



The Faraday Institute
St Edmund's College
Cambridge CB3 0BN

THE FARADAY INSTITUTE FOR SCIENCE AND RELIGION, CAMBRIDGE

**Research Associate,
The Impact of Gene Modification on Human Dignity**

Job Description

Job Title:	Research Associate (Full time)
Ref:	FP3/9
Department:	Faraday Institute, St Edmund's College
Reporting to:	Prof. Keith Fox
Salary:	£28,661 to £31,330 per annum depending on qualifications and experience
Grade:	7
Contract:	until 31 August 2018
Location:	The Faraday Institute in St Edmund's College, Cambridge
Hours:	36.5 hours per week
Holiday entitlement:	25 days annual leave plus 8 public holidays

Overview

The Faraday Institute for Science and Religion is looking to recruit a full time Research Associate to work on a project entitled 'The Impact of Gene Modification on Human Dignity' (see project summary). The post is available with immediate effect.

Detailed job description

The Faraday Institute for Science and Religion was founded in 2006 and is an interdisciplinary research institute in St Edmund's College, Cambridge. It aims to conduct high quality academic research on the science-religion discourse and to disseminate the fruits of research in the public domain.

For more details visit the website www.faraday-institute.org

Background

Techniques for manipulating genomes have been available for several decades and have been widely used for the genetic modification of bacteria, plants and animals, in both fundamental research and applied sciences. However, recent developments in technologies has greatly increased the efficiency, accuracy and ease with which such genetic changes can be made. Zinc Finger Nucleases (ZFNs) and Transcription Activator-Like Effector Nucleases (TALENs) were developed 5-10 years ago, which enabled precise genome editing, though these were expensive and time-consuming to develop. More recently the CRISPR-Cas9 system has revolutionised our ability to modify genomes in living cells, including those of humans, with much higher accuracy and efficiency, either deleting or inserting sequences into target genes, or turning genes off. The CRISPR technology is already widely used as a powerful research tool in many research laboratories around the world. This technology, which can also be applied to human cells, has developed at an astonishing pace. A small lab with modest funding can use CRISPR to modify any gene in a laboratory organism (from bacteria to mice) in order to study its downstream effects.

The application of these advances to humans has raised profound questions, including from the scientific community, some of whom have called for a temporary halt to the use of CRISPR on germ-line cells. While it has wide-ranging medical applications, some of these raise important scientific, ethical, and societal questions.

The CRISPR technology has not been tested in humans, but there is no reason to suspect that it will not work as well as in other animals. Modifying somatic cells, for treating diseases such as cancer or inherited retinal diseases, has already been shown to be effective. The modification of germ cells, producing changes that will be passed to following generations, raises many more questions. A team of Chinese researchers recently announced that they had successfully edited (non-viable) human embryos that had the genetic disease beta-thalassemia. The efficiency of these results was very low, though newer modifications of the technique allow much greater selectivity and fewer off-target effects and it seems very likely that the technology will advance to a stage at which it can be applied to humans. Are risk factors the only reason to be cautious? What does the ability to modify, correct or enhance our genomes say about what it means to be a healthy human?

The immediate medical applications would be to treat (prevent) genetic disorders, by removing or replacing a disease-causing gene in an early embryo. This raises a number of questions: Which genes should be modified? Those that are life-threatening, or life changing? What about faulty genes that only produce their effects in later life (Huntingdon's, breast cancer, Alzheimer's,)? What are the boundaries between normal variation and disability? Are we discriminating against those who live with genetically

inherited diseases, and what does this say about their dignity and worth? Would we generate a genetic under (or super) class?

Critics, worry that any use of the technology is the first step on a slippery slope to eugenics or human enhancement, or its use for cosmetic purposes. People also have an emotional sense of what is “natural” and are offended by anything that challenges this.

A further application of this technique is ‘Gene Drive’ which can be used to force the transmission of a mutation that renders an organism less fit. For instance, it can be used to produce mutant mosquitos that either cannot transit malaria, or which are reproductively sterile. While this seem to have laudable aims for public health it raises questions about releasing genetically engineered organisms into the wild before assessing any unintended consequences.

These new technologies are often poorly understood by people within different faith communities. This project will seek to examine public reactions to gene modification and to inform and engage these people in the discussion. We will seek to discover what stances different religious traditions take to these questions and will examine what theological resources can be brought to bear on the questions.

The Research Associate will work under the direction of the Principle Investigator, Prof. Keith Fox, to implement the research project. Responsibilities include the following:

- To conduct an extensive survey of the literature on the potential uses of gene modification technologies. To keep up-to-date with advances in new and emerging technologies of gene modification and their applications.
- Research the perceptions and attitudes to gene modification, amongst religious and non-religious groups of scientists and non-scientists
- To analyse and write up the research results and project conclusions for publication in peer-reviewed academic journals
- To ensure the smooth running of the project by carrying out such administrative duties as may be required
- Communicate the issues (benefits and concerns) to Christian (and other religious) groups
- To produce popular print material for the general reader, which explains the technologies, and outlines the issues.

Person specification

Essential

- Doctoral degree in a relevant area of scholarship, *e.g.* biological science, theology, sociology, bioethics. For those with non-theological academic qualifications, evidence of serious engagement with Christian theology
- Proven experience of conducting and analysing scientific research
- Track record, appropriate to career stage, of research publications
- Proven track record demonstrating excellent organisational and administrative abilities
- Excellent communication skills in English, both oral and written, including presentation skills

- Ability and willingness to work as a member of a team, in research and administration;
- Willingness to travel in the UK
- Excellent IT skills
- The applicant should have an understanding of and empathy with the ethos and aims of the Faraday Institute

Desirable

- Experience of planning and running academic conferences
- Able to be based at the Faraday office in Cambridge at least two days per week

TERMS AND CONDITIONS OF WORK

- **Full time: 36.5 hours per week**
- **Probationary Period: 6 months**
- **Available until 31 August 2018**

Application process

Applications quoting position FP3/9 should include an academic CV, naming three referees, together with a covering letter summarising the relevance of the applicant's background and experience for this position.

Applications (preferably by e-mail) should be sent to: The Faraday Institute Administrator, St. Edmund's College, Cambridge, CB3 0BN, UK [faraday.administrator@st-edmunds.cam.ac.uk] by the closing date of 25 April 2016.

Interviews are expected to be held on 9 May and the appointment will be made as soon as possible thereafter.

Staff benefits include:

- One free meal per day during working hours
- Free car parking on site (depending on availability)
- 25 days' annual leave plus 8 public holidays
- Contributory Pension Scheme