

December 2010: 15 minutes to learn a new word?

Faster rehabilitation for stroke patients may be possible if treatments can harness the brain's natural ability to remember and store new words in its long term memory, according to scientists from the CBU. Researchers led by Yury Shtyrov have found that after just 15 minutes of listening to a new word, the brain creates new networks of neurons to make up a long-term memory trace. This process happens far quicker than previously thought. The study complements previous research by the same group of CBU scientists to develop a treatment called constraint-induced aphasia therapy (CIAT), in which stroke patients who suffer from chronic language problems significantly improved their ability to speak and understand language after a short series of intensive speech-language-therapy sessions. In the latest study, the researchers attached electrodes to the heads of 16 healthy volunteers and recorded electrical signals generated by their brains while they listened to 160 repetitions of new made-up words and familiar words. Scientists analysed how the brain activity changed over a period of 14 minutes as the made-up word became more and more familiar. Brain activity in response to these new words increased until the new memory traces were virtually indistinguishable from the memory traces of an already familiar word. Dr Yury Shtyrov who led the study said *"We now know that even a little practice can lead to changes in the brain and the formation of new brain 'networks' that help us to memorise words. This research suggests that faster rehabilitation may be possible if treatments for people with brain damage, such as stroke patients, target the brain's ability to rapidly create these memory traces. The next step is to test this theory in patients affected by stroke or other types of brain damage."* The paper 'Rapid Cortical Plasticity Underlying Novel Word Learning' is published today in the *Journal of Neuroscience*, and has received national press [coverage](#).



December 2010: Wellcome Trust award for Transitions of Consciousness study

The Wellcome Trust has awarded a Research Career Development Fellowship in Basic Biomedical Science to Tristan Bekinschtein of the CBU. In the next five years the questions to tackle with this prestigious grant are 'How do we fall asleep?' 'How do we lose consciousness while being sedated?' 'How do we regain awareness?' It is the aim of the Transitions of Consciousness project to map the behaviour and brain activity while our consciousness is fading (and coming back). Tristan Bekinschtein and collaborators will measure brain activity while individuals are listening to, or responding to, a series of sounds or words while falling asleep or undergoing sedation. Such tasks will allow them to investigate the ways in which the mental abilities we employ while awake, such as paying attention and decision making, change as we fall into natural or induced states of unconsciousness, and how they are recovered when we get back to be fully conscious. This project has many exciting applications in neuroscientific research and in the clinic. The award covers MRI scanning, computing costs, equipment and a research assistant for five years.



November 2010: Phil Barnard's contemporary dance research on BBC2

Phil Barnard, senior scientist of the CBU appeared on BBC2's Culture Show this week, talking about his long standing collaboration with contemporary choreographer Wayne McGregor and dance researcher Scott deLahunta. Phil admits he knew nothing about contemporary dance before beginning the project, but over several years Phil and Wayne have developed new techniques to help the dancers create innovative movement vocabularies. The longer term project has involved challenging the boundaries between

art and science, with Phil collecting data on movement creation in the studio and then using that to motivate alterations to Wayne's making processes. Three types of imagery techniques, derived from basic theoretical work undertaken here at CBU, are now used in the studio by the company to help enrich the dancers ideas and to help them avoid



producing the kinds of movements that are characteristic of their existing repertoire and therefore familiar rather than novel. Our CBU bibliography lists four papers about this work, and the most recent work, touched on here, should come out in 2011. See the show on BBC iPlayer [here](#), or the Wayne McGregor | Random Dance [website](#) (select R-Research), and watch out for more coverage of this work in a feature length documentary by Catherine Maximoff called Wayne McGregor Going Somewhere which illustrates both the creative processes and the data collection methods in more detail.

November 2010: Social Brain Workshop for April 2011 launched

Next year the MRC Cognition and Brain Sciences Unit, will hold a workshop on the Social Brain - Evolution, development, psychopathology and future directions. The two day workshop, to be held on 12th and 13th April 2011, is being organized by Dr Dean Mobbs of the CBU with Prof. Trevor Robbins and Prof. Ian Goodyer of Cambridge University, and will provide audience members with up to the minute coverage of social neuroscience and make translational and theoretical connections between human brain imaging, comparative research and neuropsychiatric disorders. The workshop will include many of the world leaders in the area of social neuroscience. Abstract submission is now open and papers can be emailed to our dedicated email address [socialbrain2011@mrc-cbu.cam.ac.uk], and more details of the workshop can be found on our Social Brain [web page](#).

November 2010: How intelligence happens



In a new popular science book, *How intelligence happens*, John Duncan of the CBU explains the creation of intelligence in the human brain. He says: "Human intelligence has become one of the greatest forces on earth, and how it can emerge from a biological brain is one of the great scientific mysteries. In 1951 Karl Lashley, one of the fathers of modern neuroscience, looked forward to 'a physiology of logic', and in *How intelligence happens*, John tells the story of how this dream is beginning to be realised. The clues come from many places – the experimental psychology of intelligence testing, the study of how minds change after brain damage, the effort to build thinking computers, and modern experiments in brain imaging and neurophysiology. Putting these clues together, we see how brains break complex problems into solvable parts, assembling these fragments into the elaborate mental programs that allow us to navigate to work, conduct an argument or solve a geometrical problem." *How intelligence happens* is published in November by Yale University Press.

John is assistant director of the MRC Cognition and Brain Sciences Unit in Cambridge, having worked here since 1978. He is also honorary professor of cognitive neuroscience at the Universities of Cambridge and Bangor, visiting professor at the University of Oxford, and fellow of the Royal Society and the British Academy. For the past thirty years, his research has focused on linking human mind to brain. He is best known for his work on attention, intelligence and the frontal lobe.

November 2010: MRC Annual Review 2009-10 launched, with CBU research features



Shakespeare famously divided humanity into seven ages. The MRC Annual Review 2009/10, launched online today, borrows this theme to show how MRC-funded research benefits everyone, at every stage of life. The impact of medical research begins before we are even born, through research on genetics and fetal development. It improves health across the human lifespan from infancy to old age. Seven ages tells the stories of MRC scientists behind some of the most exciting discoveries from 2009/10 and of people of all ages who have benefited from their findings. CBU research and scientists are featured in many of the sections, see links below or read the whole review [here](#).

[Martin Monti](#) on probing the boundaries of consciousness.

[Andy Calder](#) on why disruptive teens don't recognise frowns.

[Adrian Owen](#) on vegetative patient communicating by thought.

How newborns can hear [danger](#).

November 2010: Tarantulas help researchers examine how fear is processed in the human brain

The human brain may respond differently to threats based on proximity, trajectory, and expectations, according to a study with tarantulas published this week. Dean Mobbs of the CBU used functional magnetic resonance imaging, or fMRI, to observe brain activity in 20 human study participants while the subjects watched what they believed to be live video of a tarantula placed near the participant's foot. Though the video actually showed previously recorded films, the subjects believed that the spider was real and placed into one of six compartments that the researchers manipulated to entice the spider to move toward or away from the subject. Participants reported their expected and actual fear experiences throughout the experiment. The results suggest, according to the authors, that different components of the brain's "fear network" serve specific threat-response functions - information which may help researchers diagnose and treat patients who suffer from clinical phobias. Read more [here](#).

October 2010: Educational visit enjoyed by all

CBU recently enjoyed playing host to 25 sixth-form students who were taking part in a neuroscience residential course that took place during half term week at Villiers Park, a local Educational Trust. Villiers Park is a national charity working to remove some of the barriers that can prevent young people from making the most of the educational opportunities available to them, in particular helping young people from less advantaged backgrounds achieve their academic potential. The week long neuroscience course gave the students a great opportunity to develop an understanding of how the brain works and what happens when damage takes place, and CBU were delighted to welcome the students for an afternoon of talks, activities and tours of the Unit, including Olaf Hauk hosting a visit to the MEG lab as seen pictured here with a willing MEG cap-wearer. Read the Villiers Park report [here](#).



October 2010: New Unit director appointed



Professor Susan Gathercole, who is currently the Head of the Department of Psychology at the University of York, has been appointed as the successor to Professor William Marslen-Wilson as Director of the MRC Cognition and Brain Sciences Unit in Cambridge. To facilitate the strategic partnership between the Unit and the University in the future development of Cambridge cognitive neuroscience, the MRC will be awarding Professor Gathercole an MRC Research Professorship to be held at the University of Cambridge. The Regent House of the University will be asked to establish a Professorship for Professor Gathercole to hold from the date of her appointment as Director.

Professor Gathercole's research focuses on memory (particularly working memory) and learning, in both children and adults. Sue says "It is a great privilege to take on the stewardship of the Cognition and Brain Sciences Unit at this truly exciting time in which cognitive science is generating ground-breaking advances in many aspects of health, disease and disorder, as well as in younger and older age. The mission of the CBU over the next decade is to harness the full potential of the field to improve human health. This will be achieved through innovative cognitive theory and cognitive neuroscience of the highest quality, coupled with an ambitious translational programme dedicated to propelling its fundamental science through to practical benefits for health, medicine, and education".

William Marslen-Wilson, out-going Director of the Unit, said "This is an excellent appointment for the Unit. Sue Gathercole has just the right combination of scientific distinction and managerial vigour to take the Unit forward to meet the exciting challenges of this new decade. We are all delighted at the outcome".

October 2010: Jon Simons win Experimental Psychology Society prize

Dr. Jon Simons has recently been awarded the Experimental Psychology Society Prize which recognises distinguished research achievement by experimental psychologists at an early stage in their career. Jon will deliver the EPS Prize Lecture at a meeting next year, which will be published in the Quarterly Journal of Experimental Psychology. "Ever since his PhD at the CBU, Jon has continued a stellar career, pioneering the use of both fMRI and patient studies to better understand the role of prefrontal and parietal cortices in human memory", said Dr Rik Henson, one of the nominators for Jon's prize, and former winner of the same prize in 2003.

October 2010: Adrian Owen named in 100 most influential figures in British science

The CBU's Adrian Owen has been named as one of the 100 most influential people in British science in the Times Eureka Science Magazine list published today. Adrian is cited for his work on neuroimaging which has allowed patients apparently in vegetative states to communicate. Adrian appears on the list alongside former MRC chief executives Sir Leszek Borysiewicz and Prof Colin Blakemore, plus Prof Stephen Hawking (cosmologist), Sir Peter Mansfield (co-inventor of MRI scanning), Lord Robert Winston (Broadcaster and fertility medicine pioneer) and Sir Paul Nurse (Nobel laureate and President-elect of Royal Society).



October 2010: CBU Gates scholar to attend House of Lords Africa event

This week, Raliza Stoyanova will be among ten Gates scholars attending a House of Lords meeting organised by [Harambe Endeavor](#), a network of African students and professionals set up to promote African development. Raliza, who is from South Africa, is now in the final year of her PhD at the CBU, supported by a full Gates scholarship, and is studying the effect of emotion on multisensory processing. Raliza and the other Gates scholars will attend the House of Lords debate on the evening of 6th October, where the aim is to promote opportunities for individuals and businesses to partner up with the next generation of African professionals as a means of aiding the continent's development.



October 2010: Paul Burgess wins BPS Presidents' Award

Professor Paul Burgess, previously of the CBU, and now at UCL, has just been awarded the British Psychological Society Presidents' Award for Distinguished Contributions to Psychological Knowledge, following nomination by the CBU's Tom Manly. The award is given as a mid-career recognition of the achievements of those who are engaged in research of outstanding quality. Paul worked here at the CBU from 1987, initially with Tim Shallice, before moving to UCL. Tom Manly says "Although there is no doubt that Professor Burgess's past achievements, by any measure, make him deserving of the BPS Presidents Award, it is also the case that his research career is very much still developing. Over the last five years the annual citation rates for his work have more than doubled. But there is still the same thrust of innovation and cross-talk between pure experimental and practical clinical work that has informed his approach from the outset." We would like to extend our warmest congratulations to Paul on his award.

October 2010: Bi-hemispheric findings of speech comprehension published

The neural foundations of language comprehension have been a matter of investigation for decades. Scientists have broadly defined the system that supports this process, but there is still disagreement about the function of its basic components. New research by scientists at the MRC CBSU and the University of Cambridge suggests that language processing system in the brain comprises two interdependent networks: one which supports perceptual processing and the basic mapping from sound to meaning, and another that supports specifically linguistic combinatorial processing.

These two networks have different but overlapping distributions: sound-to-meaning mapping is supported by bilateral fronto-temporal brain regions, while linguistic combinatorial processing engages only left hemisphere fronto-temporal regions. In a study using functional magnetic resonance imaging (fMRI), participants listened to words that were either perceptually but not linguistically complex (e.g., words that have an embedded stem, *claim/clay*) or words that were linguistically complex (e.g., had an inflectional affix, *play+ed*). Perceptual complexity was found to activate both right and left inferior frontal regions (Brodmann areas 45 and 47). In contrast, linguistic complexity activated only left-lateralised frontal regions (Brodmann area 45). These differences could reflect the evolutionary trajectory of the human language system, and emphasize the importance of bi-hemispheric systems in supporting the dynamic processing and interpretation of spoken inputs. The paper, Bi-hemispheric foundations for human speech comprehension, is published in the journal *Proceedings of the National Academy of Sciences USA*. To find out more contact [Mirjana Bozic](#) at the CBSU.



August 2010: CBU helps with Paralympic 2012 film

To mark the countdown to the paralympic games in London, Channel 4 has made the inspiring film "Inside Incredible Athletes", which profiles five competitors for 2012, and tries to understand how they achieve almost super-human skills. How does Dave Clarke, captain of the UK's blind football team, hit the back of the net again and again? In this film, Dr Rhodri Cusack uses MRI to try to understand what happens in Dave's brain as he performs a task on some simple sounds, and found striking plasticity in the visual system. See the film clip [here](#).

July 2010: Davy Evans shortlisted for Max Perutz essay award

Davy Evans, a second year PhD student has just been short-listed for the in the Max Perutz Science Writing Competition 2010. Now in its 13th year, the Max Perutz science writing prize encourages MRC-funded PhD students to present their research in a way which captivates and informs the public. The [MRC](#) received over 110 entries and 12 of the very best essays have now been shortlisted. The winning essay, runner-up and commended entries will be announced during an awards ceremony on Wednesday 25 August at the British Medical Association House in London, where MRC chief executive Sir Leszek Borysiewicz will present the first prize of £1,000. Following the event, the winning article will also be published in the [Guardian](#). Our congratulations to Davy on reaching the shortlist, and we wish him good luck with the results of the Max Perutz prize.



July 2010: Karalyn Patterson awarded Fellowship of British Academy

We are very proud to announce that Karalyn Patterson has been awarded Fellowship of the British Academy. Karalyn was elected to the fellowship this month in recognition of her outstanding work on the organisation of language and memory in adult humans, as revealed primarily by the impact of brain disease or injury, and including comparisons of English and Japanese languages. Karalyn worked at the CBU for over 30 years and continues her research, based at the Herchel Smith building, with CBU and University colleagues . Rik Henson, a CBU colleague of Karalyn for many years, remarked "I cannot think of a person within British cognitive neuroscience who is more deserving of this award than Karalyn. She has been at the forefront of the cognitive neuropsychology of language and memory for many decades, being hugely influential both theoretically, in her writings and inspiring talks, and personally, in her interactions with other researchers and with patients suffering from brain damage or disease." Everyone at CBU is delighted by the news of her award.



July 2010: CBU Guerillas in action

As part of the summer season of Guerilla Science events, CBU scientists will be giving talks at some of this year's hottest music festivals. This weekend at London's [Lovebox](#) Jessica Grahn kicked off with a talk about "Rhythm and the brain", while Adrian Owen covered coma and the vegetative state in the provocatively titled "Waking the dead?", and at the [Secret Garden Party](#) next week they will be appearing again, also joined by Tom Manly talking about "The illusion of self", Dean Mobbs talking about anxiety in "Be afraid" and Tristan Beckinschtein talking about sleep, while hopefully keeping his audience wide awake throughout. For more on Guerilla Science [read here](#).

July 2010: Wellcome Trust award for Dynamically Adaptive Imaging

The Wellcome Trust has awarded £260,000 funding to the CBU to develop Dynamically Adaptive Imaging of Visual Memory. In the last two years Dr Rhodri Cusack and his group at the CBU have been developing a new way to use an MRI scanner to investigate how the brain functions. Rather than analyzing the images of brain activity some time after the scan finishes, in this new method, "Dynamically Adaptive Imaging", the data from the MRI scanner are analyzed in real time and used to dynamically adapt the stimuli or task presented to the volunteer. Effectively, the experiment automatically adapts to the particular volunteer in the scanner, so allowing a much more detailed characterization of their neural representations. This method has many exciting applications in neuroscientific research and in the clinic. In this project, we will investigate the representations underlying visual memories. The award covers MRI scanning, computing costs, and a scientist for three years.

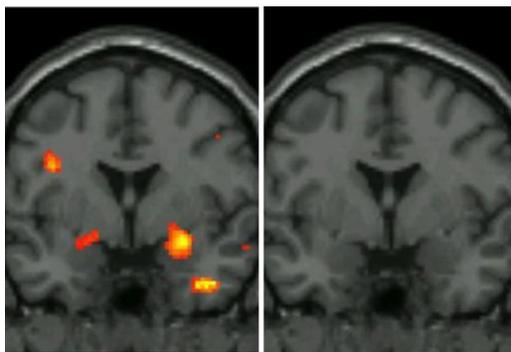


July 2010: Jessica Grahn wins British Science Association Award Lecture

Each year the British Science Association honours five outstanding young communicators with the opportunity to present a prestigious Award Lecture at the British Science Festival, one of Europe's largest science festivals. In a different location in the UK each year, this year, the festival will be in Birmingham from 14-19 September bringing members of the public the latest in science, technology and engineering. The Award Lectures are a rare opportunity to honour five professional scientists or engineers in the early stages of their career, who show outstanding skills in communication to a non-specialist audience, and we are delighted Jessica has won such a coveted award. The Lectures are a very popular component of the Festival programme with an extremely broad audience ranging from school groups and interested publics to retired academics and scientists from a wide range of disciplines. Jessica's talk will be 'Hit me with your rhythm schtick: The connection between music, movement, and the brain' and can be heard on Wednesday 15th September at Aston University. Read more [here](#).



July 2010: Brain biology linked to severe teenage antisocial behaviour



Brain abnormalities rather than peer pressure could be the key underlying factor behind severe antisocial and aggressive behaviour in teenagers according to research by scientists at the Medical Research Council Cognition and Brain Sciences Unit (MRC) and the University of Cambridge. Conduct Disorder (CD) is a psychiatric condition associated with heightened antisocial and aggressive behaviour that affects five teenagers out of every 100 in the UK. It can develop either in childhood or in adolescence. While the childhood-onset form has been linked to abnormal

brain function, the root of the adolescence-onset condition was previously thought to be the imitation of antisocial peers. In a study jointly funded by the MRC and the Wellcome Trust, scientists used an advanced brain scanning technique called functional magnetic resonance imaging (fMRI) to measure and analyse the brain activity of teenage boys with either childhood-onset or adolescence-onset CD while they were shown images of angry, sad and neutral faces. In both forms of the condition, the scan showed very similar patterns of brain abnormality compared with teenagers without the disorder.

Contrasting scans (pictured here) illustrate quantifiable 'normal' activity in healthy adolescents (left image) and an absent, abnormal response in adolescents with conduct disorder (right image).

In both types of CD, the scans showed sufferers had less activity in the areas of the brain responsible for processing emotions. This may explain why teenagers with CD are insensitive to the distress of others and to social signals of aggression. The scientists also found that the more severe the aggression and antisocial behaviour in the teenagers, the greater the level of brain abnormality.

Dr Andy Calder from the CBU, who led the research said *"We know it costs the Government ten times as much to support a child with Conduct Disorder into adulthood, compared to a normal child. We also know that kids with these disorders are at far greater risk of developing a range of mental and physical health problems in later life. There are few effective Conduct Disorder treatments, so collaborative research like this, which really sheds light on the brain processes behind why and how these disorders emerge, is really important if we're to help sufferers and their families."*

Professor Ian Goodyer, co-author on the paper and Professor of Child and Adolescent Psychiatry at University of Cambridge said *"This work breaks new ground in our understanding of the neurobiology of one of the most prevalent and difficult mental health problems in our society. The information will inform the development of early detection and intervention strategies in children at risk for antisocial behaviour."*

The study comprised 75 males aged 16-21 years old who were categorised in three groups: 27 individuals with childhood-onset conduct disorder, 25 with adolescence-onset conduct disorder and 23 healthy males as a control group.

The paper, *Neural Abnormalities in Early-Onset and Adolescence-Onset in Conduct Disorder*, appears in the journal *Archives of General Psychiatry* today.

July 2010: Award for hearing research - Bob Carlyon

Dr Bob Carlyon, one of our senior scientists, has been awarded the Thomas Simm Littler Prize by the British Society of Audiology. Bob's research investigates the ways in which normally hearing people can understand sounds, such as speech, in noisy situations. He uses this knowledge to study ways in which we can improve speech understanding by people with hearing loss, and, in particular, by deaf people who have been fitted with a cochlear implant. He will be presented with the award at the Society's annual conference in September.



June 2010: CBU scientists lift the lid on the brain at Royal Society Summer Science Exhibition

Scientists from the Cognition and Brain Sciences Unit (CBU) in Cambridge are inviting people to explore the human brain and mind when they present their research at the Royal Society's annual Summer Science Exhibition which opens on 25 June 2010. Their exhibit shows how all that we know, do and feel has its biological basis in the nerve cells of the brain.



Visitors will be able to experience MRI directly in a dummy scanner, loaned and delivered by Siemens, with sliding bed, headcoil and typical visual and auditory stimulation. Interactive touchscreen displays allow visitors to explore different aspects of brain structure and function, from the normal processes of reading a book or feeling the beat of music to the clinical implications for patient therapy and rehabilitation in conditions such as stroke or Parkinson's Disease. A display featuring a brain training website,

developed by CBU scientists and featured in the recent BBC programme 'Bang goes the theory', allows visitors to test their own abilities in perception, reasoning and memory. A display of real human brains shows the organ inside each person's head, along with the consequences of damage in brain disease. Younger children can also enjoy a display featuring *Nina and the Neurons* from the popular BBC Cbeebies television series.

"Our brains make us who we are, but how this happens remains a fascinating scientific puzzle. Using new imaging techniques we can see how normal brains remember a holiday, recognise a child's face or experience terror or disgust. At the same time, we begin to understand crippling brain diseases, like Alzheimer's, stroke, and coma, and how they can best be treated," says Professor John Duncan FRS, lead scientist for the exhibit.

June 2010: Major new study into brain ageing

Research efforts to understand how the brain changes with age, from early to late adulthood, have been given a major boost with the announcement of a new £5M grant from the Biotechnology and Biological Sciences Research Council (BBSRC). The funding has been awarded to a team of scientists from public health, clinical neurosciences and psychology at the University of Cambridge and from the MRC Cognition and Brain Sciences Unit who aim to understand how brain ageing in healthy people affects abilities like language and memory. This team will be called the Cambridge Centre for Ageing and Neuroscience (CamCAN). CBU scientists participating in this initiative include Rik Henson, William Marslen-Wilson, Tim Dalgleish, Andy Calder, John Duncan, and Rhodri Cusack.

The ageing process does not have a uniform effect across the brain. Older people often struggle, for example, to recall the right word in a conversation, but can continue to expand their vocabulary throughout old age. Understanding what structures in the brain account for this variation will be a crucial first step in allowing more people to retain a range of mental abilities throughout their lives. Professor Lorraine Tyler of the University of Cambridge, who heads the research team, said "Our mental abilities don't suddenly start to decline as we enter retirement. In fact, many are retained right into our eighties and we are often too quick to attribute normal lapses like forgetfulness to the effects of age. Understanding the complexities of how ageing affects the brain will be crucial for older people to be able to live fulfilled lives and contribute fully to society.

The study is unique in recruiting 3000 people aged 18-88 years, who will be drawn from the general population to create a large library of information on how healthy brain ageing affects mental abilities to different degrees. Not only will this help in identifying older people who might be helped by therapies, but will also provide a lasting resource for future researchers to draw on. A virtual "brain and behaviour" database will be established as part of this research, and will hold data from a population-representative

sample of 700 healthy adults from 18-88 years of age. This will be a valuable, open-access resource for scientists interested in ageing, and a basis for longitudinal study of how our brain and our cognitive abilities change as we grow older.

Dr Rik Henson, from the CBU, said "This is an exciting opportunity to combine the CBU's world-leading expertise in the cognitive domains of attention, memory, language and emotion, with its cutting-edge methods for measuring the brain with MRI and MEG, in order to understand how the structure and function of the brain changes over the adult lifespan; in particular, the extent to which the brain's plasticity allows it to reorganise functionally in order to support many (though not all) cognitive skills despite extensive structural change over the years."



For further information on CamCAN please contact [Rik Henson](#) at the CBU.

May 2010: Brain structure changes shed light on autistic traits

Autism-like behaviour in healthy people is linked with structural changes in the part of the brain which deals with social interactions, CBU scientists Elisabeth von dem Hagen and Andy Calder have discovered. Autism has long been known to consist of a spectrum of psychological disorders, with some people having more pronounced autistic traits than others. However the new findings suggest that rather than there being a precise cut-off, the spectrum extends seamlessly into the general population. Healthy volunteers underwent a Magnetic Resonance Imaging brain scan and completed a questionnaire which assessed how much their social behaviour and habits resembled those seen in people with autism. The scientists looked at the structure of a part of their brains called the posterior superior temporal sulcus (pSTS), which is linked to social functions such as monitoring changes in gaze direction and empathising with others. People with autism tend to show abnormal brain activity in the pSTS when asked to perform these tasks as well as abnormal brain structure this region. Findings from the study showed that there was less white brain matter in the pSTS in those healthy people with a greater number of autistic traits. Dr Andy Calder of the MRC Cognition and Brain Sciences Unit, who co-led the research, said: "This suggests that traits associated with the autism spectrum affect the brains of healthy volunteers in much the same way as they do in people with a diagnosis of autism."

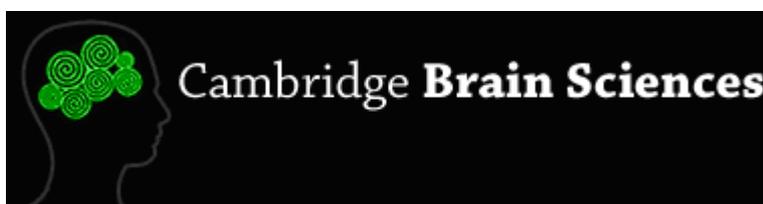


Read more [here](#).

April 2010: CBU scientists show that 'brain training' games do not make you smarter.

The results of a groundbreaking scientific study into brain training were recently published in *Nature* ([access the paper for free](#)). The study, conducted by CBU scientists, in conjunction with the BBC, showed that practice on brain training games doesn't transfer to other mental skills.

Details of the results were also shown on BBC One in the *Can You Train Your Brain? A Bang Goes the Theory Special*.



The experiment involved CBU scientists Dr Adrian Owen, Dr Adam Hampshire, and Dr Jessica Grahn, and was launched in September 2009. It is by far the largest ever trial of

computer-based brain training. 11,430 adults across the UK followed a six-week training regime, completing computer-based tasks on the BBC's website designed to improve reasoning, memory, planning, visuospatial skills and attention. Each person's brain function was measured before and after training in four computer-based tests sensitive to changes in brain function, developed by scientists at the MRC Cognition and Brain Sciences Unit, Cambridge. The tests are freely available at the [Cambridge Brain Sciences website](#), and you can also [see some of the publicity relating to the study](#).

The results showed no evidence that the benefits of playing brain training games transfer to other mental skills. People who completed computer-based training exercises did improve at the games, but these improvements were simply due to practice and were no help to them on tasks on which they had not trained, even when they tapped into similar areas of the brain as those used during training.

You can [read more](#) about this research.

March 2010: Student wins Biomag 2010 "Connectivity Challenge Award"

Daniel Wakeman, a PhD student supervised by Rik Henson, has been awarded one of the two main prizes for the Biomag 2010 "Connectivity Challenge Award". As part of this award, Dan will be making multimodal datasets from 19 participants available freely for scientists to help develop methods for integrating functional and structural MRI data with data from electroencephalography (EEG) and magnetoencephalography (MEG).



March 2010: (Very) young scientists learn about the brain

Natasha Sigala and Tristan Bekinschtein have been educating some of our youngest ever audiences about the all things 'brain'. Natasha recently visited St Mary's Junior School in Cambridge, and talked with the children in the Reception class about the brain, the five senses, why we shiver, sneeze and yawn, and they had fun looking at visual illusions, exploring a variety of brain models, played with brain shaped jelly and made their own drawings of different brains and playing a game of tactile recognition that led



to a discussion about healthy and unhealthy foods. They talked about the importance of wearing helmets when cycling and having a good night's sleep and the children all received a copy of the "Mindboggling Workbook" from the [Dana Alliance for Brain Initiatives](#)

And the following day Tristan and Natasha visited the Joint Colleges Nursery in Cambridge, to talk with the preschool children there about the brain, why we get dizzy when we spin. They had lots of fun with visual illusions and played with different brain models, then talked about healthy and unhealthy foods and safety. The highlight of the event was an egg race where one team had their eggs in styrofoam cups and were confident to carry them fast and safely, while the other team carried them on spoons, were much slower and ended up with some broken eggs (our scientist's top tip: using soft boiled eggs helps reduce the mess...). Happy parents told us how eager their children were to wear their cycling helmets after this event! The children also loved their special brain stickers at the end of our visit. And finally, an important learning outcome

was that Tristan learned how to boil eggs, so all in all fun and learning experience for everyone!

Both of these events took place as part of [Brain Awareness Week \(BAW\)](#), a global campaign that unites those who share an interest in elevating public awareness about the progress and benefits of brain and nervous system research. BAW focuses international attention on the field of neuroscience and offers opportunities for teachers and students to engage in fun educational activities, just like we did this week, hopefully inspiring the next generation of scientists, starting at the earliest possible ages.

March 2010: Exploring Mind and Brain - the CBU Cambridge Science Festival event



An entertaining and educational evening of demonstrations and lectures recently took place at the CBU on Wednesday 17th March. Our annual "Exploring Mind and Brain" event was held as part of the Cambridge Science Festival and featured lectures from three of our leading scientists highlighting our varied research, plus the chance to take part in some of our experiments exploring how the mind and brain work, with time to meet the scientists and students doing the research. Hands on activities ran for the first hour, followed by three short talks. For more on the Cambridge Science Festival visit their own [website](#).

March 2010: Aphasia - a new therapy introduced

Language therapy is a translational domain where cognitive neuroscience research can have an important impact. Researchers at the CBU are developing new methods to treat patients with *aphasia*, who have partly lost their language due to stroke. Aphasic deficits are widely believed to become stable and resistant to further improvement within one year after stroke. Recent CBU research shows that this belief is incorrect. Even several years after stroke, significant improvement of language performance can be achieved when a novel intensive language therapy is applied for just two weeks. Friedemann Pulvermüller, a senior scientist at the CBU, recently introduced this new therapy method, called Constraint-Induced Aphasia Therapy, to a group of NHS language therapists at the meeting of the South West Aphasia Special Interest Group, Royal United Hospital, Bath, in March 2010. Jon Hunt, Senior Specialist Speech Language Therapist and organiser of the meeting, said that the new therapy method "is of fundamental importance to our profession and has major implications for the way we need to be re-*re*thinking the therapy services we provide to people with aphasia". He also pointed out that the new method may be more cost efficient than previous ones, which is of special interest in times of restricted NHS budgets. The exchange between CBU researchers and language therapists was prompted by a [recent article](#) in *Annals of Neurology* reporting that scientists at the University of Malaga and the CBU could demonstrate a significant improvement of language skills in chronic post-stroke aphasia patients treated with a combination of Constraint-Induced Aphasia Therapy and the drug memantine.



February 2010: £25m boost for CBU neuroscience research

After a rigorous and highly successful five-yearly review, the MRC is to invest over £25 million in the future research programmes of the MRC Cognition and Brain Sciences Unit (CBU) in Cambridge.

Over the next five years, the unit plans to focus on developing cross-disciplinary large-scale collaborative

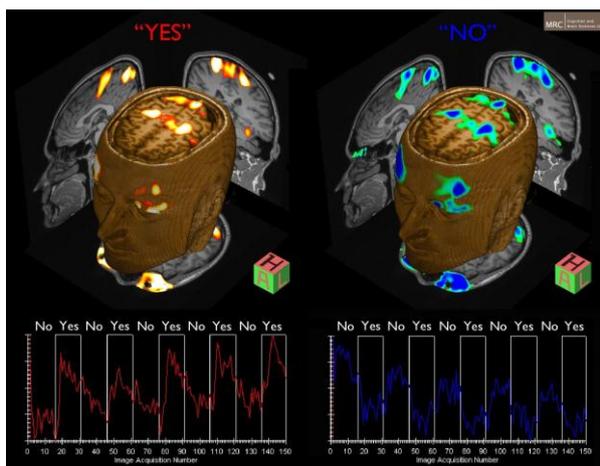


projects with its Cambridge partners. A flagship programme of research into the neurocognition of healthy ageing is currently in the pipeline, co-funded by the unit and the Biotechnology and Biological Sciences Research Council (BBSRC) through a £5 million, five-year grant. Scientists will look at a cross-sectional sample of nearly 800 healthy individuals, ranging in age from 18 to 88 years, in order to build the first complete picture of how the brain changes and evolves over the adult lifespan.

William Marslen-Wilson, Director of the CBU, said: "Our success in basic science and in clinical translation depends on our ability to build strategically coordinated teams of world-class scientists covering a range of key research areas in the understanding of cognition and brain function. We ensure that these teams have the right neuroimaging resources at their disposal to support competitive work at the international cutting edge. This gives us a powerful basis for a broad range of collaborations with our scientific and clinical partners in Cambridge and beyond.

"Systems cognitive neuroscience is revolutionising our understanding of how the brain supports the mind, in sickness and in health, and we are absolutely in the thick of this worldwide explosion of activity," he added.

February 2010: Brain scan gives vegetative state patient the power to say "Yes" and "No"



A patient presumed to be in a vegetative state for five years can communicate 'yes' and 'no' using just his thoughts, according to new research from the Medical Research Council (MRC) and the University of Liege. In 2003 the patient, a 29 year old man, sustained a severe traumatic brain injury in a road traffic accident. He remained physically unresponsive and was presumed to be in a vegetative state. Using a scanning technique called functional magnetic resonance imaging (fMRI), the patient's brain activity was mapped while he was asked to answer 'yes' or 'no' to questions such as 'Is your father's name Thomas?'. The patient could communicate

answers by wilfully changing his brain activity. In the three-year study, 23 patients diagnosed as being in a vegetative state were scanned using fMRI, which was able to detect signs of awareness in four of these cases (17 per cent). The fMRI method used can decipher the brain's answers to questions in healthy, non-vegetative, participants with 100 per cent accuracy, but it has never before been tried in a patient who cannot move or speak. This new method of using fMRI was developed by Dr Adrian Owen and his team here at the MRC Cognition and Brain Sciences Unit in Cambridge. Adrian said: "We were astonished when we saw the results of the patient's scan and that he was able to correctly answer the questions that were asked by simply changing his thoughts. Not only did these scans tell us that the patient was not in a vegetative state but, more importantly, for the first time in 5 years it provided the patient with a way of communicating his thoughts to the outside world."

Dr Steven Laureys, co-author from the University of Liège, confirmed: "So far these scans have proven to be the only viable method for this patient to communicate in any way since his accident. It's early days, but in the future we hope to develop this technique to allow some patients to express their feelings and thoughts, control their environment and increase their quality of life."

Dr Martin Monti, also from the CBU added: "The fact that this patient was able to communicate with scientists using his brain activity suggests that this technique could be used to address important clinical questions. For example, patients who are aware, but cannot move or speak, could be asked if they are feeling any pain, allowing doctors to decide when painkillers should be administered."

The study involved experts from the Medical Research Council Cognition and Brain Sciences Unit, the Wolfson Brain Imaging Centre in Cambridge and a Belgian team based at the University of Liège. The research is published in the *New England Journal of Medicine* and was part-funded by the Medical Research Council.

For further information press

[here](#)

January 2010: EU grant for Postgraduate Training Network awarded to CBU and partners

The grant, which is approximately €1million, is aimed at improving the standards of postgraduate training in different areas of neuroscience over the next three years. An international consortium of universities and research institutions has been given the EC Tempus IV award for a joint European programme entitled "Postgraduate Training Network in Biotechnology of Neurosciences (BioN)". [Dr Yury Shtyrov](#) who takes part in coordinating the project on behalf of the CBU said "We are thrilled to be part of this prestigious award which will enable us to take even further steps towards international compatibility of our PhD training in line with the [Bologna process](#) and the European Higher Education Area".



In addition to the MRC Cognition & Brain Sciences Unit, the key partners include University of Helsinki (Finland), University of Umea (Sweden), Ecole Normale Supérieure de Paris (France), St Petersburg State University (Russia), plus other schools and individual experts across Europe. The MRC CBU is committed to excellence in all areas of neuroscience research, investing in the sustainable training and education of future generations of neuroscientists, and to large-scale international collaborations that are productive and mutually beneficial.