

## Chemical Engineering PhD, (Energy and Chemical Industries specialism)

### Postgraduate PhD degree - Chemical Engineering PhD/MSc by research (Energy and Chemical Industries specialism):

Our Energy research theme addresses the challenges of introducing the hydrogen economy to replace the current reliance on carbon-based fuels. Fuel cells, hydrogen generation, storage and use are being investigated.

The Chemical Industries theme addresses key challenges including novel production routes using catalysis or supercritical fluids, reduction of waste by-products, and control of product formulation.

Chemical Engineering is dynamic and evolving. It provides many solutions to problems facing industries in the pharmaceutical, biotechnological, oil, energy and food and drink sectors. It is vital to many issues affecting our quality of life; such as better and more economical processes to reduce the environmental burden, and more delicious and longer lasting food due to the right combination of chemistry, ingredients and processing.

Birmingham is a friendly, self-confident, School which has one of the largest concentrations of chemical engineering expertise in the UK. The School is consistently in the top five chemical engineering schools for research in the country.

It has a first-class reputation in learning, teaching and research, and is highly placed in both *The Guardian* and *The Times* league tables. The School was recently awarded the **Queen's Anniversary Prize for Higher Education**.



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

**Study Options:** Full time, part time

**Duration:** PhD: 3 years full-time; MPhil: 1 year full-time, 2 years part-time

**Start date:** Research degrees can start at any time by agreement with the supervisor

#### Related courses

**[Research degrees - School of Chemical Engineering \(/schools/chemical-engineering/postgraduate/research-degrees.aspx\)](/schools/chemical-engineering/postgraduate/research-degrees.aspx)**

#### Contact

Admissions Tutor: Prof Mark Simmons

**[Contact us online \(http://bham.hobsons.co.uk/ask.aspx?cid=1223&did=24\)](http://bham.hobsons.co.uk/ask.aspx?cid=1223&did=24)** or at +44 (0)121 414 3947.

**[School of Chemical Engineering \(/schools/chemical-engineering/index.aspx\)](/schools/chemical-engineering/index.aspx)**

#### Details

Improving quality of life demands the supply of increasing amounts of energy and consumer chemicals, whilst at the same time global warming has become a major cause for concern. Our Energy research theme addresses the challenges of introducing the hydrogen economy to replace the current reliance on carbon-based fuels.

Fuel cells, hydrogen generation, storage and use are being investigated. The production of chemicals such as pharmaceuticals, vitamins, personal and household products is the traditional business of the chemical industry, but new challenges are being addressed to manufacture such products more efficiently.

The challenges are to:

- Create, test and optimise the technologies for generating, storing and using hydrogen, nationally, regionally and locally
- Demonstrate that these technologies are environmentally, socially and economically acceptable
- Establish Birmingham (the city, its industries and universities) as the leading centre for hydrogen energy research and development in the UK

Our research, which is supported by EPSRC, the European Commission, industry and Advantage West Midlands, is carried out jointly with the Schools of Biosciences and Economics and other parts of Engineering in Birmingham, and with the University of Warwick. It includes development of:

- Economic hydrogen production and processing techniques
- Viable hydrogen storage solutions
- Manufacturing routes to robust, high-performance fuel cells

An important feature of our work is that it is multidisciplinary, incorporating the socio-economic aspects of the technologies investigated, which are key to their acceptance.

We take a 'whole systems approach' to applied research, including collaborative development of innovative technology demonstrators (biological hydrogen generation and processing, integrated fuel cell-based combined heat and power systems, hydrogen fuelled transport). We place emphasis on knowledge transfer and public understanding of hydrogen energy.

Novel production routes using catalysis or supercritical fluids, reduction of waste by-products, and control of product formulation are some of the key challenges which are being addressed within the Chemical Industries theme.

## Related links

[School of Chemical Engineering \(/schools/chemical-engineering/index.aspx\)](/schools/chemical-engineering/index.aspx)

## Fees and funding

[Standard fees \(/postgraduate/dr-fees/tuition.aspx\)](/postgraduate/dr-fees/tuition.aspx) apply, [contact the School \(mailto:pg-admis-chem-eng@bham.ac.uk\)](mailto:pg-admis-chem-eng@bham.ac.uk) for further information.

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

## Scholarships and studentships

EPSRC and BBSRC studentships are available for PhDs. Other sources of funding are the Knowledge Transfer Partnership (KTP), the European Union and industrial funding for UK and EU students.

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

For further information contact the School directly or email [sfo@contacts.bham.ac.uk \(mailto:sfo@contacts.bham.ac.uk\)](mailto:sfo@contacts.bham.ac.uk)

## Entry requirements

The normal entry qualification for PhD study is either at least an upper second-class Honours degree, or a first degree of a lower classification, along with an MSc or evidence of substantial relevant industrial experience.

Learn more about [entry requirements \(/postgraduate/requirements-dr/step1.aspx\)](/postgraduate/requirements-dr/step1.aspx)

## International students

We accept a range of qualifications from different countries – learn more about [international entry requirements \(/postgraduate/requirements-dr/step1.aspx\)](/postgraduate/requirements-dr/step1.aspx)

[Standard English language requirements \(/postgraduate/requirements-pgt/international/index.aspx\)](/postgraduate/requirements-pgt/international/index.aspx) apply

## How to apply

Learn more about [applying \(/postgraduate/requirements-dr/index.aspx\)](/postgraduate/requirements-dr/index.aspx)

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 \(http://www.birmingham.ac.uk/students/courses/postgraduate/apply-pg/index.aspx\)](http://www.birmingham.ac.uk/students/courses/postgraduate/apply-pg/index.aspx)

[Apply now \(https://pga.bham.ac.uk/lpages/EPSo20.htm\)](https://pga.bham.ac.uk/lpages/EPSo20.htm)

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## Related links

[Postgraduate degree courses - School of Chemical Engineering \(/schools/chemical-engineering/postgraduate/index.aspx\)](/schools/chemical-engineering/postgraduate/index.aspx)

[Research vacancies and studentships at the School of Chemical Engineering \(/schools/chemical-engineering/postgraduate/research-vacancies-studentships.aspx\)](/schools/chemical-engineering/postgraduate/research-vacancies-studentships.aspx)

## Related news and events

[University achieves significant reduction in CO2 emissions \(/news/latest/2013/01/co2.aspx\)](/news/latest/2013/01/co2.aspx)

[University of Birmingham wins Queen's Anniversary Prize for Higher Education \(/news/latest/2011/11/queens-prize.aspx\)](/news/latest/2011/11/queens-prize.aspx)

## Research interests of staff

Our mission is to carry out research of the highest academic quality, which is novel, challenging and relevant to users.

Our strengths are in design and characterisation of microstructured products, and in heat and mass transfer, fluid flow, particle technology and materials engineering across chemical, biological and physical systems. We collaborate with world-class industry, and with leading edge engineering and science departments nationally and internationally.

## Research centres

### The Centre for Formulation Engineering

The Centre's mission is to carry out research of the highest academic quality, which is novel, challenging and relevant to users. Particular strengths are in design and characterisation of microstructured products, and in heat and mass transfer, fluid flow, particle technology and materials engineering across chemical, biological and physical systems. We collaborate with world-class industry, and with leading edge engineering and science departments nationally and internationally.

### Interdisciplinary Research Centre in Materials Processing - IRC

The primary objective of the research programme in the Interdisciplinary Research Centre (IRC) is the development of materials, through materials processing and of manufacturing technologies so that the properties of the materials are fully exploited. Close interaction with industry is an essential part of this philosophy. The programmes that are in operation with industry vary from long term projects to short term problem-solving.

## Related research

- [Energy and Chemical Industries - Formulation Engineering Research - School of Chemical Engineering \(/research/activity/chemical-engineering/energy-chemical/index.aspx\)](#)
- [The Centre for Formulation Engineering \(/research/activity/chemical-engineering/index.aspx\)](#)

## Employability

### University Careers Network

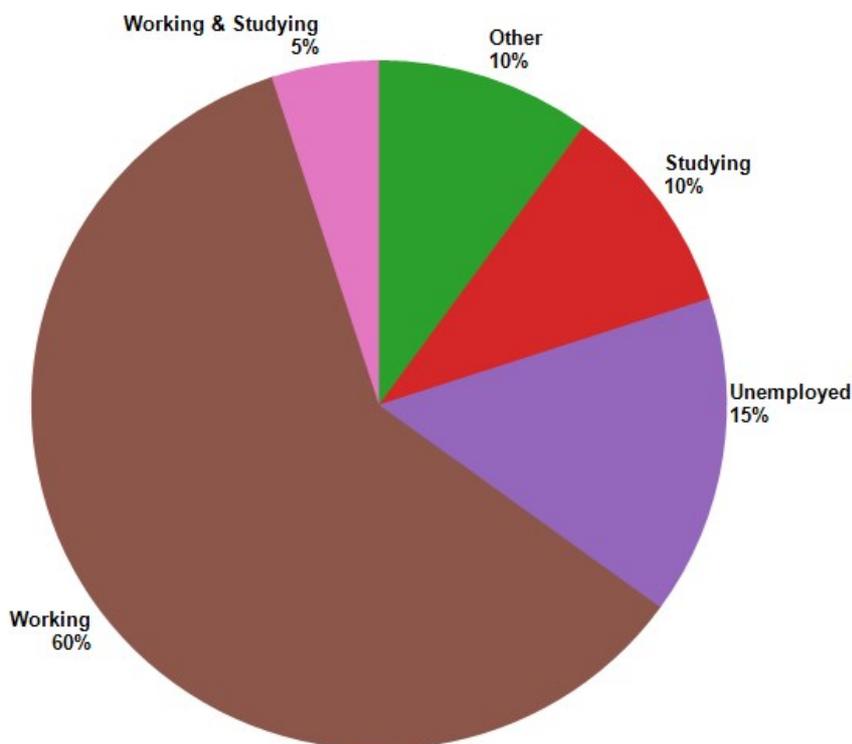
Preparation for your career should be one of the first things you think about as you start university. Whether you have a clear idea of where your future aspirations lie or want to consider the broad range of opportunities available once you have a Birmingham degree, our Careers Network can help you achieve your goal.

Our unique careers guidance service is tailored to your academic subject area, offering a specialised team (in each of the five academic colleges) who can give you expert advice. Our team source exclusive work experience opportunities to help you stand out amongst the competition, with mentoring, global internships and placements available to you. Once you have a career in your sights, one-to-one support with CVs and job applications will help give you the edge.

If you make the most of the [wide range of services \(https://intranet.birmingham.ac.uk/as/employability/careers/college/eps/index.aspx\)](https://intranet.birmingham.ac.uk/as/employability/careers/college/eps/index.aspx) you will be able to develop your career from the moment you arrive.

### Destinations of Leavers from Higher Education (DLHE) 2011/12 (postgraduate taught graduates)

The DLHE survey is conducted 6 months after graduation.



#### Examples of employers:

- BP
- British Gypsum
- Citi
- Coca-Cola
- Foster Wheeler Energy
- Jacobs Engineering
- Johnson Matthey
- KBR
- Pepsico
- RBC Capital Markets

#### Examples of occupations:

- Chemical Engineer
- Development Engineer
- Finance Analyst
- Market Analyst
- Performance Engineer
- Process Engineer
- Process Development Technologist
- Process Support Engineer
- Team Leader
- Test and Validation Engineer

#### Further study - examples of courses:

- MRes Chemical Engineering Science

- MSc Advanced Chemical Engineering
- MSc Biochemical Engineering
- MSc Chemical Engineering
- PhD Chemical Engineering
- PhD Formulation Engineering

- PhD Regenerative Medicine
- PGCE Mathematics

Visit the **Careers section of the University website** (<https://intranet.birmingham.ac.uk/as/employability/careers/college/eps/index.aspx>) for further information.

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