other changes at BNA include the appointment of Acting Chief Executive, Dr Ian Varndell, a long-time stalwart of the BNA, whose new role is to engage at the highest level with BNA policy and direction, and with partner Learned Societies and funders to promote the interests of British neuroscience. The creation of a BNA Council comprising a core of five senior members of the BNA with four additional co-opted Council members from the BNA National Committee, for which we recently held elections, will allow the BNA to move rapidly to respond to the turbulent funding and research climate we live in. Ian will be assisted by Louise Tratt who joined the BNA as Executive Officer in September 2011.

Another stalwart of the BNA, Professor Colin Ingram, whose visage graced this column for many years, has stepped down as BNA Secretary to concentrate on the burgeoning neuroscience scene in Newcastle, and we wish him every success in that capacity.

The rather disconcerting duty of attempting to fill those shoes has fallen to me, whom I expect many of you will know from my previous role as BNA Local Group Coordinator, which now is filled by Dr Trevor Bushell of Strathclyde University.

In my capacity of BNA Secretary I am looking forward to taking part in all the exciting ventures that BNA has planned, including the Festival of Neuroscience, the expansion of Local Group one day Symposia and Workshops, and working to promote UK neuroscience as widely as possible.

As always, the BNA want to hear from you – the members. We want to hear your opinions as to what we should be doing to promote neuroscience at the local, national and international level. You can channel your opinions through your Local Group Rep, or directly via any Council or Committee member. Your comments and suggestions will be taken seriously and will help shape the future direction, strategy and aspirations of the BNA.

Best wishes,

Bruno Frenguelli
Secretary, British Neuroscience Association
b.g.frenguelli@warwick.ac.uk

NEWS

Events, developments, and other news in the world of neuroscience.

A depressing decline in funding for Mental Health research

Mental health conditions like depression or schizophrenia affect 1 in 4 people in the UK, however the amount of money directed towards exploring the underlying causes and prevention of these conditions is decreasing. Psychiatric disorders have also recently been shuffled away from the top of the priority list for pharmaceutical companies. Professor Wykes, of the Institute of Psychiatry, recently noted that £77bn is spent on treating mental health issues per year in England alone. Professor David Nutt, President of the British Neuroscience Association, noted at a recent press conference on this issue that "these are dark days for brain science". Our search for the 'five a day' equivalent for mental health is critical. Without it '1 in 4' may become '1 in 3' - a worrying trend for future society.

Joanna Brooks (Human Cognitive Neuroscience, University of Edinburgh)

Neuroscientists elected to the Royal Society

The Royal Society is a Fellowship of the world's most eminent scientists and is the oldest scientific academy in continuous existence. Seven eminent neuroscientists have been newly elected as fellows of the Royal Society this year. Congratulations to:

Alun Milward Davis is a distinguished research professor based at the School of Biosciences, Cardiff University. Professor Davis's research focuses on the cellular and molecular aspects of nerve cell development, neurotrophic factor biology and cell signalling. His work has contributed a great deal of understanding to the field of neuronal development and he has made landmark discoveries concerning the function of neurotrophic factors, the mechanisms of axon attraction to specific targets and the relationship of neurotrophic survival factors with apoptotic cell death.

Professor Davis commented:
"I'm absolutely delighted to be elected Fellow of the Royal Society. My election doesn't just reflect the work I've done, it's a recognition of the research carried out by many outstanding PhD students and post-doctoral fellows in my laboratory over the years and research we've done in collaboration with colleagues around the world, so it's a collective recognition of all of our work and is an honour for everybody involved."

Angela Carmen Vincent is a professor of Neuroimmunology at the Weatherall Institute of Molecular Medicine and Nuffield Department of Clinical Neurosciences, University of Oxford. Professor Vincent's research has made a huge impact in her field focusing on the novel pathogenic mechanisms of autoantibodies to ion channels and other membrane proteins in human neurological disorders. Her discoveries have enhanced diagnosis and treatment in a number of disorders such as myasthenia, disorders mediated by nerve hyperexcitability, limbic encephalitis and cognitive neurodevelopmental disorders.

Nicholas Peter Franks is a professor of Biophysics and Anaesthetics, at the Blackett Laboratory, Imperial College London. Professor Frank's investigations into the mechanism of action of general anaesthetics has demonstrated that they act at a small number of defined neuronal protein targets, not as previously proposed in a 'non-specific manner' at cell membrane. He has led the field in identifying relevant ion channels and receptors.

Professor Franks explained:
"I'm delighted to have been elected. I'm very pleased that the work we've done on anaesthetic mechanisms has been recognised in this way. I'm enormously indebted to many colleagues, but particularly my long-standing co-worker Bill Lieb"

Alejandro Kacelnik is a professor of behavioural ecology, Department of Zoology, University of Oxford and E.P. Abraham Fellow, Pembroke College, University of Oxford. Professor Kacelink studies decision making and cognitive processes in animals blending theoretical and experimental approaches from animal behaviour, psychology and economics. He is distinguished for his work on risk

THE ROYAL SOCIETY

perception in animals ,and has been the recipient of the distinguished Cogito Prize

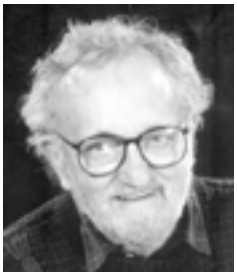
Professor Kacelnik remarked:

"Being elected to the RS is a fantastic and humbling honour. My field, behavioural ecology, is where ecology, economics, and evolutionary theory meet brain function. It cheers me a lot to feel that neuroscientists appreciate this way of thinking as much as they appreciate progress in molecular, electrophysiological and imaging techniques."

(Arthur) David Milner is an emeritus professor of Cognitive Neuroscience, Department of Psychology, Durham University and is a leading neuropsychologist of his generation. His novel theoretical formulation of dissociable functions of the two main visual pathways has overturned established views and is now widely accepted. This is that the dorsal pathway from visual cortex towards the superior parietal lobe is concerned with the automatic visual control of action rather than spatial localization, and does not have access to consciousness.

Professor Milner stated:

"I am proud and pleased to have my work, along with that of several outstanding colleagues over the years, acknowledged by arguably the world's most prestigious scientific academy."



John Morton is a professor of cognitive psychology, Institute of Cognitive Neuroscience, University College London is widely recognised as a pioneer of cognitive theories that explain and predict rather than describe and correlate behaviour. He provided an influential and lasting model of word recognition, the logogen model, the concept of Precategorical Acoustic Storage (PAS) in short term memory, the demonstration of so-called P-centres in spoken syllables as the critical psychological moment of speech perception, and groundbreaking work on infant face recognition.

Professor Morton quipped:

"I have been thinking back to all the people I have bounced ideas off over the years and all the waste-paper baskets I filled with failed ideas. Rather pleasing that some of them survived."

Carla J Shatz is professor of Biology and Neurobiology and Director, BioX, James H Clark Centre, Stanford University has been awarded as a foreign member of the RS and researches into the spontaneous activity patterns that are used to tune and validate neural connections that shape brain circuitry. By investigating the interplay between genes and experience, most notably through her work on activity regulated MHC genes, she has opened important new vistas in the field of developmental neurobiology.

Professor Shatz remarked:

"It is a great honor to be a member of this special Society! I remember with happiness the 2 years I spent at UCL as a Marshall Scholar and then- as now-was in awe of membership in the Royal Society and the company I join".

KH

National guidelines for treating CNS tumours

The British Neuro-oncology Society and the National Cancer Action Team have worked together to produce national guidelines on treating rare brain and CNS tumours, such as Primary CNS Lymphoma, Pineal and Optic Pathway Glioma, and Adult PNET. The guidelines, which were prompted by the government report 'Improving Outcomes for People with Brain and other CNS Tumours' (June 2006) cover clinical treatment as well as pathology and biology. See bnos.org.uk *AC*

Buzzing with brains

Spatial awareness in The 'Wales National Brain Bee' competition (the first of its kind in the UK), held on 6th July 2011, was attended by approximately 60 pupils from eight high schools across south-east Wales. An international competition, the event encouraged children to learn more about the brain under their own steam. It consisted of four parts: a written assessment, a model brain section, a multi-media section and an interactive lab assessment. Prizes included Amazon vouchers, a 1st prize trophy and an engraved shield for the winning school. The event was a huge success, with an enormous level of enthusiasm. We intend run as an ongoing annual event; for information contact local co-ordinator Dr Vanessa Davies, daviesvj@cardiff.ac.uk *VD*

NEWS

Events, developments, and other news in the world of neuroscience.

It's win-win with FastForward

FastForward is a UK-wide student competition, open to every faculty in every university, fostering creativity and discovery in technology, education and enterprise for health. How can healthcare be improved? Is there a gap in the appstore? Can YOU make healthcare quicker, better or safer? If you've got an idea, ***FastForward*** want to hear from you! BNA member James Giles - one of four medical students who co-founded ***Fastbleep***, the initiative behind ***FastForward*** - invites students in BNA to get involved in this programme of educational events, workshops, and online resources, which will culminate in a national conference and award ceremony in March 2012. ***FastForward*** are also seeking sponsors, collaborators and judges; please get in touch if you can help this innovative competition, where it's win-win for students and for the nation's health. www.fastbleep.com/fastforward *CB*

Neuroscientists elected to the Royal Society of Edinburgh

Three members of Edinburgh Neuroscience have been newly elected as Fellows of the Royal Society of Edinburgh (RSE). Founded in 1783, RSE is Scotland's National Academy, with 1500 Fellows from a wide range of disciplines - science & technology, arts, humanities, social science, business and public service. Congratulations to:

James Wilson Ironside is a Professor of Clinical Neuropathology at the University of Edinburgh whose research focuses on the neuropathology of prion diseases. He is Director of Laboratories in the National CJD Surveillance Unit, which identified the new variant form of CJD in 1996, and is currently Director of the MRC Network of UK Brain Banks and President of the British Neuropathological Society.

Joanna Wardlaw (Centre for Clinical Brain Sciences and Director, Brain Research Imaging Centre) is interested in the treatment and prevention of stroke. Professor Wardlaw's interests include developing cost-effective imagining techniques for diagnosis, improving training and imagining facilities, testing treatments such as thrombolysis and investigating how damage to the very smallest blood vessels can affect cognitive function that leads to dementia.

Seth Grant (Sanger Centre, Cambridge and University of Edinburgh) is a neuroscientist who specialises in the molecular basis of behaviour. Professor Grant has identified many genes and proteins that control nerve cell plasticity and learning and he uncovered the existence of synaptic complexes that control adaptive and learned behaviours and evolved from ancient unicellular organisms. His recent work shows these synaptic proteins are involved with over 100 brain diseases, including common neurodegenerative diseases and psychiatric illness. *JH*

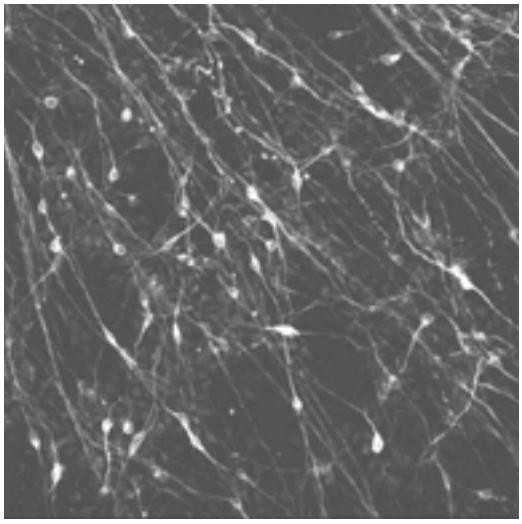
Edinburgh neuroscientist wins Royal Society of Edinburgh public engagement award

Congratulations to Joanna Brooks, pictured left, (Human Cognitive Neuroscience, Psychology, University of Edinburgh) on being awarded the first Royal Society of Edinburgh 'Beltane Innovators Award for Public Engagement'. Jo won the Brain section of I'm a Scientist, Get me out of here last year and her current project, Make Me a Scientist - a cross between a science competition and Britain's Got Talent - takes place in Autumn 2011. *JH*

Writers: Katherine Bowman (CB), Jane Haley, Louisa Lyon and Anne Cooke

Banking on a cure for Parkinson's

Oxford University researchers have begun their quest to create the world's first "brain bank" containing living neurons derived from Parkinson's disease patients. In June, team leader Richard Wade-Martins reported that cells from the first donor, a 56-year old man from Oxfordshire, were now being grown successfully in the lab. Importantly, this particular brain bank does not require brain biopsies. Instead the team are using stem cell technology to transform skin cells from their donors into pluripotent stem cells, which can then be induced to become dopamine neurons. "For the first time we can look at the cells before they deteriorate" Dr Michelle Hu told the BBC. "We can look at what cellular processes are happening that make the cells die and learn why it is that the cells get sick".



Richard Wade-Martins: Neurons that show up as bright here produce dopamine – the type of neuron involved in Parkinson's disease.

Images: http://www.ox.ac.uk/media/news_releases_for_journalists/110617.html

LL

Hat-trick for Bristol's neuroscientists

Not one, not two, but three prizes have been scooped up by members of Bristol Neuroscience for the exceptional impact of their work in society. Professor Marianne Thoresen's lifetime dedication to reducing death and disability associated with brain damage in newborn babies was acknowledged by the inaugural Vice-Chancellor's Impact Award. Her innovative treatment now saves thousands of babies worldwide. Meanwhile Dr Anne Cooke and PhD student Suzi Gage both won awards for public engagement; the 2011 University Engagement Award, and the brain category of the national 'X-Factor for science' competition *I'm a Scientist; Get me out of here*, respectively. All awards reflect how Bristol's neuroscience community is committed to making a difference in the wider community. *AC*

Top Left: Marianne Thoresen and Anne Cooke

Bottom Left: Suzi Gage: Winner of an award in the brain category of 'I'm A Scientist Get Me Out Of Here'.

Multi-sensing your place in space

Spatial awareness in humans doesn't rely on sight alone; it has been found that the same area of the brain (the parahippocampal place area) involved in seeing a room layout can be activated by other senses - for example by touch, by feeling a hidden model of a room. Seeing or feeling abstract objects did not affect this region to the same extent. Although non-humans are known to use many sensory modalities, until now humans had only been tested for vision. The findings of Thomas Wolbers (Centre for Cognitive and Neural Systems, University of Edinburgh) may help develop technologies to help the visually impaired, such as sensors that can measure spaces and convey the information to the brain, through touch such as vibrations. Paper: tinyurl.com/wolbers-etal *JH*

NEWS

Events, developments, and other news in the world of neuroscience.

Reel Science: neuroscience in the cinema

Edinburgh Neuroscience worked as a partner for the 65th Edinburgh International Film Festival to help put together a series of neuroscience-themed screenings and events called Reel Science (15 - 26 June 2011). Fortuitously coinciding, in both time and place, with the International Neuroscience and Music IV conference, some of the meeting's delegates also contributed to the events. Reel Science was such a success it may happen again in 2012! (see feature on page pages 32-33) *JH*

Sergio Della Salla, Professor of Human Cognitive Neuroscience at Edinburgh University, presenting at the reel science festival.

Liverpool Neuroscience Group

Formerly known as 'Brain Cell', the BNA local group in Liverpool re-kindled itself as the 'Liverpool Neuroscience Group', spear-headed by Yvonne Allen. She organised a number of seminars, starting with our very own BNA Secretary, Bruno Frenguelli, and concluding with excellent talks from Peter Magill (Oxford) and Stuart Allan (Manchester) who also kindly gave their time to lecture to Honours students while they were visiting. With the needs of the students in mind, Yvonne also ran a series of 'Careers in Neuroscience' workshops where speakers such as Elaine Snell (Snell Communications) and Ian Varndell (previously Enzo Life Sciences before becoming BNA's CEO) were able to describe their professional careers in PR and Biotech companies respectively, and offer mentoring advice. So, it was a good year for Liverpool Neuroscience, culminating in the One-Day Symposium on 'Gene-environment interplay' in September, reported later in this Bulletin.

In other Liverpool news, congratulations go to Professor Gus Baker, Consultant Clinical Neuropsychologist at the Walton Centre and at the University of Liverpool, for winning the Barbara Wilson Award for outstanding contribution to neuropsychology in the UK. Professor Baker specialises in the impact of neurological conditions on people's physical, social, psychological and neuropsychological functioning with an emphasis on epilepsy. He has published over 200 papers and is a world-renowned expert on the impact of epilepsy. He has previously been awarded the British Psychological Society Lifetime Award for distinguished contribution to professional psychology in recognition of his services to epilepsy; and the International League Against Epilepsy (ILAE) Ambassador Award. On receiving the news he commented: "The Barbara Wilson Award is a prestigious award because it is granted by my peers and is one of the highest accolades of my profession, so I am absolutely delighted." *KH*

Gus Baker, Clinical Neuropsychologist at the University of Liverpool.

Institute of Neuroscience Newcastle University Funding and Awards

In the field of clinical neurosciences there have been a number of notable recent awards that will support research in Newcastle. These include award of the NIHR Biomedical Research Centre in Ageing (£16.6M) directed by Professor Patrick Chinnery in which dementia, neurodegenerative disease, stroke, mitochondrial disorders, and visual impairment are all major themes. At the same time there was announcement of NIHR funding (£4.5M) for a new Biomedical Research Unit Directed by Professor David Burn, which will carry out research into dementia, specifically dementia with Lewy bodies and Parkinson's disease with dementia. The work by Professor Janet Eyre on the use of action video gaming to deliver therapy for stroke and cerebral palsy has received several major prizes, including the Medical Futures Special Award for the Best Innovation in the NHS for 2011, and funding from the Health Innovation Challenge Fund (£2M) to develop gaming as a method to assess and monitor stroke rehabilitation. *LP*

Writers: Kate Haddley, Laura Periera, Emmanuel Pinteaux and Vanessa Davis

Cardiff's busy Brain Awareness Week

Professor Simon Baron-Cohen.

The Neuroscience and Mental Health Research Institute at Cardiff University organised various activities for Brain Awareness week. These included: the Artful Brain Competition (researchers submitting their images for screening on the BBC Screen in Cardiff City Centre); Society for Neuroscience Public Lecture (Professor Simon Baron-Cohen on *'Do hormones affect how the mind develops? The foetal testosterone theory of Autism');* Neuroscience Open Afternoon (attended by >100 members of the public, Cardiff researchers showcased the breadth of local neuroscience and mental health research through talks, tours and demonstrations); and *Learn about Life and the Brain Trail* @Techniquest Science Discovery centre (primary school children and toddlers learning about the brain and nervous system through interactive activities). All in all a great week for neuroscience at Cardiff with a lot of fun had by all involved. *VD*

Images: Members of the public and researchers alike engage in the neuroscience open afternoon.

School children take part in activities designed to teach youngsters about neuroscience and the brain.

Success of BNA-sponsored Neuroscience Seminars at the University of Manchester

The Faculty of Life Sciences (FLS) at the University of Manchester has run a successful Neuroscience Seminar Series over the past 2 years, aided by the generous financial support of the British Neuroscience Association. Seminar organiser, Dr Emmanuel Pinteaux, and local Manchester BNA representative, Dr Stuart Allan, have been able to timetable a seminar series that spans most areas of Neuroscience, from fundamental basic research to disease and the clinic, as well as computational. Key speakers have come mainly from the UK but also from France, Spain and USA.

The success of the seminar series is due to the diverse range of talks and the calibre of the speakers. To attract such prestigious speakers was only possible with the financial support of the BNA. Attendance at the seminar series was unexpectedly high (most seminars attracted a full-house), and this was due in part to scheduling of the talks out-with the normal busy teaching and administrative periods in the week. Audiences comprised PIs, postdocs and PhD students, whose attendance is a compulsory part of their PhD training programme. Future seminar series are to be decided but we look forward to running an attractive programme that attracts the best Neuroscientists from around the country. *EP*

Emmanuel Pinteaux: Seminar Organiser

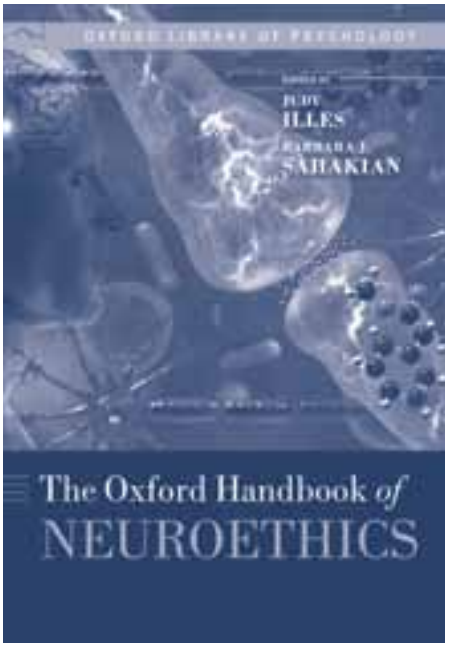
THE ETHICS BEHIND NEUROSCIENCE

Barbara Sahakian, a researcher on the neural basis of cognition, emotion and behaviour at the University of Cambridge, and the recent co-author of the Oxford Handbook on Neuroethics recalls how her interest in the ethics of neuroscience first came to light.

Barbara Sahakian

I became interested in ethics as I was invited to attend a meeting at the New York Academy of Sciences by Martha Farah and Judy Illes to discuss the ethical implications of neuroscience. In particular, they wanted me to speak on pharmacological cognitive enhancement. The meeting was fascinating in terms of the interactions of people from neuroscience backgrounds including Eric Kandel but also people with an ethics or philosophy background. An output of the meeting was a co-authored paper that really started my interest in writing and developing the area of neuroethics (Farah et al 2004). Following that meeting I was invited by Hank Greely to attend a meeting in Asilomar, California and this was the start of the International Neuroethics Society (previously the Neuroethics Society: http://www.neuroethicssociety.org). I became a Founder Member of this Society and am on the Executive Board. Around that time I was attending a meeting in Florida where I commented to an American colleague of mine that I had jetlag and that it was unfortunate that I had to speak in the late afternoon when I was less alert. My colleague turned to me and asked me if I would like to have some of his modafinil. I was surprised by this and asked whether he generally took it and he replied that he always took it for jetlag. Later on at that meeting I began to ask others whether they used modafinil and a couple of the other members at the meeting used Ritalin® and Adderall Xr®.

Shortly after that I was invited to speak to Dr Phillip Campbell, Editor of Nature, about cognitive enhancing drugs. Dr Campbell has a strong interest and commitment to the mental health area and ethical issues in neuroscience. The paper 'Professor's Little Helper' co-authored by myself and Sharon Morein-Zamir and published in Nature in 2007 was a result of this interaction with Dr Campbell. Nature followed this paper up with an online survey by Brendan Maher, published in 2008, which found that 1 in 5 of the 1400 respondents from 60 different countries used a cognitive enhancing drug. There was then a workshop sponsored by Nature and Rockefeller University when Professor Sir Paul Nurse was President. This workshop culminated in an open discussion attended by Professor Sir Paul Nurse and a paper in Nature by members of the workshop (Greely et al (2008)) entitled 'Towards responsible use of cognitive-enhancing drugs by the healthy'. Nature also sponsored a public debate in London which I took part in. In addition to the Nature debate, I have given many public lectures now on the topic of ethical issues involved in healthy people using cognitive enhancing drugs, including the President's Lecture at the Royal Society (2010), the Royal Institute and the Wellcome Collection, as well as many science festivals e.g. Cheltenham, Cambridge and the BA festival in York.



The Oxford Handbook of Neuroethics

I have also engaged with the media in terms of discussions on the radio and with the press. The most recent one was my appearance on BBC Radio 4's 'Start The Week' with Andrew Marr where I presented on The Oxford Handbook of Neuroethics. I maintain a strong interest in neuroethics and the teaching of neuroethics as well as public engagement in science (Morein-Zamir & Sahakian, 2009; Sahakian & Morein-Zamir, 2010).

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A LIFE IN THE DAY OF…

A RETIRED NEUROSCIENTIST

Steven Rose *studied biochemistry at King's College, Cambridge, and neurobiology at Cambridge and the Institute of Psychiatry, KCL. He became Britain's youngest professor and chair of biology at the Open University in 1969 where he established the Brain Research Group focusing on the biological processes involved in memory formation and treatments for Alzheimer's Disease. As a prolific author he has published over 300 papers and written several popular science books and regularly writes for The Guardian. His prize-winning accolades include the Biochemical Society medal for communication in science and the prestigious Edinburgh Medal and his book The Making of Memory won the Science Book Prize in 1993.*


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After thirty years as head of department and director of the Brain Research Group at the OU, I took early retirement to focus on research. Now, more than ten years later, I have published my last empirical research paper (appropriately like some of my earliest, in the Journal of Neurochemistry), my longest standing research colleague has also retired and the lab is closed. So how do I fill my time?

First, there are many things I can abandon without regret. Interminable departmental meetings in an increasingly miserable and insecure university environment. Endless agonising grant applications, longer to write than the research they might possibly fund if they were successful. Explanations of why I don't want to go to meetings of 30,000 neuroscientists meeting in American lecture halls as big as football stadiums. Scanning junk emails from nondescript journals soliciting papers and companies offering to sell me antibodies. And I can read the front sections of Nature and Science without feeling guilty that I might have missed a crucial paper in the letters sections. Above all, I can reflect on how privileged my generation was, entering academic life in the 1960s compared with today's world of short term contracts, no tenure and crude numerological research assessment exercises, a world in which University vice-chancellors and their swollen management teams, increasingly authoritarian, no longer speak of students and scholarship but of customers and market opportunities.

1. Steven and Hilary Rose (credit, Maggie Murray)
2. Ms Christine Lancashire (Lab manager), Steven and Dr Elizabeth Salinska (Warsaw)
3. Steven in his office at the OU
4. Moscow 2005: Prof konstantin Anokhin, Christine Lancashire and Steven
5. Steven in prep for lecture
6. Simon Rose (half of his profile, Dr Amy Johnston (Australia) and Steven.

How about the lab and the research? Having spent decades studying the molecular and cellular processes involved in learning and memory formation on the grounds that it was 'basic' research without implications for human health, in the last few years I found myself using these 'basic' findings in the hunt for a possible treatment for memory loss in Alzheimer's Disease. It all seemed promising; the university took patents out on the relevant molecules, but it is now up to drug discovery and development companies to take the work forward. With Big Pharma increasingly risk-averse busy closing down CNS research like Pfizer at Sandwich, and start-up companies with lifetimes about that of mayflies, that prospect too seems uncertain.

As with any productive research programme, over the years each discovery led to new questions to be asked, hypotheses to be tested, new exciting experiments to do. But there also comes a time to stop, and to reflect on whether any of the hundreds of research papers and reviews I and my colleagues have published over the years have fundamentally advanced our broader understanding of how the brain – even that of the young chicks I studied, let alone humans) encodes, stores and retrieves memories. Sometimes I feel I know less about the mysterious processes of memory now than I thought I did when I started research in the 1960s. So no, I don't miss the lab. There's more time to think.

But it is also fascinating – even painful - to discover how fast, once one has stopped being an active researcher, one gets left behind. The pace of new technologies, and the speed with which fashions change so that yesterday's hot molecule (take CREB or NMDA receptors as examples) becomes relegated to past history means that you lose touch with the cutting edge of research. However, looking back over a lifetime of research, I am also conscious of how the same fundamental questions keep re-emerging, dressed in new language and addressed with new techniques. Discoveries made decades ago get forgotten, and then reinvented almost without reference to their earlier progenitors. Recording from tissue slices, invented in the 1960s, reinvented in the 1980s. Or reconsolidation, discovered in the 1970s, rediscovered in the 1990s. The life sciences are moving so fast that it is easy to forget our own history.

Meanwhile, what I ought to be doing is pressing on with the book Hilary, my sociologist partner, and I are currently working on – a critical discussion of the place and claims of the new genomics and neuroscience in a globalised world economy. But events keep intervening. To take just this fortnight at the back end of September, a meeting to finalise the draft of the latest module of the Royal Society's Brainwave project, on neuroscience in conflict and control. The previous modules, published earlier this year, included a set of essays, some by prominent BNA members. This one is about the new generations of neuroweapons and will be published early next year. Then, a delightful few days in Tuscany where Hilary and I gave lectures on evolution and eugenics, compensated for by a chance to see the superb 6th century mosaics of Ravenna. A Royal Society – Royal Society of Literature weekend on science and the arts at which I am to discuss with the leading literary scholar Gillian Beer why, despite the claims of many prominent neuroscientists, I don't believe that our science can tell us much about consciousness. With apologies to Crick, Edelman and many others, I still think novelists and poets can give us greater insight than neuroscientists on human consciousness. And then a TV interview a couple of days later.

True it isn't always as distraction packed as this. There are weeks when we can work quietly on the book, plan a day's timetable flexible enough to change with the weather, find time for theatre or music, have dinner with friends – even see our grandchildren. Those are among the pleasures, against which must be balanced the discomforts that go with the inexorable biology of ageing, and the distress of living in a world in which the values of social justice and collective welfare which seemed so taken-for-granted in 1960s Britain are visibly and daily disintegrating in the face of the brute market forces of a globalised capitalism.

PLUS ÇA CHANGE, PLUS C'EST LA MÊME CHOSE

Gavin Clowry from the University of Newcastle ponders on his work on the transplantation of neurons over the last 17 years and stresses the importance of developing strategies in collaboration with clinicians to translate basic bench science into clinical therapeutic practice.

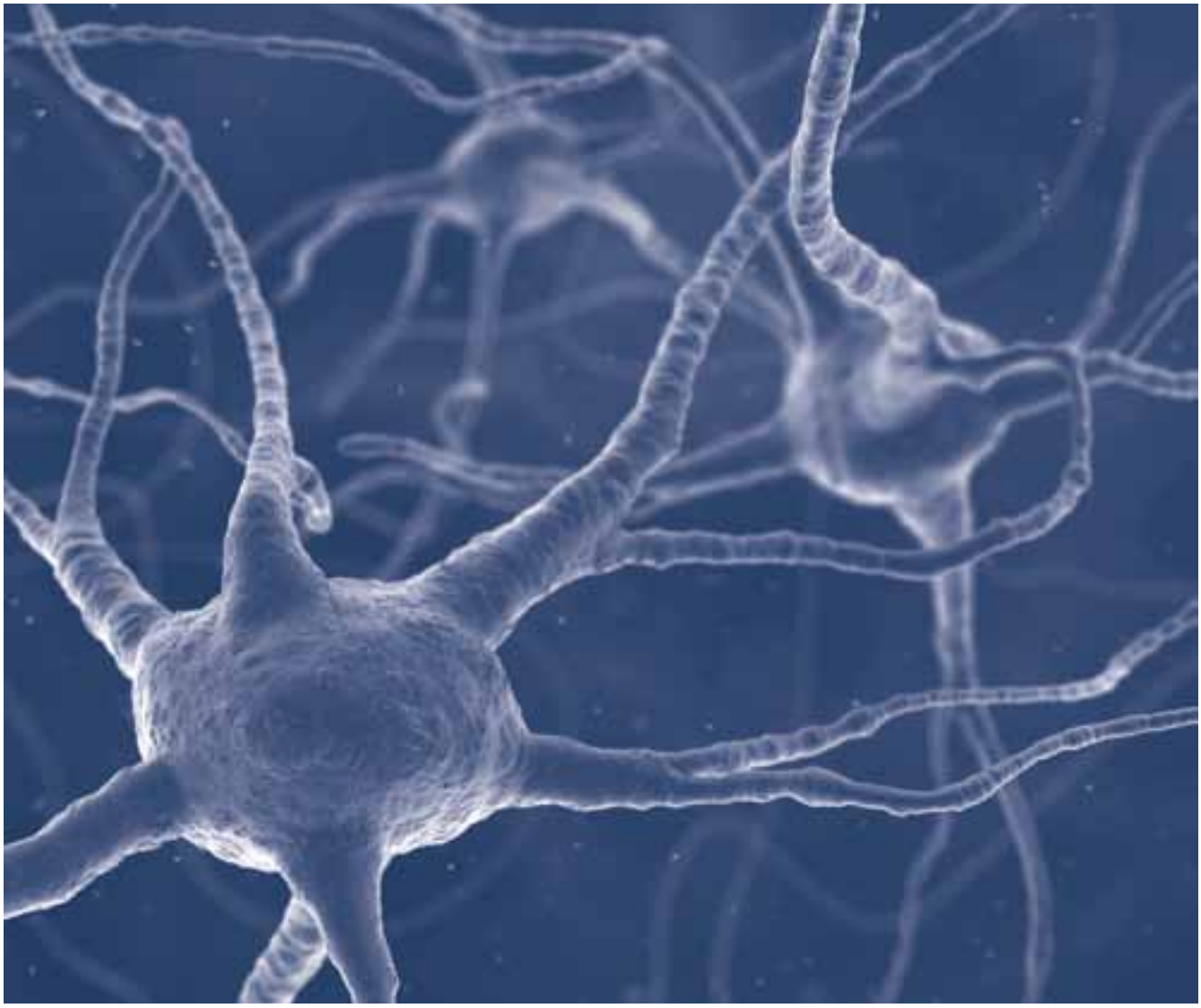
The other day, out of the blue, a student asked me how long I'd been a scientist. "About 25 years" I replied. "And what has changed most during that time?" she fired back. "Um, computing. There was no internet or electronic libraries, stats and graphs packages, digital photography and Adobe® photoshop. Everything just took much longer; you could spend all afternoon in the darkroom only to find all your microphotographs were out of focus". She seemed happy with this and returned to examining her images of immunostaining. But of course there are many other marvellous things that were only in their infancy or not even born back then; gene chips, fMRI, confocal microscopy and so on. But despite all these advances I have been reminded recently how in some ways little has changed.

Recently I was delighted to be invited to lecture at a Young Physiologists' symposium in Bristol. The theme was translational science in the heart and brain. I was horrified in the way middle aged people occasionally are when I realised I hadn't been to Bristol for seventeen years and the last time I went there I was a post-doc giving a short presentation at a Young Physiologists' symposium on the spinal cord (with slides; no powerpoint in those days). I talked about experiments carried out in Gerta Vrbovà's Lab in UCL in which we attempted to replace missing motoneurons in a rat model of motoneuron disease by transplantation of embryonic ventral horn into the spinal cord. In the end we had some convincing evidence that transplanted embryonic motoneurons could differentiate and extend axons through peripheral nerve grafts to innervate muscles.

Soon after that I went to Newcastle to work with Janet Eyre and Simon Miller on sensorimotor system development and cerebral palsy. Here I was now, back in Bristol, describing experiments to discover the differentiation pathways of human corticospinal motoneurons, and to induce stem cells to follow these pathways. What is the translational value of this? Well, there are various in vitro applications. Or could we transplant neuronal precursors to the cerebral cortex to replace missing corticospinal motoneurones? Seventeen years later and again I'm proposing to "cure" afflictions of the motor system with a rather improbable transplantation strategy!

At the start of the year I attended a workshop in New York on the use of stem cells in research and treatment of amyotrophic lateral sclerosis (motoneuron disease involving both motoneurons and the corticospinal tract). So what's changed since this was last the focus of my research? Well, a lot more is known about the disease now, particularly the neurogenetics of the condition, but there are still no new, effective treatments. No one was contemplating replacing missing motoneurons with transplanted cells, but other uses of stem cells were being proposed. It was interesting to observe the tensions between the basic scientists and the clinicians. Stem cell scientists explained how they could grow spinal motoneurons from human embryonic stem cells in a dish, stress them and then try out new pharmacological agents on them. Furthermore, motoneurons could be grown from human iPS cells derived from skin cells of patients with ALS and controls and compared to see how the disease develops in vitro. Clinicians looked sceptical that in vitro really modelled what happened in vivo and wondered if they wanted to wait seventy years for the results, that being how long ALS generally takes to develop. It was depressing to hear clinicians point out that all motoneurons are not the same and respond differently to the disease. This is well established but not taken into account by those researchers new to the field. More impressive were plans to replace dysfunctional astrocytes, an important part of the disease process, with transplants of healthy or even neurotrophin releasing, stem cell derived astrocytes to the spinal cord. Here clinicians and basic scientists seemed to be working together, even to the point where some of the intricacies of the spinal cord surgery involved were being addressed.

"If you want to translate research into clinical practice so that treatments don't stay the same even while basic science keeps advancing, it is necessary for basic scientists and clinicians to work together"



Photorealistic 3D nerve cells Image from istock credit to: Andrey Prokhorov

Thus, I was able to give this advice to the young physiologists. If you want to translate research into clinical practice so that treatments don't stay the same even while basic science keeps advancing, it is necessary for basic scientists and clinicians to work together. You have to understand the clinical problem you are trying to address and you have to make sure that your experimental models will impress the clinicians. However, don't go chasing cures, try and let curiosity drive your basic research and then benefits can flow from your discoveries. In my own collaborations, colleagues studying the corticospinal projections of children with cerebral palsy showed that projections from the visual cortex could replace damaged projections from the motor area. This prompted curiosity driven research to understand how functional arealisation is established in the developing human neocortex. Now we might apply this knowledge to produce different types of cortical neurons from embryonic stem cells.

ADOLESCENTS, FMRI, AND MORNING PASTRIES

Stephanie Burnett and Anne Cooke

A conversation with BNA prize winner, Stephanie Burnett, reveals what she's learnt, what she loves - and what she doesn't! - and some wise words about her research into the adolescent brain.

Stephanie Burnett is awarded the BNA postgraduate prize 2010 by Immediate past president, Trevor Robbins.

I've always been interested in living things. But it was after working at a special needs school, and then at a care home for autistic adults, that I knew I was particularly interested in the human brain and mind.

My parents supplied me with piles of books, freedom to manage my own time and a culturally interesting upbringing. So, although I don't really come from a science family, I was encouraged to think independently, and I ended up in science by following my interests.

***How the mind works* by Steven Pinker was the best introduction I could have had to cognitive psychology.** More recently I've enjoyed *Second Nature: the inner lives of animals* by Jonathan Balcombe. *Making up the mind: how the brain creates our mental world* by Chris Frith is great, and there's a really good (and funny) pop science book on adolescent brain development called *Blame my brain*, by non-scientist Nicola Morgan.

When I started my PhD, there wasn't much out there on the cognitive neuroscience of adolescence. It was very exciting (and difficult) trying to figure out which cognitive domains and paradigms might be fruitful for us to study. I focussed on the behavioural and neural (fMRI) correlates of social cognition, emotion and decision-making by conducting experiments on risk-seeking and social emotion (e.g. embarrassment) processing in the adolescent brain.

Trying to understand human adolescence can be a total nightmare - so much is going on! But that just makes it more interesting, and more of a challenge. We still have a long way to go.

Writing papers is a real drag. When I've done an experiment, either I know the answer to my research question, or I've realised that my experiment didn't answer it! I love collecting data, and I'd much rather get on and plan the next experiment than write up.

But writing up is important; science is a collaborative endeavour and knowledge must be passed on. I enjoy planning experiments collaboratively, and discussing data with colleagues to try and figure out what's going on.

My PhD supervisors Sarah-Jayne Blakemore and Chris Frith were big influences. Chris used to have weekly 'breakfast club' meetings which lasted an hour and a half and involved heaps of coffee, pastries and fruit. There was no agenda and we ended up discussing anything and everything related to social neuroscience: MORI polls, manga films, Bayesian decision-making in bees, morality, thought experiments in Borges' Labyrinths…

Human participants can be tiring especially 'special populations' (e.g. children). The pressure's on because you can't easily go back and collect the data again if you mess up. Recently I've had the privilege of testing some brain lesion patients. It's been very satisfying to gradually tailor protocols for them in order to converge on - and eventually isolate - their core deficit(s).

How I think about myself, other people and social situations has been irreversibly changed by studying social cognition, emotion and decision-making. Cognitive neuroscientists are very privileged because a lot of 'normal' stuff can be relevant to our work. In a way the neuroscientist in me never turns off! Going to a music festival, reading a novel, spending time with friends – these downtime activities can be very interesting from a scientific point of view.

You have to remember that science hasn't explained it all. And, even if it had, you probably wouldn't have a complete grasp of the findings. Failing to switch off your 'social neuroscience' head could get you into some dreadful situations (I'm thinking free-riding and moral grammar). I switch off by reminding myself that unconscious social cues and empathy probably work better than anything deliberate.

I would like to know to what extent current research will actually give us 'true' understanding of the brain. When I was writing up my thesis I got pretty depressed reading Foucault's Madness and Civilisation (abandoned halfway through in the interests of productivity!). Foucault argues strongly that a scientific construct (mental illness) is a product of the culture and time in which it's embedded. You could apply this to other scientific constructs too. Of course, new constructs stand on the shoulders of the ones before...but I would like to know that our current scientific programme is not just adding pointless elaborations to another metaphor. However; only time will tell.

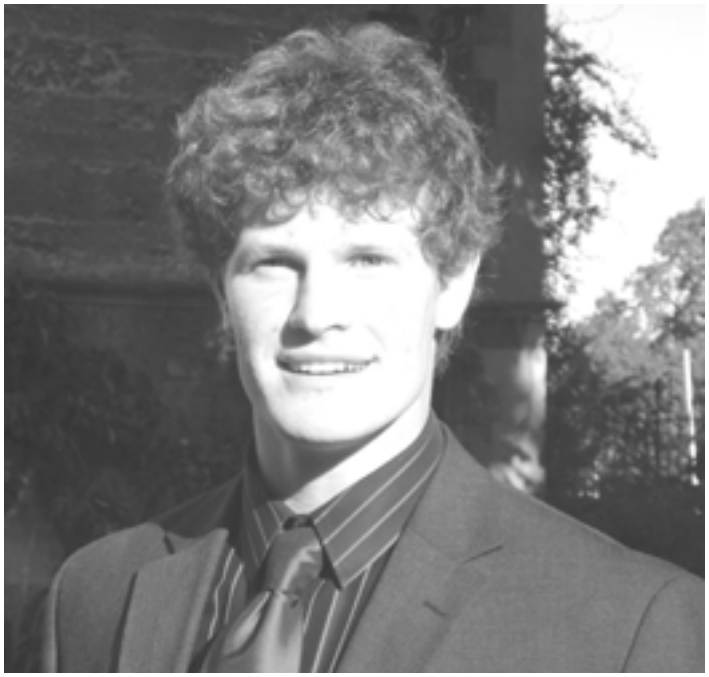
I was shocked and amazed to win the BNA prize. I think it reflects how exciting developmental and social cognitive neuroscience are right now. I'm thrilled to bits to have been awarded a British Academy Postdoctoral Fellowship to study social cognition and mental imagery in adolescence, with Jennifer Lau and Emily Holmes in Oxford. I'm going to miss the electric atmosphere at UCL, where I've been for the last six years, but am very excited about the next stage!

BNA UNDERGRADUATE PRIZE WINNER 2010: OWEN THOMAS

Owen Thomas, winner of the BNA undergraduate prize was an intercalating medic at the University of Birmingham working in Thelma Lovick's lab to investigate the role of dopamine neurons in the Ventrolateral Periaqueductal Gray (vPAG) in the control of the micturition reflex.

Dr Thelma Lovick's lab had shown that there is a critical synaptic relay in the micturition reflex pathway located in the vPAG. We think this is the site of the neuronal "switch" that determines whether you allow yourself to empty your bladder or not, depending on the social situation you find yourself in. This region contains a group of dopaminergic neurones and so we wanted to know if they were in any way involved.

We microinjected 6-OHDA into the vPAG of rats to selectively lesion the dopamine neurons. Then we monitored the pattern of voiding over 24h periods and found that intervoid intervals were shortened in lesioned rats. We followed this with acute experiments under anaesthesia to look at bladder urodynamics using cystometry and found that the threshold bladder pressure at which a void was initiated was raised in the lesioned rats. Finally, we did immunohistochemstry for tyrosine hydroxylase and counted the number of dopaminergic neurons in the PAG to assess the effectiveness of the lesion. I concluded that the dopaminegric cell group is involved in modulating the micturition reflex and our lab is now following up these initial findings.



Owen Thomas: BNA undergraduate prize winner

POSTGRADUATE AWARD:

A prize of £500 will be given to the best post-graduate applicant who has completed a Ph.D/D.Phil thesis in the year prior to the award. The prize requires that work is completed and the thesis has been submitted and approved, even if not formally awarded, by the deadline (31st October 2012).

UNDERGRADUATE AWARD:

The area of study for this award of £250 will be broad, including not only neuroscience per se, but subjects where a large part of the degree comprises neuroscience.

Full criteria for either award can be viewed at ***www.bna.org.uk***

I'M A SCIENTIST... ASK AWAY!

Emily Robinson, a PhD student researching with Stuart Allan at the University of Manchester, tells us about the excitement of being a prize-winner in the 2011 "I'm a scientist" competition and the rewards of public engagement.

What are the burning questions that students really want to ask scientists? Well this June I found out when taking part in the award winning Wellcome Trust funded science engagement project 'I'm a scientist...get me out of here!' The X-factor style competition where scientists battle for student's votes by answering questions online and taking part in frantic live webchats. The nationwide scheme groups scientists into 23 individually competing zones, each with approximately 400 students, aged 13-18years old, impatient to start the questioning!
As a Neuroscience PhD student at the University of Manchester my synapses were stretched as I competed against four scientists from very different subject areas, from a volcanologist to a theoretical physicist! The scheme differs from conventional public engagement as the students get to direct their own learning depending on their interests. Questions were as diverse as: "What are some of the risk factors of stroke?" to "Would you call yourself a geek?" The webchats were exhilarating, each was thirty minutes of intense brain activity trying to answer questions whilst keeping up with the MSN-style conversations. This informal atmosphere allowed students to raise and debate even controversial topics, such as animal research. Students voted for their favourite scientist, with daily evictions keeping us on our toes. I was speechless when the final eviction came and I was named the copper zone winner! The prize was £500 to spend on public engagement, with which I hope to develop a community project highlighting the risk factors for stroke and how they relate to lifestyle choices. I personally challenge all scientists to get involved in "I'm a scientist' 2012", as I believe science should be open for the public to question. Why not put yourself in the virtual hot seat next year? Check out my "I'm a scientist" profile: http://copperj11.imascientist.org.uk/profile/emilyrobinson

Emily Robinson 'I'm a scientist get me out of here' prize winner at work in the lab.

FROM THE LAND OF

Rochelle Akerley, a researcher at the University of Gothenburg, discusses her move to Sweden, the opportunities it has provided and Swedish neurosciences impressive track record.

Never walk (work) alone... these days, funding bodies encourage collaborative research and this is especially so for European projects. Collaboration with our European partners is appealing with the proximity of European labs and there are funding sources set up to allow such work, such as Marie Curie funds. There are many advantages in doing this: not only may you get to work with experts in your field, but it is interesting learning about how other labs work and also experience different cultures. One way of doing this is to take a sabbatical or job abroad. Last year, I took a chance and made the move to work abroad and I am now based in Sweden.

One of the most appealing things about Sweden is the landscape, which changes dramatically through the seasons. It is the third largest country by land mass in Europe and Sweden's most northerly parts are in the Arctic Circle. It also has a relative low population density with only 10 million inhabitants. The winter is long: this year, the snow was on the ground between November and March, but this also means dark skies, where in the north of Sweden you can see the aurora borealis (Northern Lights, see photo), which is an amazing natural phenomenon. In opposition to the cold winter, in summer the sky never goes dark and the light is well-celebrated.

Neuroscience has a strong base in Sweden: there are many top-rated universities such as the University of Gothenburg (where I am based), the Karolinska Institute (in Stockholm), Lund University, Umea University and Uppsala University. The research ranges from molecular neuroscience to behavioural research and there have been many notable scientific discoveries from Swedish origins. For example, Torsten Wiesel was a Swedish co-recipient for the Nobel Prize in Physiology in 1981 with David Hubel for their work on information processing in the visual system. More recently, Avrid Carlsson (based at the University of Gothenburg) won a Nobel Prize in 2000, with co-recipients Eric Kandel and Paul Greengard for their work on dopamine and its role in Parkinson's Disease.

Research on body image and self-perception at the Karolinska Institute has recently been in the media spotlight. Henrik Ehrsson's group have shown that there are specialised regions in the brain that respond to body ownership. A combination of multisensory inputs from visual, tactile and proprioceptive modalities provide us with a frame of reference that underlies the feeling of ownership of our entire body. Agneta Nordberg's work into the pathological course of Alzheimer's disease at the Karolinska Institute has also recently been in the news. The research involved the tracking of the progression of Alzheimer's disease in a patient's brain using positron emission tomography from early detection of the disease to after death, post-mortem analyses of the brain.

Anders Björklund, who is Head of the Department of Neurobiology at Lund University, also works in clinical disorders and specialises into research in Parkinson's disease. His group focus on the development of restorative and neuroprotective treatment strategies in Parkinson's and specifically use cell engineering techniques to generate dopamine cells for transplantation purposes. In collaborative, cross-disciplinary research at Lund University, Jens Schouenborg works on brain-machine interfaces. Here, the goal is to return neural control to paralysed patients and those with movement disorders, such as in Parkinson's, though the implantation of electrodes into the brain and spinal cord using wireless technology to interface with a remote computer.

"Altogether, Sweden is a great place to live and work!"

At the University of Gothenburg, sensory and motor neuroscience are strong areas such as the work of Emeritus Professor Elzbieta Jankowska, who received a medal from The Reeve-Irvine Foundation last year for her significant contributions to spinal cord function. The research area of pain and pleasure mechanisms in touch is also of interest, where Håkan Olausson and Johan Wessberg use various imaging, neurophysiological and psychophysical techniques to investigate skin sensations.

Scientific research and development has strong roots in Sweden and the government realises the importance of this by dedicating a significant amount of money to research each year. Industrial input also plays a role: for example the best-selling drug Losec was developed at AstraZeneca in Sweden. Altogether, Sweden is a great place to live and work!

THE MIDNIGHT SUN

"Scientific research and development has strong roots in Sweden and the government realises the importance of this by dedicating a significant amount of money to research each year"

SMART RESULTS

Could mobile phones and Wi-Fi in the lab be altering experimental results?

Hands up who has their mobile with them in the lab? Sarah Starkey investigates whether emissions from mobiles (and more) could influence your results – and your health - in literally unseen ways.

'Prior to the design of any biological experiment, a careful scanning of stray (electromagnetic) fields inside the lab is necessary. The experiments should be performed at the place with the minimum stray fields and special care should be taken in having the control under identical conditions with the exposed groups'

Dimitris Panagopoulos and Lukas Margaritis [1].

Kryczka | Dreamstime.com

Which stray electromagnetic fields might you find in a typical lab? 50Hz electric and magnetic fields and high frequency transients are found close to electrical wiring and electronic appliances. Microwaves - from mobile and smart phones, wireless LANs, Wi-Fi and microwave ovens inside the building, phone base stations and other transmitters outside - can produce variable hotspots and steep electromagnetic gradients.

Different spaces are not electromagnetically the same; measurements are needed. Recently, in London, I found background microwave radio frequency fields to vary between 0.05 and 4.7 V/m (0.8-2.6GHz). These are 10^4-10^{10} times greater than natural background values[2b].

Exposing animals, humans or cells to mobile phone electromagnetic fields can affect a wide range of biological processes[2a,3]. Effects include increases in oxidative stress, changes in enzyme activity and protein conformation, cell death, DNA damage and altered immune activity. In May 2011, the WHO classified radio frequency radiation as a potential human carcinogen[4].

EXPOSURE IN PUBLIC PLACES

Biological effects can occur with microwave exposures commonly found in public places and within a few metres of wireless gadgets.

For example, exposing fruit flies to a mobile phone up to 90cm away for six minutes per day for five days, damaged DNA and decreased reproductive capacity, with a peak 'window' of damage at 20-30cm[5]. Increased albumin leakage through the rat blood-brain barrier was observed after a two hour exposure to microwaves similar to those found 1.9m away from a mobile phone in use[2b]. 1.9V/m microwaves for 5 hours stimulated immune responses[6] and 4.3V/m for five days affected gene expression and organogenesis in rats[7].

Humans, 1.5m from a Wi-Fi access point (0.49V/m) experienced decreased EEG alpha and beta energies (females) and changes in event-related potentials (males) during memory tasks[8,9]. Human sperm positioned next to a Wi-Fi-enabled laptop for four hours had fragmented DNA and decreased motility[10].

SMART RESULTS *CONTINUED*

Phil Date | Dreamstime.com

SLOW BUT STEADY

Because chronic, low power exposures have been seen to trigger biological changes, microwave radio frequency fields in the lab or animal house may be affecting experimental subjects and results.

A mobile phone in standby had no immediate effect on rabbit male fertility, but did decrease sperm count and motility following chronic, eight hour a day exposures for eight to ten weeks (corresponding to the time course of the seminiferous epithelium cycle)[11]. At 1.8V/m (two hours/day, 45 days) microwaves changed the activity of several enzymes and produced double-stranded DNA breaks in rat brain[12]. A mobile phone exposure of 3.5V/m for only two hours a week for fifty five weeks reduced memory functions in rats[13]. Exposure of pregnant rats to a mobile phone in standby, switched on for fifteen minutes a day, significantly decreased the number of ovarian follicles in the female offspring[14].

However, not all studies find biological effects. Mobile communication technologies appear to alter biological processes under certain electromagnetic, biological or environmental conditions. We are only just beginning to understand what the conditions might be[2c], as well as the mechanisms through which microwaves exert their effects. Possible mechanisms include forced vibrations on free ions[15], increased free radical formation by changing electron spins in pairs of radicals[2d], and changes in magnetic magnetite (Fe_3O_4) crystals, present in the brain. Magnetite interacts over 10^6 times more strongly with magnetic fields than any other biological material.

A SOLUTION?

I would like to suggest that experimental methods include descriptions of background radio frequency and power frequency fields, and whether mobile phones or Wi-Fi-enabled technologies were used near to animals or experimental preparations. Radio frequencies play an important role in several research techniques as well as therapeutic applications. But carefully controlling and limiting exposures where possible, as well as understanding how they interact with living things may reduce unwanted effects and allow a more accurate interpretation of research results.

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Microwaves (300MHz-300GHz) are a sub-group of radio frequency radiation (30kHz-300GHz). Mobile communication technologies currently use modulated microwave carrier waves, pulsed at low frequencies. The electrical field component is expressed in Volts/metre.

WHAT MUSIC CAN DO

Matthew Jewell has just finished his BSc in Anatomy and Human Biology at the University of Liverpool and is a keen musician with an interest in digital editing and medical communications.

Jonjo Keefe

The identity of our species is inextricably linked with music. Every known culture and tribe of humans uses music for social interaction, from the grandest ritual to the softest lullaby. A great many parallels exist between music and language, not least for their universality among and specificity to humans. As with language, certain aspects of music are found in the innate neural architecture, while other components need to be learned from others. Study into music and musicians is not a new phenomenon. Post-mortem examinations of the brains of musicians date back to the 19th century [1], as investigators pursued a neural substrate for musicians' talents. Prodigious advances in the field in recent years have resulted from the revolutionary advances in neuroscience brought about by in vivo functional imaging technologies; it is now possible to begin to unravel the neural activity that allows an individual to produce, interpret, enjoy, loathe, perform and dance to music.

The origins of music itself are largely unclear. Early evidence of music dates back over 30,000 years ago with a paleolithic bone flute, showing that when humans colonised Europe, musical traditions were already advanced [2]. Although hard evidence does not exist from before this time, the fact that music is present ubiquitously in human culture suggests that music existed at a very early point in human history; its absence in chimpanzees and other primates is evidence that music is younger than the most recent common ancestor. Like all primates, humans find faster tempos more invigorating and less relaxing than slower ones, and prefer note combinations

WHAT MUSIC CAN DO *CONTINUED*

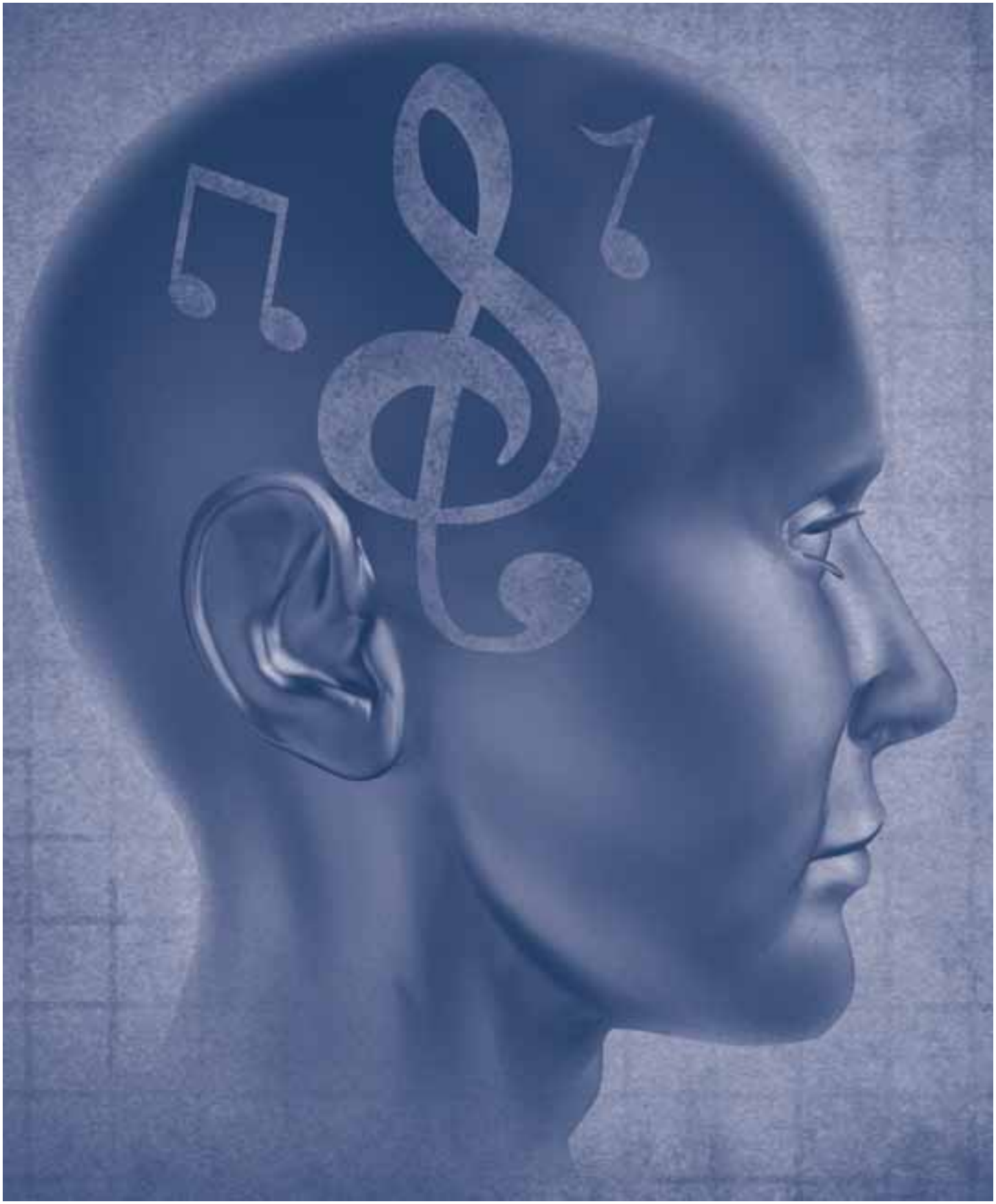
that are consonant, i.e. where the ratios between wavelengths form simple ratios (for example, two notes an octave apart have wavelengths in the ratio 1:2; notes a perfect fifth apart have wavelengths in the ratio 2:3), to dissonant notes, which sound harsh and unpleasant [3]. Very young infants display this preference for consonance at such an early age that it is not thought to result from the infant learning common intervals from listening to music, and is therefore thought to be an innate preference [4], although it is unclear whether this preference is derived from the signals sent from the inner ear or the neurological processing. Unlike human infants, however, other primates prefer silence to consonant notes and melodies [5]. This suggests an innate response to music in infants that is not learned.

Determining which aspects of music are transferrable between all cultures, and those which are specific to certain traditions, allows us to unravel further the innate, neurological processes that allow music production in humans. All forms of music share a definite beat at regular temporal intervals, which even newborn infants can detect, and when a downbeat in a regular pattern is omitted, brain activity associated with deviation from sensory expectations can be noted [6]. As with simple ratio harmonies, regular beat is present in all music cultures and has a 'hard wired' neurological correlate. At the point of a beat within music, listeners will often feel an urge to move with the music, often with a definite beginning beat at the start of a short, repeated pattern of stressed and unstressed notes. The point at which a listener would naturally move with the music, for example by tapping their foot, is known as the tactus, and indicates an underlying pulse to music. Neuroimaging studies indicate basal ganglia activity when listening to music, and that when listening to a piece of music with a regular beat, areas including the putamen, pallidum and caudate are activated more robustly than in pieces of music with an irregular beat, indicating that the basal ganglia are of utmost importance to perceiving and generating a beat [7]. The involvement of these regions in voluntary motor activity may explain why there is such a pronounced motor aspect to music; even when listening passively, one may feel an urge to move with the music. Additionally, conserved in musical traditions is the idea of transposing a piece, where the relation of a note to others, rather than their absolute wavelength, is important in remembering and recognising musical passages. Infants as young as six months have been shown to recognise musical phrases by virtue of relative, rather than absolute pitch, which is more common in younger infants and in nonhumans [8]. Some adults do retain absolute pitch, especially if they have received musical training from a young age. The ability to detect changes in pitch, rather than decoding their wavelengths may be important from an evolutionary standpoint in the development of language and the ability to recognise voices.

Musical skill, often possessed in greatest abundance by those who have received formal training, is lacking completely in those suffering from a condition known as amusia, with amusics making up an estimated 4% of the population [9]. The condition is characterised by the sufferer finding it impossible to identify differences in pitch between notes or to remember musical phrases, although changes in rhythm and volume can be detected. Amusics suffer no defect to the ear, or the primary auditory cortex, which responds normally to changes in pitch; defects in frontotemporal pathways, and grey matter cortical differences in the frontal lobe are thought to cause the disorder.

Congenital aphasia, a disorder in language, sheds more light regarding the neurological processes important for music. As aphasia can exist without amusia (and vice versa), the processes that govern language and music cannot be exactly the same, although there is a degree of overlap between the neurological systems governing both, owing to their large degree of similarity [10]. Syntax is integral to the composition and interpretation of both music and language, where basic elements combine to form words and sentences, or chords and melodies. One hypothesis based on neuroimaging and neuropsychological studies states that frontal regions common to both music and language perform syntactic processing of information, based on representations of syntactic information found in posterior regions of the brain [10]. By definition, there can be no animal models for experiments involving uniquely human attributes; by using music and language to serve as experimental models for one another, as when studying how aphasia affects amusia, more conclusions can be drawn than when studying either in isolation.

Perception of music has profound effects on the body, which cannot be bestowed by other, non-musical sounds. Dramatic changes of heart rate and other indicators of physiological changes within the body can be detected while a listener is passively listening to musical stimuli. Additionally, intense physical states such as raising of the hair on the back of a person's neck, part of a phenomenon described as "chills", can be exacted by specific pieces of music, often pieces with a perceived tension or release. Subjects report a much higher incidence of chills in pieces of music they know well, and that has previously resulted in the experience of chills [11]. This strong link between



SKYPIXEL/Dreamstime.com

WHAT MUSIC CAN DO *CONTINUED*

the physiological state, emotional state and music forms the basis of music therapy. As with the increased incidence of chills in music known to an individual, music therapy shows increased efficacy when well-liked pieces of music are used, when compared to novel pieces, further securing the link between music, emotion and memory within the brain. The therapeutic benefits of this music therapy are yet to be fully understood, however, if music therapy were able to reduce the pain and discomfort felt by patients, pharmacological pain relief could be reduced. In one study, surgical patients who listened to music before and during the procedure showed significantly lower stress levels to those who heard the normal sounds of the operating theatre with stress levels lowest in patients who were able to choose the music they listened to [12]. Both the enjoyable, calming aspect, and the feeling of control gained by listening to familiar music, appear to be beneficial for patients. Areas within the brain associated with music show connectivity with many disperse areas of the brain, and this expanse of pathways allows music to provide an important role in rehabilitation in patients with brain damage, for example those who have been affected by stroke. Those suffering with a non-congenital form of aphasia following stroke left unable to speak may be able to sing if the damage is localised to a small enough area; pathways involved in singing may be left undamaged, and by using their musical voice, patients may be able to re-access language centres of their brain previously beyond their reach [13], although the benefits provided by music may be limited to rhythmic, rather than melodic cues [14].

Strikingly, music has the ability to change the structure of the brain in drastic ways. In individuals who have practised tasks, and have become more proficient in them, are changing the landscape of their brain by virtue of neuroplasticity. Complex motor tasks such as juggling, in individuals who have practised for three months, are associated with an increase in grey matter volume in temporal regions and the left intraparietal sulcus. This expansion begins to reduce when juggling is stopped, although remains higher than before the skill was acquired [15]. Similarly, when learning a complex exercise on the piano over the course of a few days, the cortical representation of the muscles within the forearm increased [16]. The increased motor skills alone do not account for the changes the brain undergoes while practising music to a professional standard; increased motor dexterity on a keyboard may not be so different from the more common skill of typing, and may not, therefore, be evident in comparisons with controls. Indeed, more specific variations detected in Heschl's gyrus, correlated with an increased ability to detect subtle changes in repeated musical phrases, show a marked increase in activity in musicians [17]. Phrases which are musically incongruous,

either by containing dissonant notes, or non-syntactic or unexpected rhythms, illicit a haemodynamic response in the brains of musicians that is both faster and of greater magnitude than in non-musicians [18]. Increases in frontal lobe activity while solving problems are correlated with an increase in divergent thinking, an important component of creative skills that musicians, especially composers, have in abundance [19]. While it would be obtuse to assume that genetics play no part in musicians' possession of their exceptional skills, it is the neuroplastic changes brought about by a change in behaviour, the countless hours spent practising, that are the most important determining factors in the remarkable characteristics of musicians' brains. This leads to a difficulty in defining the term 'musician' in experimental paradigms, as all individuals display musical talent on a continuum from amusia to that found in a professional musician. The distinction, usually based on professional status or formal training, will always be somewhat arbitrary.

Beyond the simple processing of acoustics, the differences in musical processing in musicians and non-musicians become more apparent, notably in the contrasting activity of hemispheric function. Individuals who do play an instrument, and are responding to a piece of music they are naïve to, show more activation within the right hemisphere, linked with an increase reliance on processing of timbre and melody of the piece while listening; Musicians, particularly those responding to a piece they know particularly well, show increased activation within the left hemisphere, indicative of an increased processing of the syntactic elements of the piece, formed of the individual pitches and rhythmic patterns present [20]. Thinking patterns are closely related with musicianship, with musicians often being intuitive, rather than logical thinkers. This has lead to musicians being found to perform better in verbal memory tasks than controls, thought to be a result of the cortical reorganisation found in musicians [21]. While performing music has no effect on normal age-related hearing loss, the complex processing of speech in a noisy environment, an ability that deteriorates with age, was found to be improved in musicians when compared to nonmusicians [22].

The possibilities for future research into music are near endless, and as the field grows it will prove to inform many disparate fields of study. The congruencies in the processing of music and language allow experimental models and comparisons to be drawn where there is no animal behavioural equivalent. Further understanding of the connections between purely musical functions and those of movement, memory, hearing and emotion will inform the research into these areas. The origins of music itself shed light into how our minds work. As we dissect and study music into infinitely smaller parts, we must remember how effortlessly music has become ingrained into our being, and the words of Elvis Presley - "I don't know anything about music. In my line, you don't have to".

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IT'S JUST A FILM...
MEMORY FACT OR SCIENCE-FICTION?

Yassen Abbas

Who could forget Christopher Nolan's critically acclaimed motion picture, Memento?

Michelle Robek

The human brain is like a billion piece jigsaw puzzle. Its complexity and power is matched by nothing else in the animal kingdom, creating endless scope for artists to explore its beauty, be it through sculpture, painting - or a motion picture like Christopher Nolan's critically-acclaimed *Memento*.

In his film, a psychological thriller, Nolan depicts the life of a man who suffers anterograde amnesia because of a trauma to his brain. As a result, Leonard Shelby (Guy Pearce) is unable to create new memories, causing him to be trapped in an infinite limbo.

The film was screened at this year's Edinburgh International Film Festival (EIFF) as part of the festivals *reel science* strand, one of many neuroscience-based events on show. It was followed by a lecture from University of Edinburgh's Professor Sergio Della Sala, and then open discussion on the credibility of the neuroscience behind the film.

Nolan's depiction of memory is abstract. He creates two separate, alternating narratives, one in colour, the other black and white. The latter is in chronological order and switches back and forth with the former, creating a sense of confusion for the audience mirroring that of Leonard Shelby. Leonard's first memory when he wakes up is of his last before he was attacked, moments before his wife was murdered. Every morning, he believes his wife is still alive. Leonard's body is full of tattoos; a depressing timeline of his life in limbo. It ensures he reads of his wife's death several times a day, every day. And each time is as potent and emotionally draining as the first.

This shows the cruel hierarchical system of brain. For Leonard, any emotion he feels is suppressed by his inability to remember. Therefore, whatever Leonard feels will become obsolete and he is, arguably, partially brain dead.

We often characterise the brain as an array of individually isolated parts. The left is responsible for logic and language whereas the right is the hub for creativity and intuition. Within this jigsaw, individual pieces control aspects which personify us as mammals and particularly humans. From the hypothalamus to the cerebral cortex, each human brain is like no other. With its complexity, is it any surprise that in Nolan's 'masterpiece', there was a mistake that any neuroscientist would be quick to point out?

In the post-film lecture and discussion, Professor Sala pointed out this discrepancy. During a scene in which a neurologist discusses traumatic head injury, the auditory cortex is indicated to be the site of damage which leads to amnesia. Professor Sala compared this to brain scans

of an individual also with anterograde amnesia. The scans highlight the hippocampus, located in the medial temporal region of the brain. It is this which is thought to be responsible for storing memory.

When asked by a member of the audience if it annoyed him when films get the science wrong, Professor Sala said, *"No, it doesn't annoy me when film makers get the science wrong - it's a form of entertainment"*. What he finds really exasperating, he admitted, is when *scientists* get the science wrong.

But how well does Nolan's film accurately depict the experience of someone suffering from anterograde amnesia? Professor Sala felt it to be much better than most. Art is subjective; it is an expression of feeling and thought and it can often exaggerate what is fact. That's what differentiates movies from documentaries, fiction from fact. One is subjective the other is knowledge-based. Unlike Nolan's later film *Inception*, which sensationalises dreaming and the unconscious mind, *Memento* does a good job in portraying the human aspects of such a trauma, conveying the anxiety and most of all the confusion one has with memory loss.

In *Memento* Leonard's amnesia serves as Nolan's paintbrush. It is the basis of the complex narrative as well as both the plot and its several sub-plots. For something that is incredibly complicated, which isn't fully understood by neuroscientists, Leonard's amnesia is perhaps the easiest aspect for the audience to comprehend.

The emotional aspect is less straightforward. Because the audience are able feel for Leonard throughout the film, even though he is unable to sustain long-term emotion himself, instead of disapproval when Leonard murders the man he thinks killed his wife, empathy is the dominant feeling. Because Leonard hasn't just lost his wife, he's lost himself too. And it is he whom the audience mourn.

"With its complexity, is it any surprise that in Nolan's 'masterpiece', there was a mistake that any neuroscientist would be quick to point out?"

CAN WE MODEL SCHIZOPHRENIA IN A MOUSE?

Louisa Lyon

Schizophrenia is a severe psychiatric disorder with enormous social costs for individuals and caregivers, as well as economic costs for society as a whole.

"Only a short time before I was confined to my bed I began to hear voices, at first only close to my ear, afterwards in my head, or as if one was whispering in my ear ... Those voices commanded me to do, and made me believe a number of false and terrible things"

John Perceval (1838)[1]

Nn555 | Dreamstime.com

The so-called 'positive' symptoms of schizophrenia, which include hallucinations, delusions and disorganised thinking, are probably the best known. These, however, can be treated fairly effectively with antipsychotics.

It is the 'negative' symptoms - such as loss of motivation, social withdrawal and poverty of speech - together with the cognitive impairments in attention, memory and problem solving, which evade existing treatment and prevent patients from holding down a job or engaging in society.

SCHIZOPHRENIA'S NEXT TOP MODEL?

The drug discovery process would greatly benefit from a definitive rodent model of schizophrenia, which could be used to identify novel targets and screen new candidate compounds. Hundreds of putative models have been generated, using techniques ranging from brain lesions to genetic engineering to pharmacological and environmental manipulations. But do any of these truly reproduce this very human disease?

In an influential report published twelve years ago2, Barbara Lipska and Daniel Weinberger proposed that a model should have:

- 'face' validity - mimic signs and symptoms of disease
- 'construct' validity - reproduce aetiology
- 'predictive' validity - ability to predict response to medication

Meeting these criteria has proved to be a tough call.

FACE-OFF: HUMAN VS MOUSE

Given that there is no unique biomarker or diagnostic test for schizophrenia, we are forced to rely on symptomatology to confirm the 'face validity' of any potential model. Positive symptoms pose obvious problems: few would accept that a rodent lacking the capacity for language could hear voices or believe their thoughts were being controlled. Negative and cognitive symptoms appear more promising; although not specific to schizophrenia, many do at least have rodent equivalents.

AETIOLOGY: NATURE, NURTURE, AND RISK

To add to the complexity, schizophrenia is a heterogeneous disorder both in terms of symptoms and aetiology. In order for our mouse model to have construct validity, the causes of 'mouse schizophrenia' should resemble those of 'human schizophrenia'. But the causes of schizophrenia are multiple and complex.

With heritability estimates of up to 80%3, schizophrenia undeniably has a strong genetic component. Schizophrenia cases, however, tend not to result from single gene mutations. Instead polymorphisms in multiple genes each confer a slightly increased risk, with different genes implicated in different individuals.

Many of these polymorphisms are in the non-coding regulatory regions of genes, meaning that their effects are probably far more subtle than the knockout or transgenic mice generated to study them. Such animals can help us to identify mechanisms relevant to schizophrenia, but they cannot be considered truly complete models. In this regard, rare chromosomal events that dramatically increase risk, such as the DISC1 (Disrupted-in-Schizophrenia 1) translocation 4 or the 22q11 microdeletion5, may be more informative.

A multitude of environmental factors, ranging from when you're born to where you live, also affect risk6. Some rodent models directly mimic factors identified as risks in humans, e.g., prenatal viral infection, while others use rodent-equivalent stressors, such as isolation rearing. As with gene mutations, however, these individual manipulations represent only pieces of the schizophrenia jigsaw.

Increasingly, schizophrenia is viewed as a neurodevelopmental disorder in which genetic and environmental risk factors interact early in life to create a brain predisposed to psychosis. Events occurring around adolescence then trigger some predisposed individuals to develop the disorder. Crucially, however, the causative factors may not be precisely the same for any two individuals7.

TREATMENT: TACKLE EACH SYMPTOM IN TURN?

Faced with such complexity, it is unlikely that any single model will ever be perfect.

Rodents are, however, a valuable tool for studying how environmental and genetic factors interact to produce abnormal brain development, a process that appears to lie at the heart of schizophrenia and one which is difficult to study in humans. Rodents also remain our best bet for modelling processes known to be disrupted - e.g., the functioning of interneurons - and then attempting to reverse those disruptions using drugs.

Encouragingly, cognitive deficits account for much of the long-term disability associated with schizophrenia, and these may be amongst the most plausible to model - and to attempt to treat -even if treating negative symptoms remains elusive.

'Divide and conquer' might, therefore, be the way to go.

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BLUFFER'S GUIDE TO...

MICRONEUROGRAPHY: HUMAN IN VIVO PHYSIOLOGY

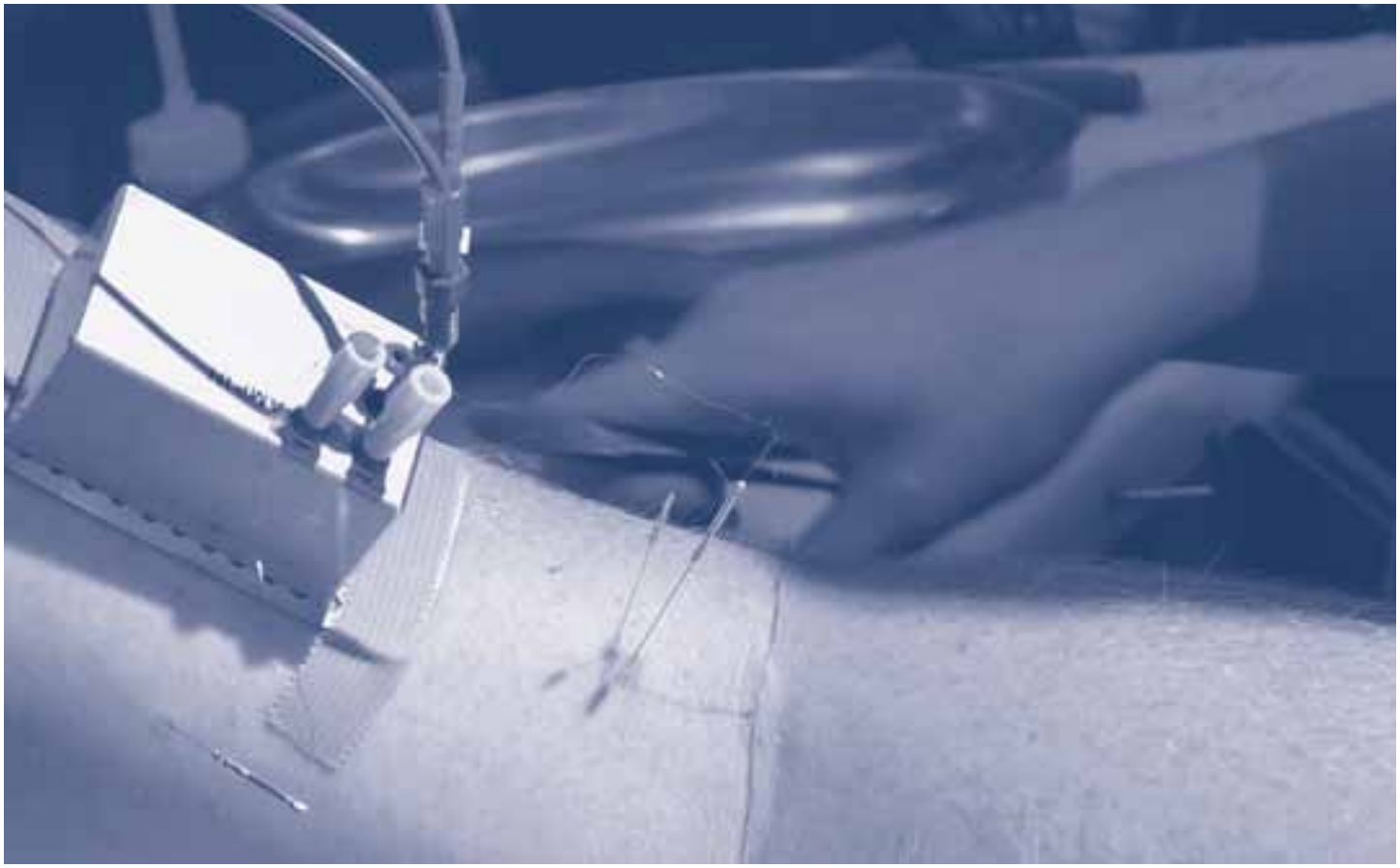
Rochelle Akerley

Microneurography is a method for obtaining in vivo recordings from the human nervous system. It is used for studying peripheral afferent and efferent nerves and was first developed in the mid-1960s by Karl-Erik Hagbarth and Åke Vallbo, in Sweden. This technique enables us to investigate both myelinated and unmyelinated axons, such as cutaneous afferents involved in touch, temperature and pain. Microneurography was initially developed due to Hagbarth and Vallbo's interests in motor control, especially in the muscle spindle. A significant amount of microneurography work now also focuses on recording from sympathetic efferents, for example involved in the baroreceptor system. There are also clinical applications for microneurography, such as evaluating neuronal activity in neuropathy.

My research into sensory and motor control includes work on the sense of touch: this is where the technique of microneurography provides an exciting insight into human sensation. I first learned in vivo recording in rats with Prof. Peter Redgrave at the University of Sheffield and then in my PhD with Prof. Richard Apps at the University of Bristol. This experience enabled me to step into the fascinating world of in vivo physiology in healthy humans. I now use microneurography at the University of Gothenburg, in Sweden, where Åke Vallbo is an Emeritus Professor. I take part in these experiments on a regular basis with Dr.'s Johan Wessberg and Helena Backlund-Wasling, who are both experienced microneurographers.

"...it is very strange to experience a distinct sensation in your hand but see that nothing is touching it"

In our experiments, it is essential that the participant is able to sit very still for a long time: the experiments can last up to 8 hours. We insert fine microelectrodes, which are thinner than ones typically used in acupuncture, into afferent nerves in the upper arm. We locate the nerve by first inserting an electrode for microstimulation. When we are close to the nerve, the person can actually feel a sensation in their skin during microstimulation, even though they are not being physically touched. As well as being the



experimenter, I have also been a subject in these experiments and it is very strange to experience a distinct sensation in your hand but see that nothing is touching it. Once we have verified the depth and location of the nerve, we insert another electrode parallel to the stimulating electrode, from which we can record single unit neuronal responses.

The search procedure can take hours in microneurography and is dependent upon the requirements of the experiment (some nerves are more difficult to locate) and also the individual participant's anatomy. However, once the nerve has been found, it is an amazing experience to record single unit responses from an awake human. During the recording phase of the experiment, we stroke the skin to stimulate all the sensory endings there so that we can actually 'see' and 'hear' the neuronal responses on screen and through headphones. When a single unit is obtained, we have paradigms for stimulating the skin, such as applying a moving grating stimulus at a controlled force and velocity to the finger tips.

There are risks associated with microneurography, as it is an invasive technique. During the development of the technique in the 1960s, Hagbarth and Vallbo used their own nerves to test on before recruiting volunteers. However, only minor sensory after effects have been found and these soon resolve. This is in part due to the extensive training required for microneurography. In all, microneurography is a unique method that enables us to investigate single unit neuronal responses from humans; both experimenters and participants alike are fascinated by seeing and hearing nerves firing in real-time.

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MEETING REPORTS
21ST BNA NATIONAL MEETING

Anne Cooke reports on the 21st BNA National Meeting, 17-20 April 2011, Harrogate

"Two questions: how did the brain evolve? And how does it manage to function? - it could break in so many ways!

- Seth Grant, Edinburgh Neuroscience

Although these words were used in one specific talk, they summarise why all 700+ neuroscientists had gathered in Harrogate for the BNA's 21st National Meeting. How does our amazing brain develop? How does it work? And, when it breaks down, can we restore function again?

It would be impossible to cover four busy days of talks, posters, workshops, dinners and debates in a 200 word report. I hope, therefore, that these photos provide a few fond memories - and encourage everyone to come to the next (really!) big BNA meeting, the 2013 Festival of Neuroscience (see advertisement, page 47).

Congratulations to all who worked to make it such a successful event. It was the first national meeting to be co-ordinated and run by a BNA office team; undoubtedly having Arciris Garay-Arevalo (Administrator) and Hannah Critchlow (Co-ordinator, on secondment from Cambridge Neuroscience) dedicated to running BNA for the last two years has brought many benefits. Thanks also go to Outgoing-President Trevor Robbins, the program committee, the Scientific Advisory Board, all sponsors, and The Gatsby Charitable Foundation for its ongoing support.

Full report available at bna.org.uk

All photos credited to Anne Cooke

BNA EXPLORES THE AUTISTIC MIND

CHELTENHAM SCIENCE FESTIVAL, 10TH JUNE 2011

Anne Cooke

The challenges of autism can be immense, as any parent of an autistic child will attest, and this is reflected by neuroscientists' commitment to improve its understanding and treatment.

Brain disorders of human behaviour, however, are never simple. Autism, and Asperger's syndrome, may have limitations in some capacities but what about the positives? Would it be more accurate and helpful to picture a normal distribution across the population, where each of us fall somewhere along a continuous scale, rather than labelling autism as a disorder?

BNA opened up the science and the debate to a sell-out audience at this year's Cheltenham Science Festival, bringing together lead researcher Simon Baron-Cohen (Cambridge); Jon Adams who has Asperger's Syndrome; and the partnership behind 'Pig Pen', Ben Connors and Gabriel Hardistry-Miller, a non-verbal autistic man.

Simon's talk immediately introduced the notion that autism has both positives and negatives. He described the impairments, the low ability to read faces and emotions, and that there are associated abnormal regions of the brain. Typically, however, autism brings great aptitude for systemising. This can be used to beneficial effect; his research shows that the systemising skills of children with autism can be exploited to help teach them to read emotions.

Being repeatedly told, "It's your fault" is never going to bring out the best in anyone, yet Jon Adams could use it as a catchphrase for his years at school. His quietly moving account of growing up, eventual diagnosis, and ultimately turning Asperger's to his advantage brought both admiration and insight to the condition. Complexity and sequencing hold particular affinities for him, and he's made use of this, with flair, by applying to his chosen fields of both geology and art. As he said, he may not be able to read people, but he can read stones.

When artist Ben Connors first met Gabriel Hardistry-Miller, he couldn't have dreamt that the two of them would go on to found a music, performance and poetry club called PigPen. Ben had just taken on the job of being a mentor to Gabriel, whose autism means he uses just a simple yes/no device to communicate. Despite - or maybe because of - such limitations the two of them have developed a mutually beneficial and successful team. They gave a powerful illustration of how even extreme autism has hidden riches.

Discussion continued to focus on the positives. With many audience members having personal experience of autism, their comments emphasised the ways around the problems rather than see them as dead ends, with people offering accounts, ideas and practical advice.

There was an optimism that autism will move on from being 'just' a disorder to gaining its rightful place in society - as just one approach among many for how the human brain interprets, and tackles, human life.

Images from the top:

Chelt Q and A: Delegates ask policy questions.

Chelt Pig pen: Gabriel Hardistry-Miller and Ben Connors

Chelt Simon B-C: Simon Baron-Cohen

Chelt Speakers: Gabriel Hardistry-Miller, Ben Connors, Jon Adams and Simon Baron-Cohen.

All photos credited to Anne Cooke.

MEETING REPORTS

HEARTS, MINDS AND ANIMALS AT BRISTOL ZOO

Samantha Lane describes the symposium 'Translational physiology: Heart and minds what makes us tick?', 6th June 2011

So…what really makes us tick?

A flurry of early career scientists abandoned their lab benches across the UK to gather at Bristol Zoo's Conference Centre, and attend the Young Physiologist Symposium 'Translational physiology: Heart and minds what makes us tick?'

The day featured talks and posters from PhD students and post-docs, presenting their work in fields of both neuroscience and cardiovascular research.

These were bookended by talks by two inspiring guest speakers. First, Dr. Gavin Clowry gave a fascinating insight into developmental pathway of the human corticospinal motoneurons. Professor Saadeh Suleiman finished the day with a cardiovascular talk which demonstrated the progression of cardiovascular discovery on the bench to the bedside within the clinic, even including footage of open heart surgery.

Lunchtime made it a day with a difference: delegates had the chance to make acquaintance with meerkats, penguins, and two new additions to the Bristol Zoo; Jayendra and Kalyana the lion cubs.

With a wine reception and a sit-down dinner too, it was an amazing day for all delegates, who will reap the benefits as they make their first, early steps into their science careers.

Supported by The Physiological Society, physoc.org

THE BRAIN AND ALL THAT JAZZ

Cara Featherstone reports on the Neurosciences and Music IV conference, 9-12th June 2011

Four hundred neuroscientists, psychologists, clinical neurologists, clinical psychologists, therapists, music performers, educators and musicologists gathered at New College, University of Edinburgh, for the Mariani Foundation's Music and Neurosciences IV conference. This year's theme, under local host Dr. Katie Overy, was 'Learning and Memory'.

The first strand was the study of musical learning and neural plasticity: neural bases of music processing, sensitive periods, absolute pitch, mental representations and imagery, preferences, and performance. The impact of plasticity on other areas of perception and cognition formed the second strand, showing music training affecting speech processing and working memory. The third strand focussed on the therapeutic role of music: from dystonia to tinnitus, via aphasia, sensory-motor deficiencies, visual neglect, Alzheimer's disease, Parkinson's disease, Williams' syndrome and autistic spectrum disorders, music was shown to aid recovery by providing clear feedback for physical movements, and aiding cortical reorganisation.

Opened by a ceilidh, the conference ended with a scratch jazz gig in which the delegates' musical alter egos had the final word. For full program, visit tinyurl.com/neuro-music-iv

The Neurosciences and Music V is provisionally scheduled for 2014 in France.

Dr. Michiko Yoshie

Jazz Concert at the finish of the meeting.

GENE-ENVIRONMENT INTERPLAY:
SHAPING BEHAVIOUR AND CNS DYSFUNCTION

One-day symposium at the University of Liverpool by Kate Haddley

L-R: Chris Ponting, Yvonne Allen (organiser), Gerome Breen, Ian Deary, Peter McGuffin, John Quinn (organiser), Jonathan Hill, Richard Bentall and Rob Ring.

In September more than 90 delegates gathered at the historic Liverpool Medical Institute for a one-day symposium jointly sponsored by the BNA and The Genetics Society. The theme was gene-environment (GxE) interplay with an emphasis on cognition and brain dysfunction. Experts gathered to present new ideas and explore old ones on how genes and the environment interact to impact on mental health and shape an individual's behaviour. The first session featured Chris Ponting (Oxford), who talked about the comparative genomics of brain function and the development of resources for analyzing cross-species variation. Chris has recently worked on a collaboration assessing genome-wide vitamin D binding sites and their correlation with a number of autoimmune disorders. He encourages members, particularly post-docs, to investigate the computational Genomics: Analysis and Training programme (www.cgat.org), a 5 year programme sponsored by the MRC for the training of computational biologists. Peter McGuffin (KCL), discussed the interaction of nature and nurture in the manifestation of depression/schizophrenia and John Quinn (Liverpool), focused on the modulation of gene expression, on the basis of genetic heterogeneity, for altering an individual's response to the environment such as stresses or drugs.

Following on from that Jonathan Hill (Manchester) presented findings from a GxE study assessing early childhood development as a function of the environment in which the children were raised. His group has found that polymorphisms in the monoamine oxidase A gene which result in a low level of expression when coupled with childhood abuse can increase susceptibility to ADHD and antisocial behaviour. Ian Deary (Edinburgh) discussed the effect of GxE interactions on cognitive ability with an emphasis on ageing and finally Rob Ring, Vice-President for the charity 'Autism Speaks' in the USA related the effort to translate genetic discoveries to clinical implementation in treating Autism and the potential funding opportunities available for doing so (www.autismspeaks.org).

The last session of the day saw Richard Fitzgerald (Liverpool) examine the potential benefits of personalized medicine based on genetic variation in the cytochrome P450 drug-metabolism enzymes in treating brain disorders and developing effective treatments. Finally, Richard Bentall (Liverpool) posed the question: has anyone benefited from genetic research into psychosis? Causing quite a stir amongst the geneticists and firing up a lively discussion which was hosted by Gerome Breen (KCL) and that continued into the wine reception afterwards!

Overall the meeting provided a platform for some lively interactions and the dissemination of new ideas and approaches being applied to the area of GxE interaction and attempted to bring together the two disciplines of 'nature' and 'nurture' as a composite for shaping future experimental studies and collaborations in the ultimate end goal of translating bench science to the clinic.

L-R: Jill Bubb and Alec Simpson discuss the sessions at the tea-break. Robert Connolly and Joanne Gamble talking about the sessions at the wine reception. Delegates enjoy a glass of wine at the end of the talks. Fabio Miyajima, John Quinn (Organiser) and Michael Lyons at the wine reception.

MEETING REPORTS

SCOTTISH NEUROSCIENCE GROUP MEETING 2011

Rod Scott

Professor David Nutt relaxes before his talk

The BNA supports neuroscience events in Scotland and has for many years helped the Scottish Neuroscience Group fund a one-day meeting. The meeting locations move around between Glasgow, Edinburgh, St. Andrews, Dundee and Aberdeen. This year 150 delegates and sponsors (CED, Tocris bioscience, Bioline, Scientifica, Bruker, VWR Jencons, Carmen, Coherent, Enzo life Sciences, PerkinElmer, Merck Millipore, Transnetyx and Lonza), met at the Institute of Medical Sciences and the Suttie Centre of the University of Aberdeen and enjoyed showcase presentations from postgraduate research students and established scientists.

The showcase speakers from across Scotland were Laura Ansel & Lianne Strachan (Aberdeen), Karen Spencer & Peter Moult (St Andrews), Selina Henriquez & Neil Dawson (Strathclyde), Andrea Toell (Lonza) Karen Smillie & Dorothy Tse (Edinburgh), Carl Holmgren & Michael Gallacher (Dundee) Sony Shrestha & David Tarr (Glasgow). They discussed very diverse topics in neuroscience such as new approaches for tranfecting neurones in culture, optogenetic investigations of motor networks, experimental developmental stress and how cognitive deficits in schizophrenia might be reduced.

Talks were also given on behavioural models of Rett syndrome, the influence of T. gondii infection on behaviour, Schema-Dependent Gene Activation and the influence of hyperglycaemia on focal ischaemic damage. At the cellular and molecular levels, there were oral presentations on the input properties of lumbar spinocerebellar tract neurones, synaptic vesicle recycling and bulk endocytosis, endocannabinoid responses at CCK-positive interneuron connections to CA1 hippocampal pyramidal neurones and the involvement of an epilepsy mutation on GABAA receptor gating.

Additionally, 50 posters were presented at the meeting. The audience also greatly enjoyed a thought provoking talk by BNA president Professor David Nutt (Imperial College, London) entitled; "Science in drug and alcohol policy: current oxymoron - future possibility?"

The next SNG gathering will be in Dundee on Friday the 31st of August 2012.

Posters and sponsors in the atrium of the Institute of Medical Sciences at the University of Aberdeen

LEICESTER NEUROSCIENCE DAY 2011 – MODEL ORGANISMS IN NEUROBIOLOGY

Volko Straub

Giles Hardingham answering questions following his presentation.

In January 2011, the Neuroscience and Behaviour Theme at the University of Leicester, which includes neuroscientists from the university and MRC Toxicology Unit at Leicester, hosted its third Leicester Neuroscience Day. The theme of this year's day-long symposium was 'Model Organisms in Neurobiology', and provided a forum to show-case the variety of approaches and expertise in Leicester, to stimulate discussion over which systems we use to model fundamental processes in neurobiology and to increase new collaborations. We had distinguished guest speakers Prof. Lindy Holden-Dye (University of Southampton) and Prof. Giles Hardingham (University of Edingburgh). Lindy gave a interesting presentation on the lessons that can be learned from working with worms, whilst Giles presented an exciting overview of his work on NMDA receptors and their role in neuroprotective and neurotoxic events. In addition, there were talks by Bambos Kyriacou (Drosophila circadian control mechanisms), Jonathan McDearmid (zebra fish neuro-development), Tom Matheson (biomechanics in locusts), Volko Straub (neuronal regeneration in snails), Todor Gerdjikov (mechanisms of perception and attention), Ian Forsythe (synaptic toxicity) and Giovanna Mallucci (reversibility of neurodegeneration in mice). The talks were complemented by a poster session with about 50 posters. The great attendance at the symposium with about 120 neuroscientists from the region clearly illustrated that neuroscience at Leicester is going from strength to strength. The very successful event was excellently organised by Giovanna Mallucci, Jonathan McDearmid and Nick Hartell and was sponsored by contributions from the BNA, Physiological Society, MRC and the University of Leicester.

Lindy Holden-Dye discussing neuroscience during the poster session

SHOWCASING THE RESEARCH OF THE BRAIN INFLAMMATION GROUP

Emily Robinson

Ever wondered what research goes on behind the walls of the University of Manchester? This July the Faculty of Life Sciences threw the doors open and welcomed over 700 members of the public giving people from the local community the chance to meet real scientists and find out about researcher. This included a large contribution by the Brain Inflammation Group (aka B.I.G.), whose research focuses on the detrimental effects of inflammation after brain injury, such as stroke. There were activities aimed at all age groups to engage the whole family. Children could guess the brain weights of different animals or play with a giant slinky to learn about nerve conduction. Older children could take the challenge of the 'guess the fruit' game, where the complex brain imaging technique of magnetic resonance imaging (MRI) which is used by the B.I.G could be explained by looking at MRI images of fruit. Then attendees were guided through posters clearly explaining the research approaches the B.I.G use, including in vitro methods, translational in vivo models and clinical studies. This interaction with the public sparked off some interesting discussions about how stroke research could inform the public about the risk factors of stroke, such as this comment from a visitor: 'there could be opportunities to introduce small changes in lifestyle through this research to encourage people to avoid being at risk of stroke', which will be a future aim for the B.I.G's public engagement work. Also the feedback from the public was very positive 'Very interesting and presented in a very understandable way', 'you should do this more often. Keep up the good work'. Find out more about the research and public engagement work undertaken by the B.I.G. via the @BIG_research twitter page https://twitter.com/#!/BIG_research

School Children learn about nerve conduction by playing with a giant slinky.

MEETING REPORTS

A STUDENT'S VIEW OF A BNA SYMPOSIUM

Gosia Borkowska

A Few of the Symposium Speakers (l - r) Prof David Price, Dr Iroise Dumontheil, Prof John Hardy, Dr Thomas Bak, Prof William Deakin and Prof Mike Cousin

The BNA Symposium, 'Neurodevelopmental disorders across the lifespan', was hosted by Edinburgh Neuroscience, University of Edinburgh on 8th and 9th of September. Since my research interest is neurodevelopmental & genetic aspects of psychiatric disorders, this meeting was not to be missed. The programme promised brilliant speakers so it was no surprise that over 130 participants registered and more than 30 posters were presented.

The audience at this symposium was diverse, so it began with a concise introduction to brain development; Dr Andrew Jackson explained how, through studying microencephaly, genes involved in determination of the brain size and the mechanisms behind it were recognised. Prof David Price presented a bigger picture of how particular brain structures are formed with a close-up on the mechanisms behind it: genetic patterning, proliferation and migration. Finally, Dr Guilermina Lopez-Bendito explained the mechanisms behind connectivity in the brain by looking into axonal path-finding of thalamocortical system.

The symposium then started to address disorders of development: Prof Adrian Bird showed that, using the mouse model of Rett syndrome, variation in the significance of disorder-related proteins across the lifespan might lead to clues regarding the employment of gene therapy even after onset of the disease. The final talk of this stimulating day was the Plenary Lecture given by Prof Daniel Geschwind who illustrated the need for a multi-level approach to studying complex genetic disorders like autism and the necessity of taking a normal variation into account when studying brain disorders. Day one ended on a surprisingly hilarious note with David Price and David Sterratt showing the excruciating pains and hidden pleasures of writing a science book at the Joint Book Launch of 'Building Brains' and 'Principles of Computational Modelling in Neuroscience'.

Day two of the symposium started with a strong coffee for most of us and an introduction to synapse formation by Prof Nils Brose and the implications of the functional synapse in neurodevelopmental disorders like Autism Spectrum Disorder (ASD). From there, Dr Noboru Komiyama focused on post-synaptic functionality adult neurogenesis, implying possible usefulness of this phenomenon in clinics. From the post-synapse to the pre-synapse, Prof Mike Cousin in a straightforward manner showed the stimulus-dependent way of the vesicle recycling, the proteins involved in this process and how this knowledge could be of use in understanding epilepsy. On this note, Dr Richard Chin argued whether epilepsy should be considered a neurodevelopmental disease and concluded by categorising epilepsy as a syndrome which stems from the interplay of various genotypes with environmental factors. Next, Prof Stephen Warren gave an overview of the most common single-gene mutation cause of autism, the Fragile X Syndrome; concentrating on the involvement of both the excitatory and inhibitory systems and potential therapies emerging from it. Finally, Dr Iroise Dumontheil presented series of functional imaging studies showed involvement of the rostral prefrontal cortex in disorders such as ASD, Attention Deficit Hyperactivity Disorder and schizophrenia.

The second day of symposium ended with three lectures related to late onset disorders. Dr Mandy Jonstone emphasized the importance of rare copy number variants in genes involved in brain development as a genetic aspect of schizophrenia. Prof William Deakin explained how single nucleotide polymorphisms contribute to the risk of acquiring depression and how a subtle interplay between the genetics, life experiences and environment confers to the disease phenotype expression in later life. Prof John Hardy illustrated the traps of the genome wide association studies (GWAS), encountered in Alzheimer's disease, the difficulties in interpreting its outcome and how this could inform studies in neurodevelopment.

Dr Thomas Bak summed up the meeting with a short talk highlighting the 'jungle of phenotype' in otherwise characterised diseases; where there is a need to integrate various experimental approaches to neurodevelopmental disorders.

BOOK REVIEWS

BUILDING BRAINS: AN INTRODUCTION TO NEURAL DEVELOPMENT

David Price, Andrew P. Jarman, John O. Mason, Peter C. Kind

ISBN 978-0-470-71229-0

Reviewed by Katie Long

The adult brain is a highly complex organ, with each cubic millimetre of the cerebral cortex containing around one billion synapses. Development of the brain must therefore be a highly orchestrated and sophisticated process. For those coming into the field of neuroscience for the first time, whether it's through an undergraduate course or as a postgraduate, trying to understand neural development is a daunting challenge – one which the authors are hoping to make more accessible.

The book starts out with the basics, introducing the main model systems used in the field, then builds up levels of complexity with each chapter, ending with experience-dependant development in the visual system. This allows the reader to get to grips with fundamental ideas first, before being introduced to more complex concepts.

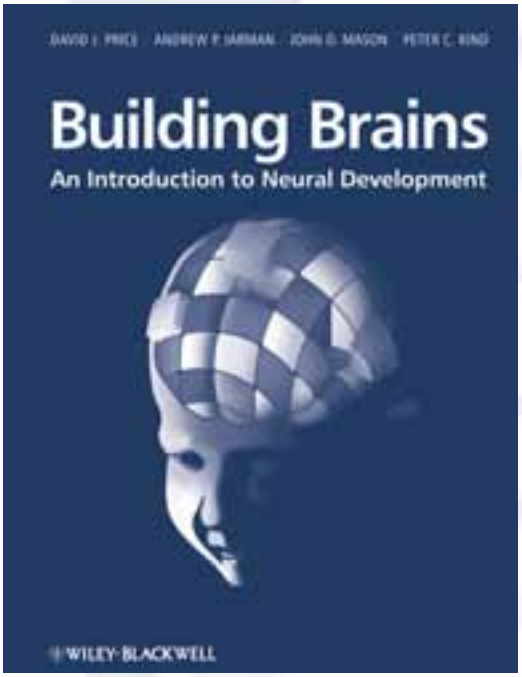
The key to making this book so accessible is the high number of figures; in fact, it's a challenge to find a page without one! Figures are large and easy to follow, either on or within a page of the corresponding text. The colour schemes used are maintained throughout the book, for example neuroectoderm is always represented in orange and presynaptic axons in blue. Alongside each figure, and the corresponding text, are small black icons to show the reader which model organism was used.

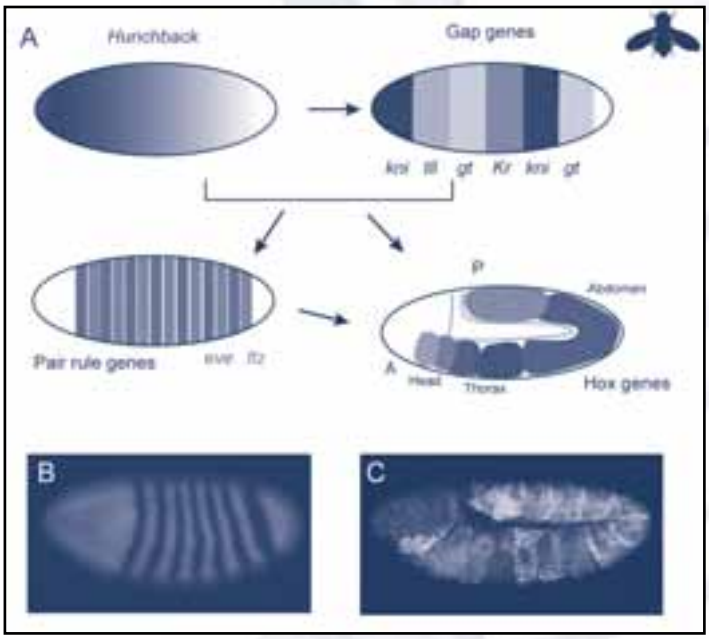
It would be helpful to have an index of the figures used, as many of them are clear enough to stand alone – however, they are available on the accompanying website. Accompanying the graphical figures, often used to illustrate a fundamental point, are striking images from publications, bringing the experiments to life. A good example of this is figure 4.4 (shown).

Another way the authors have made this text accessible is with the layout and organisation. Each chapter starts with a short introduction and ends with a bullet point summary. Chapters are divided into sub-headed sections, breaking down the complex subjects into more digestible ideas. Additionally, at the top of each page are the chapter title and subheading, making the book easy to navigate, especially when studying.

My favourite features of the book - which I would have liked when studying as an undergraduate - are the in-text glossary and further reading references. Key words and phrases are highlighted within the text, with their definitions alongside in the margin. There are also references within the footnotes for related research articles and websites for those interested, as well as a chapter by chapter guide of suggested reading at the end of the book. These links to further reading, and the use of text boxes, allow the main text to flow well, but give plenty of opportunities to find out more for those interested.

If I were to come into the field again, Building Brains would be well worth a read. I think the authors have met the challenge of making neural development accessible, whilst keeping it enjoyable too.





BOOK REVIEWS

PRAGMATIC NEUROETHICS: IMPROVING TREATMENT AND UNDERSTANDING OF THE MIND-BRAIN Eric Racine

ISBN 978-0-262-01419-9

Reviewed by Hanno Koppel

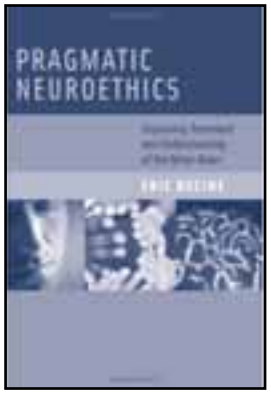
In the excitement that followed the first successful transplantation of a human heart in 1967, a significant question seemed to remain unasked; no-one seemed to want to know why, if the UK and the USA were the global leaders in transplant research and surgery, it was South Africa that claimed the first success in the field?

Some people might find the full answer to this question distasteful, but sadly the answer is racial inequality meant that experimental surgery was less restricted in South Africa than the UK and US. And it is ethical considerations that handicap or promote biomedical advances that are addressed in this book. Ethics constitutes the red-and-white striped pole that needs to be raised to allow passage from the laboratory into the surgeon's theatre, physician's consulting room or pharmacy. To look at that barrier, and at the issues that raise and lower it, is always a true, fruitful and vigorous debate.

In an era in which neurological and mental health problems are burgeoning (or, perhaps, awareness of them is increasing), it is becoming ever more important to understand the way in which advances in neuroscience can be applied.

Eric Racine holds a list of distinguished academic appointments, including directorship of the Neuroethics Research Unit in Montreal, so he would seem to be well-placed to explain the ethical challenges that confront both patients and their doctors in neuroscience. In his book, "Pragmatic Neuroethics", despite a mildly irritating tendency to frequently split infinitives, he fully justifies that expectation.

The inclusion of the word "pragmatic" in the title of this book refers to the practical, multidisciplinary methodology that seems to be the most interesting and fruitful way of working with neuroscience. The subtitle, "Improving treatment and understanding of the Mind-Brain", conveys some significant components of Racine's slant. For example, it is not either just about the abstract, academic side of ethics, or just about pushing applications, but about integrating the theoretical and the applied to develop a rounded, balanced approach.



Very wisely, Racine openly states he is giving a subjective approach that is limited by his own training and understanding. For instance, he explains that he does not address legal questions as he is not qualified to do so. Not only is such honesty refreshing, it generates a confidence that he knows about the areas that he does address.

Racine sets out four main goals of his book: reviewing pragmatic neuroethics; providing a theoretical approach that will address some ethical problems; using a pragmatic and empirical approach to address some key issues; and to look at future challenges and directions.

In his review of neuroethical studies he refers to a series of current debates. For example, Racine looks at media coverage of some notable neuroethical debates, incorporating public understanding – well, maybe that is not exactly the right word in this context – of the issues.

These are complex and difficult matters to address, and deeply painful for those living directly, or vicariously, through the distress of neurological disease. Yet history suggests that they do seem to be manageable. Heart transplantation, a procedure that was once wrought with bitter controversy (the fact that the donated heart was still beating gave rise to the notion that the donor must be still alive) is now routine. Thousands of people a year survive only because the ethical debates confronted the difficult and painful matters of the day.

Medical research has a lot to do with money, power and fame, but it is also about the people who, as Racine puts it, suffer in silence. Ethics is the tool that helps to untangle these conflicting factors in order to decide the right thing to do. The pragmatic approach, as championed by Racine, takes the subject out of the ivory tower and places it firmly and accessibly in front of every one of us to use.

DIARY

2012

14 -18 JULY
8th FENS Forum of Neuroscience

Centro de Convenciones Internacional de Barcelona (CCIB), Spain

http://forum.fens.org/2012

16 - 19 AUGUST:
Trends in Psychiatric Genetics and Neurobiology

Fortaleza, Ceara State, Brazil

Details to be announced.

2013

7-10 APRIL
Festival of Neuroscience

Barbican Centre, London

Celebrating the Sciences of the Brain and Mind

The BNA's biennial meeting in 2013 will be a unique event. At least eleven societies with a neuroscience interest - both clinical and non-clinical - are partnering with the BNA to create a meeting with over thirty symposia and seven plenary speakers presenting the best neuroscience research. As the Barbican Centre is one of London's main entertainment venues, a major public engagement programme will also be organised to enable members of the public to interact with scientists, carers, charities, funders, policy makers... and some well-known celebrities with experience of mental health issues. More details will be released throughout 2011 - please check events on the BNA webpage for updates http://www.bna.org.uk

- PUT THE DATES IN YOUR 2013 DIARY NOW!

FENS - IBRO EUROPEAN NEUROSCIENCE SCHOOL PROGRAMME

We would like to inform you, that the call for student applications for the FENS-IBRO SfN School

Chemical Senses: Neurobiology and Behavior is open. Bertinoro, Italy - 3 - 8 June 2012

The goal of this School is to introduce PhD students and postdoctoral research trainees, already well prepared in neuroscience and related fields, to current understanding of the behavioral roles, functional organization, and neurophysiology of chemosensory (olfactory, gustatory, vomeronasal, and trigeminal) systems.
Beginning with consideration of the chemical nature of the natural stimuli for which these systems are adapted, as well as their sensory ecology (the "behavior" of the stimuli in the environment), the program will unfold through detailed examination of each system as it is studied in experimentally favorable animals.
Finally, chemosensation in humans and other mammals will be considered from the viewpoints of animal behavior and clinical science. Visit the schools' website for further information.

Deadline for applications: 23 January 2012

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Borkowska, Gosia: is a PhD student in Biomedical Sciences (Developmental Biology) at the University of Edinburgh.

Bowman, Katherine: is a medical student at the University of Manchester, and Events Director at Fastbleep, a social enterprise for medical education (fastbleep.com).

Brooks, Joanne: is a postgraduate research student in the department of psychology at the University of Edinburgh with an interest in hemispheric asymmetries in attention and working memory across lifespan.

Burnett, Stephanie: did her PhD at the UCL Institute of Cognitive Neuroscience with Sarah-Jayne Blakemore and Chris Frith and is currently a postdoctoral research associate with Masud Husain at the UCL Institute of Neurology.

Clowry, Gavin: is a researcher and senior lecturer at the Institute of Neuroscience, University of Newcastle. He works on the development, plasticity and repair of the nervous system, particularly the sensorimotor system.

Cooke, Anne: is the Facilitator and Communications Manager at the Bristol Robotics Laboratory and co-ordinates 'Bristol Neuroscience', at the University of Bristol, which represents and promotes all aspects of neuroscience in the local area.

Davis, Vanessa: is the manager at the Neuroscience and Mental Health Research Institute at the University of Cardiff.

Featherstone, Cara: is a researcher in cognitive neuroscience whose work uses the properties of music and language to study general principles of human cognition

Freguelli, Bruno: is a researcher at the University of Warwick and the current BNA secretary.

Haley, Jane: Originally a neuroscience researcher, Jane Haley now develops and co-ordinates neuroscience and public engagement programs as administrator for Edinburgh Neuroscience.

Jewell, Matthew: Studied Human Anatomy and Cell Biology at the University of Liverpool and has a keen interest in music and the brain, digital editing and medical communications.

Koppel, Hanno: Previously a neuroscientist and anatomy lecturer, Hanno is now an NHS psychotherapeutic counsellor working with asylum seekers and ethnic minorities.

Lane, Samantha: is a final year PhD student in the department of Physiology and Pharmacology at the University of Bristol investigating the interaction between Noradrenergic neurones and astrocytes.

Long, Katie: is a third year PhD student at the University of Edinburgh, investigating the role of adhesion molecules in neural stem cells in vivo.

Lyon, Louisa: is currently on the Wellcome Trust 4 year D.Phil Programme in Neuroscience at the Wellcome Trust Centre for Human Genetics in Oxford studying the role of group II metabotropic glutamate receptors.

Periera, Laura: is the External Liason Co-ordinator at the Institute of Neuroscience at the University of Newcastle.

Robinson, Emily: is a PhD student researching with Stuart Allen at the University of Manchester.

Rose, Steven: was Chair of Biology at The Open University and is now retired but continues to contribute to the field via several popular science books and media interviews. He regularly writes for The Guardian.

Sahakian, Barbara: is based at the University of Cambridge and researches the neural basis of cognition, emotion and behaviour, developing drugs for psychiatric disorders, and is passionate about developing the field of neuroethics.

Scott, Rod: is a researcher investigating the properties of neuronal voltage-activated Ca2+ channels with a focus on sensory neurones at the University of Aberdeen.

Starkey, Sarah: worked in neuroscience research (GSK) on in vitro models of disease, using electrophysiology and voltammetry. She now studies bioelectromagnetics and looks after her children.

Straub, Volko: is a fellow in the Department of Cell Physiology and Pharmacology at the University of Leciester investigating intrinsic neuronal properties and their short and long-term modulation with a particular emphasis on the neuromodulatory role of nitric oxide and serotonin.

Thomas, Owen: was an intercalating medic at the University of Birmingham working in Thelma Lovick's lab to investigate the role of dopamine neurons in the Ventrolateral Periaqueductal Gray (vPAG) in the control of the micturition reflex.

Are you interested in submitting items for the Spring edition?

We are particularly interested in scientific articles from scientists at all stages in their career including students.

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