To celebrate the launch of our 2012 student essay competition, we’re dedicating the main article of this edition of Précis to last year’s 2nd place entry, which was written by Imperial College Masters student Esther Ng.

The range of topics covered during last year’s competition was superb and so we’ve decided once more to allow entries to be on any aspect of the science–faith discussion.

Further details about the competition can be found in the advert below and full rules and guidelines are available at www.cis.org.uk/student-essay-competition. Once again we look forward to reading what our talented student members have to offer!

For many centuries, philosophers and scientists have deliberated, debated and disputed over the interaction between faith and the brain. However, it is only in the last 2 decades that imaging techniques such as magnetic resonance (MR) and positron emission tomography (PET) have advanced to the point that the functioning brain can now be studied with resolution equivalent to post-mortem examination. Coupled with improvements in electrophysiology, these tools allow us to probe neuronal and cellular processes that are inaccessible to other means of investigation.

This essay explores recent developments in neuroscience within the context of religion and discusses how these findings influence our beliefs.

The Neurological Basis for Belief

First prize: £200 Amazon gift voucher
Second prize: £100 Amazon gift voucher

Essays can discuss any topic under the broad heading of “Science and Faith”

Entries must be e-mailed to becky@cis.org.uk by midnight on the 31st August 2012

Full details, rules and guidelines at www.cis.org.uk/student-essay-competition

www.cis.org.uk
One approach for investigating the neurological basis for religion is to study those on the extremes of the spectrum. Several neurological and psychiatric diseases are associated with hyper-religiosity as well as unusual religious activity. Temporal lobe epilepsy is associated with increased religious experiences in the ictal, postictal and interictal periods, as well as religious auras in the preictal period (Devinsky and Lai, 2008). Schizophrenia and obsessive compulsive disorders are also associated with religious experiences and increased religious practices (Mohr et al, 2010; Yorulmaz et al, 2009). Structural as well as biochemical evidence from these patients suggest that the network controlling religious activity in the brain is extremely extensive. Many different anatomical locations are implicated, including the prefrontal, temporal and parietal cortices, as well as the hippocampus, thalamus and brainstem (Raine and Yang, 2006; Damasio, 1999; Markowitsch et al, 2003). Furthermore, all neurotransmitter systems except the noradrenergic system have been implicated. This includes the dopaminergic, serotonergic, glutaminergic as well as cholinergic systems. (Cohen and Carlezon, 2007; Previc, 2006; Danbolt, 2001)

The ability of our brains to synchronise these disparate mechanisms in coordinating faith-based activities points towards our innate tendency towards religious belief. However, is religion in healthy individuals on the same continuum as psychopathological religion, or is it a different entity? Psychotropic drugs such as phencyclidine, ketamine and amphetamines, which interfere with neurotransmitter systems implicated in these disorders, can also trigger religious experiences in healthy individuals (Nencini and Grant, 2010), suggesting underlying qualitative similarities between religion in between healthy and so-called mentally ill individuals. Furthermore, delusions with religious themes are more common in societies which have a heavy emphasis on the supernatural, suggesting that they are an outlier manifestation of spirituality rather than a separate phenomenon.

Even within healthy individuals, religiosity exists on a continuum. Twin and adoption studies suggest that the effects of genetics and heritability on religiosity ranges from 27% to 62%, depending on age and gender (Koenig et al, 2008; Eaves et al, 1999). While no specific religiosity gene has been identified so far, inter-individual differences in brain structure have been linked to religious variability. Kapogiannis et al (2009) carried out an MRI study on 40 healthy adults, which demonstrated that those who reported experiencing an intimate relationship with God and engaging in religious behaviour had increased volume of the right middle temporal cortex. Experiencing fear of God was associated with decreased volume of the left precuneus and left orbitofrontal cortex and doubting God’s existence was associated with increased volume of the right precuneus. Naturally, this raises a causality question – could these MRI differences be the result of environmental factors such as upbringing? In this study, the authors found no correlation between religiosity of upbringing and anatomical features. While this does not entirely exclude environmental influences, it certainly shows that inborn biological differences have considerable significance in shaping our beliefs.

In the Christian context, this calls into question the perennial conundrum of pre-destiny. If one is genetically predisposed to be doubtful (possibly due to an increased size of right precuneus), is it fair to hold the person accountable for refusing to believe in God? If genetics and brain structure play such important roles in religious variation, how much of our religious choice is actually free will? For that matter, does free will actually exist in the realm of molecular neuroscience?

All thoughts are mediated by electrical impulses that travel within a neuron then to the next neuron through the release of neurotransmitter molecules at the membrane synapse (gap between the 2 neurons). These electrical impulses are governed by the physical principles that permeate the rest of the world. This presents a philosophical dilemma. Classical physics, such as that which controls the speed and acceleration
of vehicles, is deterministic in nature, and does not make any room for free will. It states that humans are automatons who act entirely according to the electrical impulses generated in their brains, which begs the question – who generates the impulses?

Quantum physics is a paradigm shift that attempts to answer this. According to quantum theory, the state of the brain has a part in which the neurotransmitter is released and a part in which the neurotransmitter is not released. This quantum splitting occurs at every one of the trillions of nerve terminals. Hence the quantum state of the brain splits into a vast host of classically conceived possibilities, one for each possible combination of the release or no release options. The result of these physical processes is not a single discrete set of non-overlapping physical possibilities but rather a smear of classically conceived possibilities (Schwartz et al, 2005). An agent is needed to select between these possibilities, which allows for the input of free-will. In that case, how can we differentiate between God speaking to us (and generating the electrical impulses) and us generating these impulses ourselves through our own thoughts?

While the study of neuroscience in religion seems to raise more questions than it answers, will it ever prove or disprove the existence of God? I doubt it. Despite the development of advanced brain imaging techniques and state-of-the art particle colliders, much of neuroscience and quantum physics is still dependent on believing in certain theories for which we are still searching for empirical proof. This, in fact, is the essence of faith. Examining how our brain experiences faith is a worthwhile endeavour, but would not help to support the existence of God. For that, a personal relationship is essential, but for some people, myself included, contemplating the neurological basis for this relationship helps to enhance it. For such people, the neurology of theology is certainly worth further exploration.

**Esther Ng, Imperial College**

**REFERENCES**


Previc FH. The role of the extrapersonal brain systems in religious activity. Conscious Cogn 2006, 15:500–539


**GOD AND NATURE MAGAZINE**

The second edition of the new science - faith magazine, God and Nature is now available to read online at http://godandnature.asa3.org/.

If you’re interested in contributing to future issues please e-mail Emily Ruppel at emily@asa3.org.

**INTERVIEW**

The interview for this edition of Précis is not available to view online due to the mission work of the interviewee overseas. If you would like to receive a copy of the interview, please e-mail becky@cis.org.uk.
NEW CIS GROUP IN NEWCASTLE
A new local group is being established in Newcastle. Several interested locals met together for a planning meeting on the 18th June and the group are hoping to host their first event in the new academic year. If you would like further information please e-mail Peter Donaldson (peter.donaldson@newcastle.ac.uk) including CIS in the subject line to avoid spam filters.

LOCAL GROUP NEWS
If you live somewhere that does not have a CIS local group but you wish it did, please get in touch with the Development Officer, Becky Lowton (becky@cis.org.uk) about starting up a new group in your area.

There is strong interest in forming local groups in a couple of centres around the UK. If you would like information about these groups please contact

Birmingham: Daniel Holt
dan Holt92@gmail.com)

Warrington, Widnes, Runcorn & St Helens: Howard Leatherbarrow
cgf-warrington@hotmail.co.uk)

LOCAL GROUPS
ABERGAVENNY
If you would like to get involved with the CIS discussion group in Abergavenny please contact Dr Huw Morgan on jhcmorgan@gmail.com.

BRISTOL
The next Christians in Science Bristol talk is taking place on Friday 26th October, 7.30 pm, at Tyndale Baptist Church, Whiteladies Rd, BS8 2QG.

Dr Kate Distin, author of ‘The Selfish Meme’ and ‘Cultural Evolution’ will be speaking on “Is Religion a Virus of the Mind? A Response to the New Atheists”.

We hope this talk will be of interest to Christians and atheists alike – please invite your friends!

Recordings of our previous events are available through our page on the CIS website. For more information about events, or to be added to our mailing list please contact cmbbiggs@googlemail.com.

CAMBRIDGE
Prof Alister McGrath will speak on “Science and Faith: Seeing the Big Picture” in the opening lecture of the residential conference at 6.45 on the 13th July, Queens’ College Cambridge.

This lecture will be open to those who are not attending the conference. Tickets are £5 and it is recommended you book in advance. E-mail secretary@cis.org.uk for more details.

Details of future events are available at www.st-edmunds.cam.ac.uk/faraday/Lectures.php.

CENTRAL SOUTH
On 17th May Prof Bill Newsome from Stanford University gave a thought provoking lecture on “Neurons and Persons: Brain, God and the Mind” to over 300 people in a packed lecture theatre. This was followed by an extended Q&A session - the lecture clearly having stimulated people’s thinking on the issues involved. Bill explored issues of bottom-up determinism, the quantum brain, freedom, autonomy and self determination. A recording and the slides from the lecture can be found on the Central South part of the CIS website.

The next lecture is scheduled for 15th November and will be by John Wyatt, provisionally titled “Matters of Life and Death.” If you would like further information about the Central South Group please go to our webpage or e-mail simon@cis.org.uk.

DURHAM
Contact Alan Roberts (a.w.roberts@durham.ac.uk) for information about future events in Durham.

EDINBURGH
The Edinburgh group will be meeting on the last Thursday of each month. If you would like details of times and locations please e-mail Gavin Merrifield on g.d.merrifield@ed.ac.uk.

GLASGOW
If you would like details of CIS Glasgow please contact Dr Lawrence Osborne (lawrence@lhosborn.co.uk).

HARROW
For details of future events please contact Revd
Lyndon North (revlnorth@aol.com, 07747 638783).

**IPSWICH**
For information about future events in Ipswich please contact Dr John Ling (jjling@btopenworld.com).

**IRELAND**
On the 11th June, Prof Peter Williams from Union Theological College, Belfast spoke to us on the subject of “The Theology of the Fall.”

Arrangements are currently being made for the next Walton Lecture. More details about this and other events and activities can be found on our website www.cis.org.uk/ireland/ or by contacting Peter van der Burgt (peter.vanderburgt@nuim.ie).

**LIVERPOOL**
The Liverpool group meets on the last Wednesday of every month in term time at 5.30 pm in the Anglican Chaplaincy, Mulberry Court. Contact Neville Cobbe for information (Neville.cobbe@liverpool.ac.uk).

**LEEDS**
Please contact John Lockwood (jlockwood1@me.com) for details future events in Leeds or to be added onto the mailing list.

**MANCHESTER**
In May, CiS Manchester welcomed Prof Sue Kimber, co-director of the North West Embryonic Stem Cell Centre, to speak at our summer meeting. Sue gave a fascinating talk entitled “A Christian Perspective on Stem Cell Biology” which was followed by a lively time of questions and discussion.

The Manchester committee are currently planning the Autumn - Winter programme. We are also looking for someone to take on the role of treasurer. E-mail Becky Lowton (rebecca.lowton@googlemail.com) if you would like further details or to be added onto the mailing list.

**NORWICH**
Please contact info@cis.norwich.org.uk for details about upcoming events in the Norwich area.

**NOTTINGHAM**
CiS Nottingham meets regularly for discussion of science - faith issues. Please contact Geoff Bagley (geoffbagley@me.com) for further information.

**OXFORD**
The Oxford group meets once or twice a term at St Andrew’s Church, Linton Road, Oxford OX2 6UG. Our most recent meeting took place on the 8th June, during which Professor Russell Cowburn, from the Department of Materials in Cambridge, gave a talk entitled “A Christian Perspective on Nanotechnology”.

If you would like more information about events please e-mail Dr Diana Briggs on diana Briggs@wolfson.oxon.org.

**SOUTH WEST**
Please contact Prof David Huntley (dhuntley@plymouth.ac.uk) for details of science - faith events in the south west.

**SURREY**
The second meeting of the CiS Surrey group, held on the 29th May, was addressed by Dr. Denis Alexander, who gave a talk entitled ‘Creation or Evolution - Do We Have to Choose?’ There were 75 attendees, mainly from local churches, but some people came from London and surrounding counties. It was very well received by Christians of several denominations. Sixth Formers from local colleges, having listed their atheist friends’ questions, put them to Denis following the talk, and seemed happy with the responses. The next meeting will be a panel discussion and is being planned for October.

For further details please contact Joy Perkins at joyeperkins@googlemail.com.

**RESIDENTIAL CONFERENCE**
It’s hard to believe that the residential conference is upon us! A conference report will follow in the next edition of PréCiS and for those unable to attend, we will try to upload the lectures onto the CiS website.

**SUBMISSIONS FOR THE NEXT PRÉCIÓNIS**
We would love to receive your contributions for the next issue of Précis - please send details of events, conferences, books and other news you would like included to Becky Lowton at becky@cis.org.uk by the 31st September.