



## Research Projects

Any enquiries about these past projects should be made to the first named investigator:

### **Research Project No.17: Meric Srokosz and Rebecca Watson**

#### **Project title: 'The Sea In Scripture'**

As the ocean covers approximately 71% of the surface of the Earth it is arguable that we live on a water planet that should be called the Ocean. The ocean is the habitat for an amazing range of living organisms, from microscopic bacteria, phytoplankton (miniscule plants) and zooplankton (miniscule animals) through to the largest mammal on Earth, the blue whale. Human beings have used the ocean as a resource for thousands of years. Fishing provides a significant fraction, about 16%, of the total animal protein eaten by humans globally, with this percentage being higher in some nations, often the poorer ones. The oceans are also a crucial part of the climate system with the large-scale ocean circulation (currents) re-distributing vast amounts of heat across the globe. Despite this surprisingly little has been written on the ocean from a biblical perspective. This project is unique in that it addresses this neglected area (the oceans) from a biblical point of view, and because it is an interdisciplinary collaboration between a biblical scholar (Dr Rebecca Watson) and an oceanographer (Prof Meric Srokosz).

This project has been funded by the Issachar Fund.

### **Research Project No.16: Ruth Bancewicz**

#### **Project title: 'Wonders of the Living World'**

The living world is beautiful, intricate and highly ordered. Science is constantly revealing more about the incredible organisms on this planet, which thrive and reproduce in even the most hostile environments. Non-scientists can enjoy finding out about these discoveries through the burgeoning science communication industry, and people of faith can say with even more confidence than before, 'All creation declares the glory of God!'

Far less well known is the work of scientists such as Simon Conway Morris and Jeff Schloss, who are asking some fascinating and quite specific questions about the deeper structure of the living world. Their research has shown that biological evolution is highly organised and constrained, involving a high level of cooperation between organisms. These studies and many others show that, as well as increasing our general sense of wonder, the findings of biological science can raise questions about the meaning of what we see. The scientific data do not compel us to believe in God, but neither do they compel us to accept that the universe is meaningless. What we see in the living world is entirely consistent with belief in a personal God who has a purpose for the world. This is a public engagement project which aims to address this significant communication gap, particularly among the international Christian community.

Research will identify relevant areas of scientific discovery, theologians with an interest in this topic, and effective ways of presenting this content. A focussed Faraday course on 'Wonders of the Living World' will bring together key scientists and theologians for discussion of the topics to be communicated. Material produced as a result of this project will include a series of short videos, an article collection, study guides for adults and young people, and a full-colour illustrated book. The materials produced will be promoted through a website, public speaking, online and print publicity, and launch events. Our goal is to help others find new ways in which they can celebrate the wonders of the living world.

### **Research Project No.15: Alasdair Coles**

#### **Project title: 'Mystical seizures and salience in temporal lobe epilepsy'**

This research project addresses the questions: what are the neurological bases of mystical experience and the accompanying sense of personal significance and meaning? We will use the classical neurological approach of deducing normal function from studying neurological disease, in this case people with “mystical” epileptic seizures, frequently cited in popular literature on science and religion, and most famously described by Dostoyevsky in *The Idiot*.

People with such seizures provide the “natural experiment” of seeing to what extent frequent mystical experiences contribute to human flourishing. This sub-project is needed because, surprisingly, such seizures are poorly studied; the largest series is of only 11 cases.<sup>2</sup> From the few case descriptions, we note firstly that most people with such seizures have a religious background, suggesting their interpretation depends on prior experience; and, secondly, that many gain long-lasting personal meaning (“salience”) from their experiences.

The research team, consisting of ordained and lay neurologists and a theologian/psychologist, will identify 30 people with mystical seizures, mainly from an epilepsy surgery program and therefore already with sophisticated MRI and EEG data. We will investigate the brain region(s) responsible for mystical seizures; how their experience is influenced by religious upbringing; how frequently they are accompanied by a feeling of personal significance, and the effects of epilepsy treatment. Dissemination will be in the neurological literature, but also to people affected by epilepsy and general audiences. The impacts will be to encourage the neuroscientific study of mystical experience and raise awareness of spirituality and meaning in the care of people with neurological disease.

### **Research Project No.14: John Wyatt and Peter Robinson**

#### **Project title: 'Human identity in an age of nearly-human machines - the impact of advances in robotics and AI technology on human identity and self-understanding'**

The goal of this research sub-project is to explore the theological, social and philosophical implications of recent developments in robotics and AI technology for secular and religious understandings of human nature and identity. Of particular interest and concern is the development of humanoid robots whose appearance, motor behaviour and responsiveness are becoming virtually indistinguishable from human beings. In addition, new technical developments provide increasingly realistic simulation by AIs of human compassion, empathy and emotional intelligence. These developments raise urgent and profound questions and challenges for human self-understanding. To date there has been very little genuinely multidisciplinary and informed debate about these issues. The current sub-project aims to address the implications of these developments using an academically rigorous and structured approach. In particular we will investigate whether there is a genuine convergence and blurring of human/machine abilities and behaviour and if so whether this is likely to lead to fundamental changes in common social and religious understandings of what it means to be human.

### **Research Project No.13: Hilary Marlow**

#### **Project title: 'Science and Scripture in Christianity and Islam'**

This interdisciplinary project will examine the extent to which the relationship between science and religion is affected by the hermeneutical strategies adopted for reading Scripture and investigate how the narratives of science and those of religious texts can be brought into dialogue. The project will focus on Christianity and Islam, the two largest world religions, both of which attach great importance to their written Scriptures and historical traditions. It will involve the collaboration of research scientists, theologians and textual critics in both faiths to investigate the ways that Christian and Muslim scientists from different contexts relate their Scriptures and traditions to the scientific worlds in which they operate. It will examine the challenges that individuals and groups face in trying to do this and evaluate the strategies that are adopted to minimise potential conflict between science and Scripture. Furthermore it will enable people in the Christian and Islamic traditions, scientists and non-scientists alike, to explore creative ways in which their Scriptures can be related to some of the big questions in science. The project will examine the following key questions by means of a literature review, extensive fieldwork surveying Christian and Muslim scientists, and the development and testing of models and resources:

- In what ways are perceptions of the relationship between science and religion shaped by the hermeneutical strategies that different faith communities adopt for understanding their Scriptures and traditions?
- What theoretical models and practical resources will enable believing scientists to integrate new scientific knowledge with their ancient traditions and Scriptures in such a way that they flourish spiritually and morally as well as intellectually

## **Research Project No.12: Russell Cowburn FRS**

### **Project title: 'Transcending the dimensions'**

In recent years there has been much excitement within condensed matter physics of the possibility of exploring new dimensionalities. Far from the wormholes and such like of science fiction required to transport us into other Universes, worlds of different dimensionalities can now be created in the physics lab using modern nanotechnology fabrication methods. For example, films that are only a single atom thick – and hence are intrinsically 2-dimensional - can be fabricated using advanced laboratory equipment. Low dimensionality materials should be studied because they are a new and largely unexplored part of the Universe where the laws of physics manifest themselves very differently to those we know in our 3-dimensional world. It is not just that a 2-dimensional material is a very thin version of a 3-dimensional material. The underlying behaviour of the electrons in a 2-dimensional material is completely altered because of the reduced dimensionality. This proposal seeks to investigate experimentally one such reduced dimension system based on magnetic materials. The aim of the sub-project is to understand further how dimensionality modifies the perceived laws of physics. Project results will benefit the academic scientific community by an improved understanding of the nature of reality in reduced dimensions coming from an experimentally-led perspective. The wider public will benefit from an improved ability to appreciate the nature of our 3-dimensional existence and an appreciation of the existence of new aspects of the created Universe. By integrating the scientific results of the sub-project with a discussion on Edwin Abbott's famous 1884 novel 'Flatland: a Romance of Many Dimensions', an improved conversation between literary, theological and scientific descriptions of reality will be held with the wider public.

## **Research Project No.11: Bob White FRS and Roger Abbott**

### **Project title: 'Life in the pressure-cooker: a pathway to developing beautiful minds?'**

The overall aim of this research sub-project is to examine the ways in which faith groups contribute to constructive thinking, generosity and thanksgiving out of the maelstrom of disaster. The need exists for a project of this kind due to the lack of understanding and knowledge on the role that localized religious beliefs and faith communities play within the context of disaster recovery and disaster risk reduction. Faith and religious communities have often been ignored in disaster studies, and religious responses have often been considered 'backwards' and lacking in 'modernity'. Furthermore, studies that have incorporated religion have often adopted a generic understanding of religion, which lacks consideration for the contextualized and experienced paradigms of religion. The proposed research will focus on achieving three main objectives: (1) using mixed method approaches to examine the impact of contextually specific religious beliefs on disaster response, recovery and risk reduction initiatives over a longitudinal period; (2) explore how Christian beliefs and practices contribute to, or hamper, the capacity of disaster-impacted populations to respond, recover and adapt; and (3) investigate how Christian beliefs and practices contribute to and/or hinder character development and post-traumatic growth after disasters, particularly over time.

## **Research Project No.6: John Wood and Diana Beech**

### **Project title: 'Restoring Spiritual Values to European Science the New Renaissance'**

In 2009 the European Commission's senior advisory board on the European Research Area published a vision document entitled "Preparing Europe for a New Renaissance - a strategic view of the future of the European Research Area." This document and the subsequent report "Realising the New Renaissance" have been extremely influential in the forthcoming European programme "Horizon 2020" which will commit 80b€ over the period 2014-2020 for both basic and applied research. In the first document it states:

"Our world is changing. We face mounting challenges: of global warming, scarce water, energy shortages and healthcare, to name a few. Their solution will require new ideas, discoveries, talents and innovations – the fruits of research. To achieve them, we must start by changing the way we do research. We must reorganize, to create a truly open European Research Area marked by free movement of people and ideas. We must rethink the way science interacts with politics and society, so our governance is based on best-available evidence. We must rewrite the social contract between the researcher and society, so that freedom of thought is balanced by responsibility for action. We must open our markets, our companies and our knowledge institutions so they work together more productively. Above all, we must create an environment in which the best ideas thrive, the brightest people prosper, and our excellence is rewarded – while at the same time improving the cohesion of our society. These are big demands, and imply fundamental change in the way we think, work and research –indeed, change as great as any in our history. We call this change a 'new Renaissance', deliberately invoking the memory of a comparable revolution in thought, society and science."

All this is very laudable but on what spiritual or other basis does it build? Throughout the document and others that have emanated from the European Commission the main message is one of economic survival. This is in marked contrast to the visionaries and founders of the European Union such as Robert Schuman and Jacques Delors and even more different from the ideals of the first Renaissance in Europe.

The aim of this project is to, without prejudice, analyse the current situation by referring to the early documentation and speeches of the founding fathers to compare these with current documentation. This will be followed by a number of structured interviews with leading policy makers and politicians in Europe especially comparing the underlying values of the older member states with those of the newer ones with their communist and catholic/orthodox backgrounds. The findings will be field tested in an open workshop prior to constructing a manual/book which will essentially act as a benchmark or even a wake-up call for future decision makers. Above all the project aims to ask policy makers what values they are applying (if any) and what will be the consequences of their actions.

#### **Research Project No.5: Bob White FRS**

##### **Project title: 'The Role of Faith, Hope and Love in an Uncertain World'**

Much of the daily lives of people are governed by forces external to themselves, particularly when it comes to the impact of natural disasters and other smaller scale events that arise from our interaction with the material world. This project investigates the role of religious values, and in particular religious faith, hope and love in shaping the response of individuals, local communities and the wider national and international world to the uncertainties of the physical world in which we live. Natural disasters bring us face to face with some of the most fundamental questions about our understanding of the deepest realities of human nature. This is true both for those caught up in disasters and for those who hear about them through today's ever-present media.

Ironically, as humankind becomes more and more technologically advanced and as we understand ever more about the science of the physical world in which we live, more people are killed every year by disasters. It is likely, indeed, that in our lifetimes there will be an earthquake that kills more than a million people.

This project explores the relationship between natural disasters and the faith or spirituality of those affected, a novel way of exploring the relationship between science and faith.

#### **Research Project No.4: Rodney Holder**

##### **Project title: 'Frameworks for the justification of religious and scientific belief'**

How is science justified, and is religion at all comparable? The project will explore the similarities and differences between scientific and theological ways of thinking, carrying out an extensive review of the literature on this topic. Theology has the capacity to justify its claims, though not all the approaches to justification in theology are equally helpful or equally rational. The project will result in a book with an opening chapter examining the radical philosophical claim that theology is not a subject of rational study at all, and a second chapter examining the issue of whether religious claims are undermined by evolutionary explanations for the origins of religion. There will follow an overview of major developments in the philosophy of science on the question of justification over the last 100 years. The book will then contrast and critique how the question of justification is handled by significant theologians, including scientist-theologians, and philosophers of religion, always bearing in mind the comparison with the way in which scientific beliefs or theories are justified.

#### **Research Project No.3: Alasdair Coles**

##### **Project title: 'The neurology of religion'**

The project involves a study of religious belief, behaviour and practice in people with neurological diseases affecting the basal ganglia (Parkinson's disease) and frontal lobes (frontal variant of frontotemporal dementia) in Cambridge, UK. Cohorts of patients with these conditions are already well established and characterised within the clinical neuroscience department at Cambridge University, with comprehensive psychometric and radiological data, so the specific research effort will be to apply standardised measures of spirituality (the Brief Multidimensional Measure of Religiousness/Spirituality). The aims of the study are to assess the role of the frontal lobes and basal ganglia in mediating religious experience, behaviour and belief; to describe the extent to which deficits in these structures impose "bottom-up" restraints on religious behaviour, belief and experience, thereby complementing Project 1: 'Genes, Determinism and God'; and to determine to what extent these deficits can be overcome by the individual. In so doing, we will promote a model that is unusual in the neuroscience literature as it recognizes the limits of reductionism and examines the capacity of the self, as an emergent characteristic of the whole, to exert "top-down" freedom of choice.

#### **Research Project No.2: Berry Billingsley and Keith Taber**

**Project title: 'The Interactions Between Science and Religious Belief in the Secondary School Context in England'**

The aim of this project is to investigate the factors that shape the thinking of secondary-school students (age 11-16) on the relationship(s) between science and religion within the English curriculum context. The research involves quantitative and qualitative survey work amongst pupils in a variety of secondary schools. The ways in which pupils with faith backgrounds view science and the possible pursuit of scientific careers will be addressed. In addition to the research, specific learning resources for students will be developed that offer approaches to respond to the key issues raised during the research. The resource development strand is both informed by the research strand and designed to feedback into the research by offering opportunities to evaluate student responses to the resources.

The project has an Advisory Board comprising: Marianne Cutler, Executive Director, Professional and Curriculum Innovation, The Association for Science Education; Prof. Mary James, Associate Director of Research, Faculty of Education, Cambridge University; Michael Poole, Visiting Research Fellow in Science and Religion at King's College London; and Prof. Michael Reiss, Professor of Science Education at the Institute of Education, London University.

**Research Project No.1: Denis Alexander and Nell Whiteway**

**Project title: 'Genes, Determinism and God'**

Genetic determinism has waxed and waned ever since genetics became established as a scientific discipline in the early part of the 19th century. This project aims to investigate the literature describing the relationship between the inter-individual genomic variation that exists between organisms within a species and the variation that exists in behavioural phenotypes. Using a 'bottom-up' approach, relatively simple organisms will be investigated, then more complex, finally addressing the same inter-individual variation relationship within the human context. The question will be asked as to whether genetic variation is relevant to human concepts of free-will and moral responsibility, and the role of such variation in the Judaeo-Christian notion of humankind being made in the image of God. Dr. Alexander presented some of the results of this research in his Gifford Lectures that took place at St. Andrew's University on December 3rd, 4th, 6th and 7th, 2012.