PhD Advert Template

Your advert (including section headings) should **not** exceed **550** words.

An example can be found here: [OP2304 Solving the Leaky Barrier Conundrum: Nature Based Solutions to reduce flooding at Newcastle University on FindAPhD.com](https://www.findaphd.com/phds/project/op2304-solving-the-leaky-barrier-conundrum-nature-based-solutions-to-reduce-flooding/?p149997)

Please complete the following sections:

Project title: Engineering therapeutic immune-biomaterials for tissue engineering applications

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

Accept all year-round applications

Funding information: Self-funded students only

Project description:

Current regenerative medicine strategies aim to restore the function of damaged or diseased tissues with functional and site-appropriate implants. Biomaterials have played a central role in the implantable medical device industry and have improved the lives of millions of people worldwide. However, biomaterials are foreign bodies, and adverse immune reactions to biomaterials represents a fundamental challenge that impact and reduce the patients’ life quality. Adverse reactions are often seen to interfere with healing, leading to immediate acute outcomes such as immense pain, excessive inflammation, tissue destruction, or even isolation and rejection of medical devices. More recently, the fundamental participation of immune cells in development, tissue and organ homeostasis, ageing, and degenerative diseases has been recognised. Therefore, biomaterials with favourable immunoregulatory properties can shift the default response to a foreign body implant towards one of tissue integration and functional remodelling.

Designing materials to regulate the immune response for regenerative medicine requires an understanding of the role of the immune system in normal physiologic processes including wound repair, development, and tissue homeostasis as well as an understanding of the immune system contribution to tissue remodelling through cross-talk with resident stem/progenitor cells. Within this highly interdisciplinary project, new biomaterials that can mitigate the foreign-body response and promote tissue regeneration and immune regulation are to be investigated by exploring natural and synthetic materials. Therefore, biosynthetic materials that combine synthetic and natural components towards mimicking those functional properties found in nature, will be engineered by using cell-friendly, effective, and selective bio-orthogonal reactions for regenerative medicine and tissue engineering applications. These materials are to be processed into more complex 3D structures by exploiting advanced additive manufacturing techniques to promote immune regulation for regenerative medicine applications.

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):

Salthouse D, Novakovic K, Hilkens CM, Ferreira AM. Interplay between biomaterials and the immune system: challenges and opportunities in regenerative medicine. Acta Biomaterialia. 2022. DOI: <https://doi.org/10.1016/j.actbio.2022.11.003>

Montalbano G, Toumpaniari S, Popov A, Duan P, Chen J, Dalgarno K, Scott III WE, Ferreira AM. Synthesis of bioinspired collagen/alginate/fibrin based hydrogels for soft tissue engineering. Materials Science and Engineering: C. 2018; 91:236-46. DOI: <https://doi.org/10.1016/j.msec.2018.04.101>

Kotlarz M, Ferreira AM, Gentile P, Russell SJ, Dalgarno K. Droplet-based bioprinting enables the fabrication of cell–hydrogel–microfibre composite tissue precursors. Bio-Design and Manufacturing. 2022:1-7. DOI: <https://doi.org/10.1007/s42242-022-00192-5>

Dura G, Peters DT, Waller H, Yemm AI, Perkins ND, Ferreira AM, Crespo-Cuadrado M, Lakey JH, Fulton DA. A thermally reformable protein polymer. Chem. 2020; 6(11):3132-51. DOI: <https://doi.org/10.1016/j.chempr.2020.09.020>

Application enquires:

Dr Ana Ferreira Duarte

Ana.ferreira-duarte@newcastle.ac.uk

**Link:** [**https://www.ncl.ac.uk/engineering/staff/profile/anaferreira-duarte.html**](https://www.ncl.ac.uk/engineering/staff/profile/anaferreira-duarte.html)

**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

[ ]  ecology

[ ]  ecotoxicology

[ ]  entomology

[ ]  environmental biology

[ ]  evolution

[ ]  genetic engineering

[ ]  genetics

[ ]  genomics

[ ]  human genetics

[ ]  immunology

[ ]  marine biology

[ ]  microbiology

[ ]  molecular biology

[ ]  molecular genetics

[ ]  neuroscience

[ ]  parasitology

[ ]  plant biology

[ ]  plant cell biology

[ ]  reproductive biology

[ ]  structural biology

[ ]  systematic biology

[ ]  virology

[ ]  zoology

[ ]  other

Business & Management

[ ]  accounting

[ ]  business

[ ]  e business

[ ]  education management

[ ]  event management

[ ]  hospitality

[ ]  human resource management

[ ]  management

[ ]  marketing

[ ]  project management

[ ]  sport management

[ ]  tourism

[ ]  other

Chemistry

[ ]  analytical chemistry

[ ]  applied chemistry

[ ]  computational chemistry

[ ]  environmental chemistry

[ ]  industrial chemistry

[ ]  inorganic chemistry

[ ]  organic chemistry

[ ]  petrochemical chemistry

[ ]  pharmaceutical chemistry

[ ]  physical chemistry

[x]  polymer chemistry

[ ]  structural chemistry

[ ]  synthetic chemistry

[ ]  other

Communication & Media Studies

[ ]  broadcast media

[ ]  digital media

[ ]  journalism

[ ]  print media

[ ]  production

[ ]  public relations

[ ]  publishing

[ ]  other

Computer Science

[ ]  artificial intelligence

[ ]  computer architectures

[ ]  computer vision

[ ]  computer graphics

[ ]  cyber security

[ ]  data science

[ ]  human computer interaction

[ ]  internet of things

[ ]  machine learning

[ ]  networks

[ ]  quantum computing

[ ]  software engineering

[ ]  videogames

[ ]  other

Creative Arts & Design

[ ]  animation

[ ]  art

[ ]  crafts

[ ]  creative writing

[ ]  dance

[ ]  design

[ ]  drama

[ ]  fashion

[ ]  film studies

[ ]  fine art

[ ]  graphic design

[ ]  interior design

[ ]  music

[ ]  music technology

[ ]  photography

[ ]  theatre studies

[ ]  other

Economics

[ ]  econometrics

[ ]  financial economics

[ ]  macroeconomics

[ ]  microeconomics

[ ]  political economics

[ ]  other

Education

[ ]  further education

[ ]  higher education

[ ]  nursery education

[ ]  primary education

[ ]  secondary education

[ ]  special needs education

[ ]  other

Engineering

[ ]  acoustics engineering

[ ]  aerospace engineering

[ ]  atomic engineering

[ ]  automotive engineering

[x]  bioengineering

[x]  biomedical engineering

[ ]  chemical engineering

[ ]  civil engineering

[ ]  communications engineering

[ ]  control systems

[ ]  cybernetics

[ ]  dynamics

[ ]  electrical engineering

[ ]  electronic engineering

[ ]  energy technologies

[ ]  environmental engineering

[ ]  fluid mechanics

[ ]  gas engineering

[ ]  geotechnical engineering

[ ]  integrated engineering

[x]  manufacturing engineering

[ ]  marine engineering

[ ]  mechanical engineering

[ ]  mechanics

[ ]  mechatronics

[ ]  nanotechnology

[ ]  offshore engineering

[ ]  petroleum engineering

[ ]  robotics

[ ]  solid mechanics

[ ]  structural engineering

[ ]  structural mechanics

[ ]  systems engineering

[ ]  thermodynamics

[ ]  other

Environmental Sciences

[ ]  climate science

[ ]  hydrology

[ ]  marine sciences

[ ]  meteorology

[ ]  pollution

[ ]  soil science

[ ]  other

Finance

[ ]  actuarial science

[ ]  banking

[ ]  financial management

[ ]  insurance

[ ]  investment

[ ]  taxation

[ ]  other

Food Sciences

[ ]  food hygiene

[ ]  food production

[ ]  other

Forensic and Archaeological Sciences

[ ]  archaeological science

[ ]  forensic science

[ ]  other

Geography

[ ]  agricultural geography

[ ]  cultural geography

[ ]  economic geography

[ ]  environmental geography

[ ]  geographical information systems gis

[ ]  historical geography

[ ]  human geography

[ ]  marine geography

[ ]  physical geography

[ ]  political geography

[ ]  remote sensing

[ ]  social geography

[ ]  transport geography

[ ]  urban geography

[ ]  other

Geology

[ ]  applied geology

[ ]  geochemistry

[ ]  geophysics

[ ]  geoscience

[ ]  geotechnology

[ ]  hydrogeology

[ ]  marine geology

[ ]  palaeontology

[ ]  seismology

[ ]  volcanology

[ ]  other

History & Archaeology

[ ]  african history

[ ]  american history

[ ]  ancient history

[ ]  archaeology

[ ]  asian history

[ ]  australasian history

[ ]  british and irish history

[ ]  economic history

[ ]  european history

[ ]  heritage studies

[ ]  history

[ ]  history of art

[ ]  history of religions

[ ]  history of science

[ ]  medieval history

[ ]  military history

[ ]  modern history

[ ]  russian history

[ ]  social history

[ ]  world history

[ ]  other

Information Services

[ ]  information security

[ ]  information systems

[ ]  librarianship

[ ]  other

Languages, Literature & Culture

[ ]  african studies

[ ]  american studies

[ ]  asian studies

[ ]  australasian studies

[ ]  chinese

[ ]  danish

[ ]  dutch

[ ]  english language

[ ]  english literature

[ ]  european studies

[ ]  finnish

[ ]  french

[ ]  german

[ ]  italian

[ ]  japanese

[ ]  middle eastern studies

[ ]  norwegian

[ ]  portuguese

[ ]  russian

[ ]  spanish

[ ]  swedish

[ ]  other

Law

[ ]  criminal law

[ ]  commercial law

[ ]  contract law

[ ]  property law

[ ]  other

Linguistics & Classics

[ ]  ancient greek

[ ]  celtic studies

[ ]  classics

[ ]  latin

[ ]  linguistics

[ ]  other

Materials Science

[ ]  ceramics

[ ]  glass

[ ]  metallurgy

[x]  polymers

[ ]  textiles

[ ]  other

Mathematics

[ ]  applied mathematics

[ ]  applied statistics

[ ]  computational mathematics

[x]  data analysis

[ ]  engineering mathematics

[ ]  mathematical modelling

[ ]  medical statistics

[ ]  operational research

[ ]  probability

[ ]  pure mathematics

[ ]  statistics

[ ]  stochastic processes

[ ]  other

Medicine

[ ]  anatomy

[ ]  audiology

[ ]  biomechanics

[ ]  cardiology

[ ]  complementary medicine

[ ]  dentistry

[ ]  endocrinology

[ ]  epidemiology

[ ]  neural engineering

[ ]  neurology

[ ]  nutrition

[ ]  ophthalmology

[ ]  optometry

[ ]  pathology

[ ]  pharmacology

[ ]  pharmacy

[ ]  physiology

[ ]  physiotherapy

[ ]  podiatry

[ ]  radiology

[ ]  speech science

[x]  tissue engineering

[ ]  toxicology

[ ]  other

Nursing & Health

[ ]  adult nursing

[ ]  community nursing

[ ]  counselling

[ ]  dental nursing

[ ]  environmental health

[ ]  health informatics

[ ]  medical nursing

[ ]  mental health nursing

[ ]  midwifery

[ ]  occupational health

[ ]  occupational therapy

[ ]  paediatric nursing

[ ]  paramedical science

[ ]  surgical nursing

[ ]  other

Philosophy

[ ]  ethics

[ ]  metaphysics

[ ]  philosophy of science

[ ]  other

Physics

[ ]  acoustics

[ ]  astronomy

[ ]  astrophysics

[ ]  chemical physics

[ ]  computational physics

[ ]  electromagnetism

[ ]  environmental physics

[ ]  experimental physics

[ ]  medical physics

[ ]  nuclear physics

[ ]  optical physics

[ ]  particle physics

[ ]  quantum mechanics

[ ]  solid state physics

[ ]  space science

[ ]  theoretical physics

[ ]  other

Politics & Government

[ ]  development studies

[ ]  government

[ ]  international relations

[ ]  politics

[ ]  public policy

[ ]  other

Psychology

[ ]  child psychology

[ ]  clinical psychology

[ ]  community psychology

[ ]  counselling psychology

[ ]  developmental psychology

[ ]  educational psychology

[ ]  forensic psychology

[ ]  health psychology

[ ]  neuropsychology

[ ]  occupational psychology

[ ]  organisational psychology

[ ]  psychotherapy

[ ]  sport psychology

[ ]  other

Sociology

[ ]  criminology

[ ]  disability studies

[ ]  gender studies

[ ]  socio economics

[ ]  social work

[ ]  other

Sport & Exercise Science

[ ]  sport coaching

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[ ]  sport performance

[ ]  sport technology

[ ]  sport therapy

[ ]  other

Theology & Religious Studies

[ ]  divinity

[ ]  religious studies

[ ]  theology

[ ]  other

Veterinary Sciences

[ ]  animal welfare

[ ]  veterinary dentistry

[ ]  veterinary medicine

[ ]  veterinary nursing

[ ]  veterinary nutrition

[ ]  veterinary pathology

[ ]  other