

## MRes Environmental and Biological Nanoscience\*



This programme is designed to provide students with a comprehensive understanding of all aspects of nanoscience and its potential environmental and human health-related risk. It focuses on the fundamental and underpinning science but also discusses applications, synthesis and policy, and regulatory responses. The programme is research focused, with a large part devoted to an independent but supervised research project carried out in state-of-the-art-laboratories.

\*This programme was previously known as MRes Human and Environmental Implications of Nanotechnology and Nanoscience

**Study here and find out why the University of Birmingham was awarded The Times and The Sunday Times University of the Year 2013-14 (<http://www.birmingham.ac.uk/news/latest/2013/09/20-sep-Birmingham-announced-as-University-of-the-Year.aspx>)**

### Course fact file

**Type of Course:** Combined research and taught

**Study Options:** Full time

**Duration:** 1 year full-time

**Start date:** September

### Contact

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**School of Geography, Earth and Environmental Sciences (</schools/gees/index.aspx>)**

### Details

Key features of the programme are:

- Coverage of nanoscience and its implications
- Focused teaching and learning modules
- Experimental, field based or modelling research project

The programme is a collaborative endeavour between the Environmental Health Science group in the School of Geography, Earth and Environmental Sciences and the School of Biosciences. Taught and research elements are undertaken concurrently.



**[Download the programme brochure \(/Documents/college-les/gees/Courses/heinn-mres-flyer.pdf\)](/Documents/college-les/gees/Courses/heinn-mres-flyer.pdf)**

### Why study this course

#### Adam, former student

"The aspect of the MRes HEINN degree which stands out the most is the access to training on a wide range of equipment for characterisation at the nanoscale, which is not available on other Masters degree programs."

#### Christine, former student

"We could choose our own project topic and essay title, following up on the things that interested us from background reading early in the course. The project work involved chemical preparation, physical characterisation and biological toxicity testing. I gained so many new skills in such a short time on this course! It was a very challenging year, but also exciting, rewarding and full of fun!"

### Modules

The programme comprises a research project and a taught component:

## Research project

The research component of the programme comprises a major project. Research may be based in the area of the extended literature review and/or the research methods module and requires a substantial piece of independent research upon which a written dissertation is based. The School of Geography, Earth and Environmental Sciences and the School of Biosciences are heavily involved in research in nanosciences and its implications on environmental and human health, and have excellent facilities, which include research laboratories, field measurement instrumentation and powerful computers. For projects with other foci, supervision from other schools is also possible. The breadth and depth of expertise and equipment will enable major projects to include experimental laboratory studies, fieldwork and/or modelling and data analysis. The project is supervised by two members of academic staff with knowledge and understanding of the chosen research topic.

## Taught component

- **Nanoscience and Nanotechnology: Environmental and Human Health**

This module discusses the fundamentals of nanoscience, looking at the unique properties of the nanoscale. Synthesis and characterisation of nanomaterials is discussed. Sources, transport and fate of nanomaterials are investigated, along with the relevant environmental processes. The background to the current UK and wider response to nanomaterials is discussed. An extended literature review is expected as part of this review. This broadly based activity is designed to give the student in-depth knowledge of a chosen area of research activity, as well as training in a number of generic skills such as literature searching, critical assessment of scientific literature, report writing and referencing. The extended literature review acts both as a means of formal assessment and a precursor to the major project.

- **Nanotoxicology**

The principles of toxicology will be covered with respect to the ways in which agents can gain access into biological systems, their biotransformation, disposition and excretion. Differences between molecules and nanomaterials will be highlighted. The mechanisms of adverse effects on biological systems will then be investigated in relation to cellular and genetic toxicity and the potential disease consequences. Particular emphasis will be on understanding the dose–response relationships, methods of assessment and prediction and specific studies on nanomaterials will be highlighted. A library project and an oral presentation to the student group is included.

- **Research Methods**

Students learn key methods relevant to the conduct of research through a series of lectures and independent research exercises. The areas covered include statistical analysis, hypothesis generation, and research planning and project management. There are also research seminars within the School and University, which inform students of current research within the field of air pollution.

## Fees and funding

**Standard fees** ([/postgraduate/dr-fees/tuition.aspx](#)) apply - This programme is in **fee band B** for international students

- Home/EU students £3,996 FT only
- International students £16,230 FT only

Learn more about **fees and funding** ([/postgraduate/dr-fees/index.aspx](#))

### Scholarships and studentships

Scholarships may be available. International students can often gain funding through overseas research scholarships, Commonwealth scholarships or their home government.

For further information please contact Marian Jordan on +44 (0)121 414 6989 or email [m.a.jordan@bham.ac.uk](mailto:m.a.jordan@bham.ac.uk) (<mailto:m.a.jordan@bham.ac.uk>). Alternatively email [financialsupport@bham.ac.uk](mailto:financialsupport@bham.ac.uk) (<mailto:financialsupport@bham.ac.uk>).

## Entry requirements

Candidates should possess one of the following:

- At least a second-class Honours degree awarded by an approved university or institution in an appropriate subject
- A degree without Honours, awarded by an approved university or institution in an appropriate subject, followed by at least two years appropriate postgraduate experience

## International students

### Academic requirements

We accept a range of qualifications, our [country pages](#) ([/International/students/country/index.aspx](#)) show you what qualifications we accept from your country.

### English language requirements

You can satisfy our English language requirements in two ways:

- by holding an **English language qualification** ([/postgraduate/requirements-pgt/international/index.aspx](#)) to the right level
- by taking and successfully completing one of our English courses for international students

## How to apply

When clicking on the Apply Now button you will be directed to an application specifically designed for the programme you wish to apply for where you will create an account with the University application system and submit your application and supporting documents online. Further information regarding how to apply online can be found on the [How to apply pages](#) (<http://www.birmingham.ac.uk/students/courses/postgraduate/apply-pg/index.aspx>)

**Apply now** (<https://pga.bham.ac.uk/lpages/LESo37.htm>)

## Related links

[Postgraduate opportunities - School of Geography, Earth and Environmental Sciences](#) ([/schools/gees/courses/postgraduate/index.aspx](#))

## Learning and teaching

The MRes consists of 180 credits in total. The research project comprises 120 credits and the taught component 60 credits.

## Assessment methods

A range of assessment methods will be used, with taught components assessed by exam, extended literature searches and essays, oral presentations and a written proposal. The research project is assessed by a ca 20 000 word dissertation, a log-book, book/lab book and an oral examination.

## Related research

- [Centre for Systems Biology \(/research/activity/csb/index.aspx\)](/research/activity/csb/index.aspx)
- [Environmental Health Sciences research - School of Geography, Earth and Environmental Sciences \(/research/activity/environmental-health/index.aspx\)](/research/activity/environmental-health/index.aspx)

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## Employability

This MRes is designed for those with interests in human and environmental health implications of nanoparticles and is recommended for those both in work and just leaving undergraduate education, with interests in nanoscience and its implications for health, safety and the environment. Manufactured nanoparticles and nanomaterials offer many potential socio-economic, health and environmental benefits as a result of the novel properties and behaviour that materials can exhibit when manufactured at the nanoscale. While the production of nanomaterials is undergoing exponential growth, their biological effects and environmental fate and behaviour are relatively unknown.

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