PhD Advert Template

Project title: Biomedical Neuroprosthetics

Project ID *(optional)*: *Please leave blank*

Accept all year-round applications

Funding information: Self-funded students only

Project description: This PhD will perform research into cutting-edge implantable biomedical devices for the brain – also known as neuroprosthetics. Our implants use an advanced form of genetic enhancement to photosensitise the brain tissue so that we can stimulate it with different wavelengths of light as well as electrical pulses. These devices utilise advanced electronics, photonics, signal processing and device physics to create systems which can treat neurological diseases.

Depending on student background and interest, the PhD study can take a number of different directions:

1. Implantable microelectronics: developing advanced low-power circuitry to be implemented on CMOS chips for driving our implants
2. Advanced device fabrication: Using cleanroom techniques and optoelectronic assembly to make microdevices to be inserted into the brain.
3. Advanced signal processing: To allow for closed-loop control of neural implants in the brain according to the background brain activity.

Our ultimate aim is to utilise this technology to restore sight to those blinded by diseases such as retinitis pigmentosa and glaucoma. Many groups have tried this to date with disappointing results. But we believe that with a sufficiently advanced brain interface, we can restore sight sufficiently to allow blind people to navigate and find key objects and people.

The work would be carried out in our exciting neuroprosthesis lab with an interdisciplinary team of post-doctoral staff and PhD students. We have a vibrant research culture with regular meetings and debates. We are also friendly and welcoming of people from many diverse backgrounds. The lab is also part of the wider Newcastle University Centre of Excellence in Biomedical Engineering.

The prerequisite would be a 1st class or perhaps an upper second-class first degree with an excellent final year project or a merit/distinction on an MSc program. Background degrees can be in Electronic Engineering, Computer Science, Biomedical Engineering or Physics. But we also consider people from other forms of engineering or related physical sciences.

*Newcastle University is committed to being a fully inclusive Global University which actively recruits, supports and retains colleagues from all sectors of society.  We value diversity as well as celebrate, support and thrive on the contributions of all our employees and the communities they represent.  We are proud to be an equal opportunities employer and encourage applications from everybody, regardless of race, sex, ethnicity, religion, nationality, sexual orientation, age, disability, gender identity, marital status/civil partnership, pregnancy and maternity, as well as being open to flexible working practices.*

References (optional):

B Zaaimi, et al. “Closed-loop optogenetic control of normal and pathological network dynamics” Nature Biomedical Engineering (2022) <https://doi.org/10.1038/s41551-022-00945-8>

Dimitrios Firfilionis, et al. “A Closed-Loop Optogenetic Platform” Frontiers in Neuroscience Sept 2021; 15: 718311. doi: 10.3389/fnins.2021.718311

Zhenyang Hou, et al. “A scalable data transmission scheme for an optogenetic visual prosthesis” Journal of Neural Engineering Volume 17, Number 5 055001, DOI: 10.1088/1741-2552/abaf2e

Reza Ramezani, et al. "On-Probe Neural Interface ASIC for Combined Electrical Recording and Optogenetic Stimulation" IEEE TBCAS, 2018 Jun;12(3):576-588. doi: 10.1109/TBCAS.2018.2818818.

Application enquires:

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<https://www.neuroprosthesislab.org.uk/>

**We will also need to link your PhD advert up to the subject keywords below so that your PhD studentship can be found on findaphd.com. Please highlight up to three relevant keywords from the lists provided below.**

**FindaPhD.com**
You can select up to **10 subject areas**.

PhD Disciplines & Subject areas

Agriculture

[ ]  agricultural sciences

[ ]  agricultural technology

[ ]  arable farming

[ ]  livestock farming

[ ]  forestry & arboriculture

[ ]  other

Anthropology

[ ]  biological anthropology

[ ]  social anthropology

[ ]  other

Architecture, Building & Planning

[ ]  architecture

[ ]  built environment

[ ]  construction management

[ ]  landscape architecture

[ ]  rural planning

[ ]  surveying

[ ]  urban planning

[ ]  other

Biological Sciences

[ ]  bacteriology

[ ]  behavioural biology

[ ]  biochemistry

[ ]  biodiversity

[ ]  bioinformatics

[ ]  biophysics

[ ]  biotechnology

[ ]  cancer biology

[ ]  cell biology

[ ]  developmental biology

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[ ]  ecotoxicology

[ ]  entomology

[ ]  environmental biology

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[ ]  marine biology

[ ]  microbiology

[ ]  molecular biology

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[ ]  neuroscience

[ ]  parasitology

[ ]  plant biology

[ ]  plant cell biology

[ ]  reproductive biology

[ ]  structural biology

[ ]  systematic biology

[ ]  virology

[ ]  zoology

[ ]  other

Business & Management

[ ]  accounting

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[ ]  education management

[ ]  event management

[ ]  hospitality

[ ]  human resource management

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Chemistry

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Communication & Media Studies

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[ ]  journalism

[ ]  print media

[ ]  production

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Computer Science

[ ]  artificial intelligence

[ ]  computer architectures

[ ]  computer vision

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Creative Arts & Design

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Economics

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Education

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Engineering

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Environmental Sciences

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Finance

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Food Sciences

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Forensic and Archaeological Sciences

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Geography

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Geology

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History & Archaeology

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Information Services

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Languages, Literature & Culture

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Law

[ ]  criminal law

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[ ]  contract law

[ ]  property law

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Linguistics & Classics

[ ]  ancient greek

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[ ]  linguistics

[ ]  other

Materials Science

[ ]  ceramics

[ ]  glass

[ ]  metallurgy

[ ]  polymers

[ ]  textiles

[ ]  other

Mathematics

[ ]  applied mathematics

[ ]  applied statistics

[ ]  computational mathematics

[ ]  data analysis

[ ]  engineering mathematics

[ ]  mathematical modelling

[ ]  medical statistics

[ ]  operational research

[ ]  probability

[ ]  pure mathematics

[ ]  statistics

[ ]  stochastic processes

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Medicine

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Nursing & Health

[ ]  adult nursing

[ ]  community nursing

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[ ]  dental nursing

[ ]  environmental health

[ ]  health informatics

[ ]  medical nursing

[ ]  mental health nursing

[ ]  midwifery

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[ ]  occupational therapy

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Philosophy

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Physics

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Politics & Government

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Psychology

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Sociology

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Sport & Exercise Science

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Theology & Religious Studies

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Veterinary Sciences

[ ]  animal welfare

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