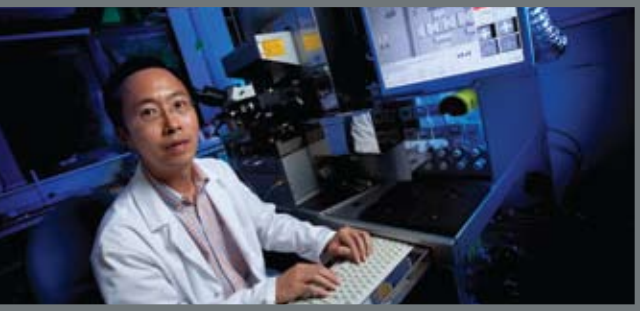
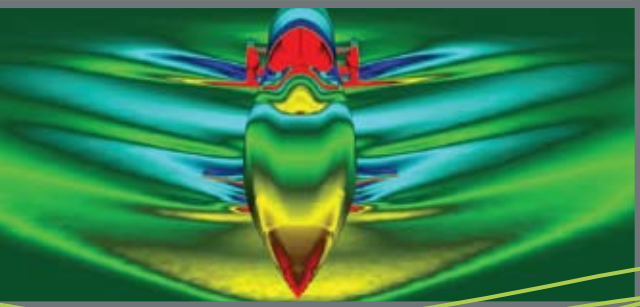
Swansea University
Prifysgol Abertawe



POSTGRADUATE DEGREES

ENGINEERING AT SWANSEA UNIVERSITY



Welcome

Swansea University continues to maintain its position as one of the top universities in the UK for engineering.

At the College of Engineering, we are recognised internationally for our cutting-edge research, with 73 per cent of our academic staff producing research of world-leading or internationally excellent quality.

We collaborate closely with multinationals, small and medium size businesses (SMEs), and public and third sector organisations, which provides great opportunities for students in both research and employment.

Through our range of postgraduate study opportunities, from taught to research degrees in a variety of disciplines both traditional and emerging, our aim is for postgraduate students to develop the potential to become future leaders and champions of industry or to be equipped to meet the challenges and opportunities for a career in research.

With our world-class research centres and a sustained investment programme to provide outstanding resources and facilities, the College of Engineering provides a superb environment in which to study or conduct research.

I invite you to come and see what we have to offer and I look forward to welcoming you to the College of Engineering.

Professor Javier Bonet

Head of the College of Engineering
Swansea University

“Swansea University continues to maintain its position as one of the top universities in the UK for engineering.”

Powertrain Image on cover by Ed Carter, Research Engineer, College of Engineering

“At the end of my degree at Cambridge in Aerospace and Aerothermal Engineering, I felt like it was right for me to continue in academia and so embarked on a PhD at Swansea University in Computational Fluid Dynamics (CFD). It was apparent to me that the vast majority of aerodynamics problems were being tackled, at least in part, using the new computational modelling techniques that Swansea had made itself famous for pioneering.

It was the transition to Swansea that provided me with the opportunity to get involved with the **BLOODHOUND SSC** project and I joined the design team to work on aerodynamics. The team at Swansea University had already gained much trust due to their work on the Thrust SSC program and seemed the obvious choice to be invited to get involved in the CFD research for **BLOODHOUND SSC.**

I’ve had a lifetime fascination with how things work, so being part of the project is a dream come true for me. It’s an amazing experience.”

Dr Ben Evans

Computational Fluid Dynamics Engineering
College of Engineering, Swansea University

Why gain a postgraduate qualification at the College of Engineering?

“A hot contender for any best campus award going, Swansea is virtually unparalleled for its location and is consistently popular choice with applicants. It sits in parkland overlooking the Swansea Bay, on the edge of the stunning Gower peninsula.”

The Guardian University Guide

Whether you’re still studying, have finished your first degree or are currently working, completing a postgraduate programme can propel your career further:

- By developing your knowledge in a specific area, you can help to differentiate yourself from other first degree graduates and show commitment to your discipline of engineering.
- If you would like to qualify as a Chartered Engineer, accredited courses can provide the additional educational components for the further learning needed to qualify as a Chartered Engineer, as set out by UK and European engineering professional institutions.
- From your fellow students to academics and employers, studying at postgraduate level can increase your contacts and networking potential for future career success.
- The technical and transferable skills, in project management, working to deadlines, giving presentations and teamwork, gained through a postgraduate qualification are important to employers.
- Research degrees provide the opportunity for you to develop your knowledge in a supportive environment and in turn, to push the boundaries of our understanding of engineering.

College of Engineering

Recognised internationally for:

- Outstanding teaching
- Ground-breaking multidisciplinary research
- Well-established links with industry
- Excellent career prospects

Engineering at Swansea is a cutting-edge learning environment with state-of-the art teaching and research facilities. We offer a broad portfolio of postgraduate courses that reflect our research strengths and changing needs of industry.

Swansea University

Swansea University is a traditional campus in an enviable seafront location, with lower living costs than most of the UK and only three hours on a direct train from London.

For more information on the University, visit: **www.swansea.ac.uk**

“I have so many favourite memories of the University. The lovely beaches, Mumbles and the Gower close-by and the expansive Singleton Campus. In my spare time I used to go to the beach for a BBQ or to play volleyball.”

Arnab Dasgupt, MSc Mechanical Engineering

Image by Andrew Evans, Student, College of Engineering

Join one of the **UK's leading institutions** in which to study engineering

College of Engineering ranked 8th in the UK

The Research Assessment Exercise (RAE) in 2008 ranked engineering at Swansea as eighth in the UK for the combined score of the research quality across the engineering disciplines.

Particular highlights include civil engineering at Swansea ranked second in the UK for research quality, general engineering ranked joint fifth and materials engineering joint eighth.

The RAE assesses the quality of research in the UK Higher Education sector, assuring us of the standards we strive for.

World-leading research

The RAE showed that 73 per cent of our academic staff produced research of world-leading (4*) or internationally excellent (3*) quality.

Research pioneered at the College of Engineering harnesses the expertise of academic staff within the department. This ground-breaking multidisciplinary research informs our world-class teaching with several of our staff leaders in their fields.

The College of Engineering consists of three world-class research centres:

- Civil and Computational Engineering Centre
- Materials Research Centre
- Multidisciplinary Nanotechnology Centre

A multidisciplinary approach is crucial to address future challenges within engineering. The organisation of engineering at Swansea University from individual departments of Chemical, Civil, Electrical, Materials and Mechanical into the College of Engineering has proved to be extremely successful, in both teaching and research outcomes.

Extensive links with industry

We work in partnership with major industrial companies, which ensure our programmes are current, responsive to change and adaptable to the requirements of employers. Our collaborative research links with industry are amongst the best in the UK.

Our knowledgeable academic staff and students are valued by companies for bringing a new perspective and insight into the latest engineering developments.

For more information on our links with industry, see individual programme pages and information on our world-class research centres.

"We have been working with the College of Engineering at Swansea University through the Steel Training Research and Innovation Partnership (STRIP) and Sustainable Product Engineering Centre for Innovation in Functional Coatings (SPECIFIC). It is a great way for us to tap into the knowledge and enthusiasm that exists in abundance within the University.

The EngD and MRes students we have working on the STRIP scheme have brought a fresh way of thinking to our company and they receive valuable training and access to real industrial conundrums."

Paul Jones, Technology and Innovation Manager, Tata Steel

"We are a partner to the College of Engineering through the Knowledge Economy Skills Scholarships (KESS) scheme. The thesis project for one of our KESS students targeted development of a novel technique for diagnosis of osteoporosis. We have referred to her research in developing a diagnostic technique for this crippling disease. We are happy to say that she has recently signed on with us, and we know she will prove to be an invaluable employee."

Dr Kristen James, Director of Clinical Studies, Acuitas Medical

“Here at Swansea there is plenty of access to resources such as specialised labs and brand new cutting-edge equipment to help you develop your ideas.”

Gareth Blayney, PhD Nanotechnology

Join one of the **UK's leading institutions** in which to study engineering

State of the art teaching and research facilities

From our well-equipped modern laboratories, multimedia suites and study rooms, to the creation of the £22 million Centre for NanoHealth, we have the equipment and resources to compliment the innovative developments taking place at the College of Engineering.

For more information on all our research facilities, see the information on our world-class research centres.

Propel your career

Whether you want to secure a role in industry or pursue a career in research, studying at the College of Engineering will ensure you're equipped with the skills relevant for the sector.

Our links with industry foster transitional and permanent links for our students, providing valuable industry experience for CV's and maximising employment opportunities.

Our dynamic courses respond to the requirements of industry as well as being underpinned by the innovative research taking place at the College of Engineering.

You will have access to professional careers guidance to help develop your career path, through external speakers from industry, the Swansea University Careers and Employability Service or our Professional Development for Engineers courses.

“The knowledge of machining techniques, material selection, fluid mechanics and thermodynamics learnt at Swansea have all featured in my professional career.

The skills gained at Swansea assisted in a successful interview for my current role and progression thereafter.”

Owen Shadick, completed MRes Computer Modelling in Engineering, now Engineering Team Leader at Q Chip Ltd

Personal and professional development

Studying at the College of Engineering can help develop your potential to become a future leader or champion of industry.

We offer courses to help develop your interpersonal, leadership and project management skills for your successful future career.

“Studying at the College of Engineering provided me with a very high level of technical education and significant industrial and international exposure. This helped me not only to build my confidence in my subject of research but also in my overall personal development. As a result of this, after finishing my PhD I had several job offers and I took the one that suited me best.”

Mayur Pal, PhD completed at the College of Engineering, now Associate Research Reservoir Engineer at the Shell International Exploration and Production Research Centre

Funding your studies

We have a range of scholarships and bursaries offered at postgraduate level. For more information, see page 72.

Taught Degrees

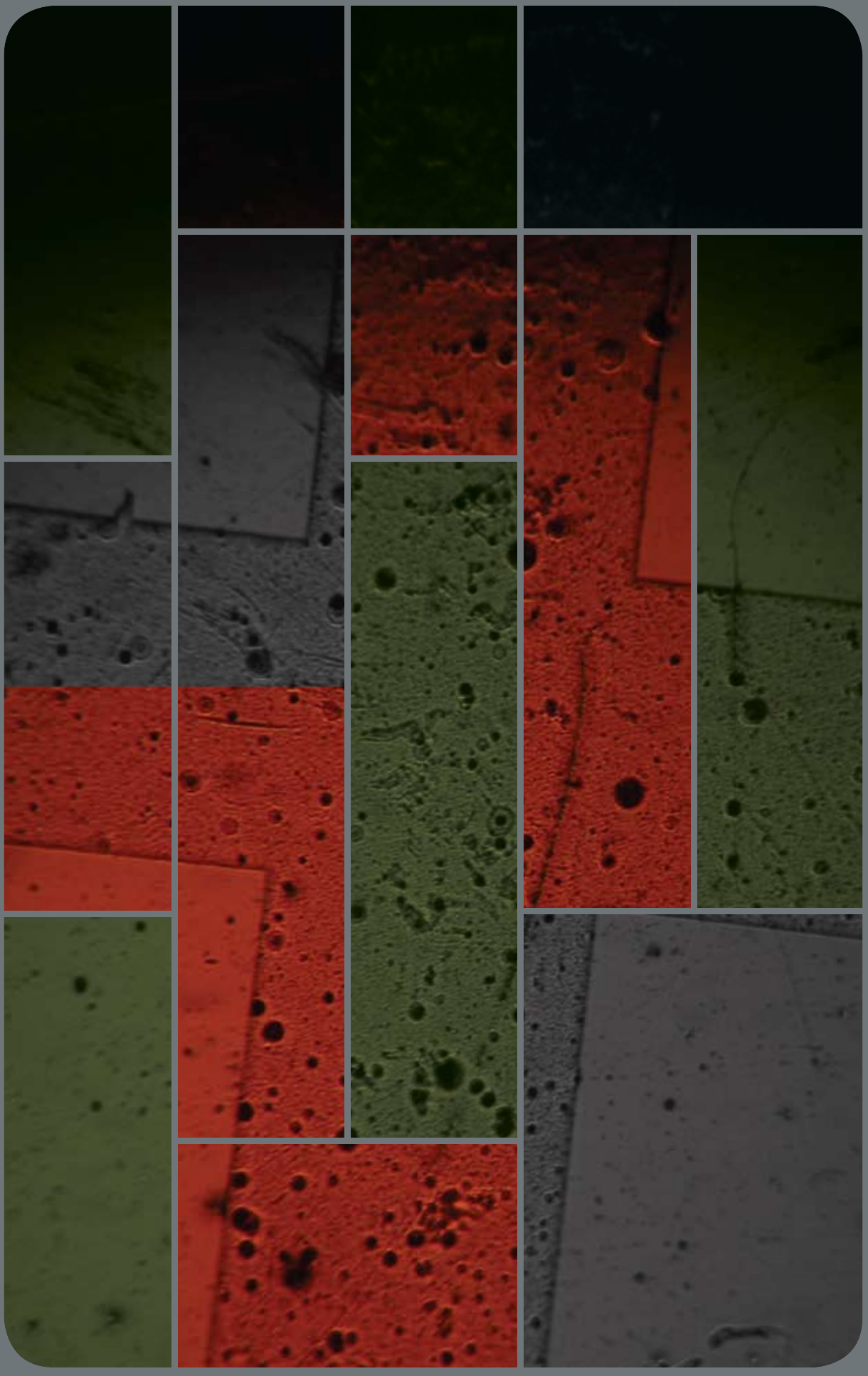


Image by Karthikeyan Rajasundaram, PhD Nanotechnology, College of Engineering

Taught degrees at the College of Engineering

Our taught degrees can enhance your career prospects, prepare you for further research and help you gain specialised skills. Furthermore, they can develop your subject knowledge from your first degree or, in certain courses, allow you to study a completely new subject.

The MSc degrees reflect our research strengths and the changing needs of industry. The advanced topics covered provide a stimulating challenge for students and give a valuable knowledge base for further study or a career in industry.

Through gaining a postgraduate qualification, you will acquire the knowledge, motivation, and self-learning skills required for continuous professional development during your future career, and valuable experience of working on complex projects both as an individual and team member.

Course Structure

MSc programmes are modular in structure. Students must obtain a total of 180 credits to qualify for the degree. This is made up of 120 credits in the taught element (Part One) and a project (Part Two) that is worth 60 credits and culminates in a written dissertation. Students must successfully complete Part One before being allowed to progress to Part Two.

Assessment

The award of the MSc is based on satisfactory performance in examinations, continuous assessment and research dissertation. The examinations are taken in January and May/June and, if passed satisfactorily, students move on to the full-time research project during the summer. The research dissertation is submitted in September and is examined externally.

We offer the following taught degrees:

- MSc Aerospace Engineering
- MSc/Diploma Chemical Engineering
- MSc Civil Engineering
- MSc Computational Modelling and Finite Elements
- MSc Communications Systems
- MSc Computational Mechanics
- MSc Electronics for Sustainable Energy
- MSc Electrical and Electronic Engineering
- MSc Materials Engineering
- MSc Mechanical Engineering
- MSc Medical Radiation Physics
- MSc Nanomedicine
- MSc Nanoscience to Nanotechnology

“I think obtaining a Master’s degree in a university with a great reputation such as Swansea University makes it much easier to find a job.”

Roberto Morujo, MSc student, College of Engineering

MSc Aerospace Engineering

> After passing all the modules on the MSc course, I had the possibility to develop my final thesis in an industrial environment. I learnt about avionics and electronic equipment and developed team work and communication skills.
>
> My favourite memory of the course is our team winning the International Aircraft Design and Handling competition. Our effort really paid off when we won the first prize!
>
> Before starting my final thesis, I found a job as an Applications Engineer in one of the most important aerospace engineering companies, MTorres.
>
> Swansea University provides a fantastic opportunity to study any field of engineering with professional and friendly staff.
>
> **Roberto Morujo, MSc Aerospace Engineering**

OVERVIEW

This MSc degree is based on the world-class expertise available in the Materials Engineering Centre and the computational expertise in the Civil and Computational Engineering Centre.

The College of Engineering has a distinguished history of working with aerospace companies around the world.

This course will provide you with a systematic understanding of the advanced knowledge, critical awareness and new insights required by effective practising aerospace engineers.

At Swansea, world-class aerospace research drives excellent teaching within a cutting-edge learning environment with state-of-the-art teaching facilities, preparing students for the design, analysis, testing and flight of the full range of aeronautical vehicles, including propeller-driven and jet-powered planes, helicopters and gliders.

The College of Engineering is home to one of the world's most advanced engineering flight simulators to enable students to gain hands-on experience.

This MSc is awaiting accreditation by the Institution of Mechanical Engineers (IMechE) and the Royal Aeronautical Society (RAeS).

MODULES

Modules on the course can vary each year but you could expect to study:

- Finite Element Computational Analysis
- Computational Electromagnetics
- Flight Dynamics and Control
- Rotary Wing Aircraft
- Simulation Based Product Design
- Composite Materials
- Numerical Methods
- Computational Fluid Dynamics
- Autonomous Aerospace Vehicles
- Dynamics and Transient Analysis
- Strategic Project Planning
- Research Dissertation
- Communication Skills for Engineers
- Group Project
- MSc Research Project

FUTURE CAREER PROSPECTS

Employment in the aerospace and aeronautical industries.

LINKS WITH INDUSTRY

Our world-leading technology has contributed to many exciting projects, including the aerodynamics for the current World Land Speed Record car, Thrust SSC, and the future BLOODHOUND SSC, and the design of the double-decker super-jet Airbus A380.

We also pride ourselves in the extensive collaborations with international companies such as BAE Systems, Rolls-Royce, EADS and Airbus.

ENTRY REQUIREMENTS

First or a second class honours degree in Engineering or similar relevant science discipline.

If you hold an overseas degree, see page 74 for more information on applying as an international student.

If you do not possess an honours degree and have professional experience in a relevant area, see page 74 for more information.

SUITABLE FOR

Those who would like to gain comprehensive knowledge, understanding and skills that will enable them to contribute to the creation and maintenance of aerospace and aeronautical equipment.

CONTACT DETAILS
College of Engineering
Tel: + 44 (0)1792 295514 | **Email:** engineering@swansea.ac.uk

Taught Degrees

MSc Chemical Engineering

> “Accredited by the Institution of Chemical Engineers, Swansea University’s long standing MSc in Chemical Engineering attracts students from all around the world.”
>
> **Dr Peter Douglas, Senior Lecturer, College of Engineering**

OVERVIEW

This course is built upon the wide range of research in chemical engineering at Swansea University. This includes engineering applications of nanotechnology, bioengineering, biomedical engineering, cell and tissue engineering, chemical engineering, colloid science and engineering, desalination, pharmaceutical engineering, polymer engineering, rheology, separation processes, transport processes, and water and wastewater engineering.

The MSc research project provides an opportunity to work with a member of academic staff in one of the above, or a related, area of research. The project may also involve collaboration with industry.

The taught component of the MSc covers specific areas of advanced chemical engineering as well as the complex regulations that are found in the engineering workplace. It also provides an opportunity for the development of personal and transferable skills such as project planning, communication skills, and entrepreneurship.

The MSc is accredited by the Institution of Chemical Engineers (IChemE). If you already have either an IChemE accredited Bachelor’s degree in Chemical Engineering or the Diploma in Chemical Engineering, this matching Master’s degree course, together with relevant industrial experience, provides a route to Chartered IChemE status.

CHEMICAL ENGINEERING (DIPLOMA)

This is a one-year conversion course for graduates in a science, engineering, or related subject, who wish to work in the chemical engineering field but have not obtained a first degree in Chemical Engineering.

It consists of 12 coursework modules over two semesters followed by a six-module plant design project over the summer period. Successfully passing the Diploma gives exemption to the qualifying design exams of the Institution of Chemical Engineers (IChemE). It thus provides an entry point for science and engineering graduates into the chemical engineering profession at bachelor level, and with further matching Master’s level study and relevant experience it provides a route to Chartered IChemE status.

MODULES

Taught components on the MSc course can vary each year but you could expect to study modules such as:

- Advanced Transport Phenomena
- Optimisation
- Water and Waste Water Engineering
- Complex Fluids and Flows
- Membrane Technology and Bioreactor Design
- Desalination
- Ethics, Safety and Regulation in Engineering
- Communication Skills
- Colloids and Interface Science
- Environmental Analysis and Legislation
- Polymers: Properties and Design
- Research Practice
- Strategic Project Planning
- Entrepreneurship for Engineers

FUTURE CAREER PROSPECTS

Chemical engineers find employment in a variety of public and private sector industries, applying the principles of chemical engineering to health, energy, food, the environment, medicine, petrochemicals and pharmaceuticals.

LINKS WITH INDUSTRY

Swansea staff have research links with local, national, and international companies. An industrial advisory board, consisting of eight industrialists from a range of chemical engineering backgrounds, ensure our courses maintain their industrial relevance.

ENTRY REQUIREMENTS

First or second class honours degree in Chemical or Biochemical Engineering, or a first or second class honours degree in a related discipline, such as chemistry, biochemistry, physics, or other engineering discipline

If you hold an overseas degree, see page 74 for more information on applying as an international student.

If you do not possess an honours degree and have professional experience in a relevant area, see page 74 for more information.

SUITABLE FOR

Graduates with a Chemical Engineering degree who are looking to advance their technical knowledge before further research or embarking on a career in chemical engineering. This course is also suitable for those who don’t possess a degree in Chemical Engineering but would like to develop chemical engineering as part of their future career plans.

CONTACT DETAILS
College of Engineering
Tel: + 44 (0)1792 295514 | **Email:** engineering@swansea.ac.uk

MSc Civil Engineering

"The College of Engineering has an excellent reputation for civil engineering. This course utilises the expertise of academic staff to provide high-quality postgraduate training for students."

Professor Yuntian Feng, Course Coordinator, College of Engineering

OVERVIEW

The Research Assessment Exercise (RAE) in 2008 ranked civil engineering at Swansea University as second in the UK for research quality, with 95 per cent of academic staff classed as producing world-leading (4*) or internationally excellent (3*) research.

This MSc aims to provide advanced training in civil engineering analysis and design, particularly in modelling and analysis techniques.

As a student on this course you will be provided with in-depth knowledge and exposure to conventional and innovative ideas and techniques to enable you to develop sound solutions to civil engineering problems.

You will also be provided with practical computer experience through the use of computational techniques, using modern software, to provide a solution to a range of current practical civil engineering applications. This will enable you to apply the approach with confidence in an industrial context.

This MSc is awaiting accreditation by the Joint Board of Moderators (JBM).

FUTURE CAREER PROSPECTS

The civil engineering sector is one of the largest employers in the UK and demand is strong for civil engineering graduates. This course also equips you with the skills to be involved in other engineering projects and provides an excellent basis for a professional career in structural, municipal and allied engineering fields.

MODULES

Modules on the course can vary each year but you could expect to study:

- Reservoir Simulation
- Advanced Fluid Mechanics
- Dynamics and Transient Analysis
- Finite Element Computational Analysis
- Advanced Structural Design
- Advanced Structural Analysis
- Entrepreneurship for Engineers
- Computational Plasticity
- Fluid-Structure Interaction
- Group project
- MSc Research Project

LINKS WITH INDUSTRY

Strong interaction and cooperation is forged with the construction industry and relevant member institutions of the Joint Board of Moderators (JBM), particularly the Institution of Civil Engineers (ICE) and the Institution of Structural Engineers (IStructE).

These companies are actively engaged with civil engineering at Swansea University: Atkins, Arup, Balfour Beatty Civil Engineering Ltd, Black and Veatch Ltd, City and Council of Swansea, Dean and Dyball, Halcrow UK, Hyder (Cardiff), Interserve Ltd, the Institution of Civil Engineers (ICE), Laing O'Rourke, Mott MacDonald Group Ltd, Veryard Opus.

ENTRY REQUIREMENTS

First or second class honours degree in Civil Engineering or a similar relevant engineering or science discipline.

If you hold an overseas degree, see page 74 for more information on applying as an international student.

If you do not possess an honours degree and have professional experience in a relevant area, see page 74 for more information.

SUITABLE FOR

Those who would like to prepare for an active and responsible career in civil engineering design and construction.

Practicing engineers will have the chance to improve their understanding of civil engineering by attending individual course modules.

CONTACT DETAILS
College of Engineering
Tel: + 44 (0)1792 295514 | **Email:** engineering@swansea.ac.uk

Taught Degrees

MSc Computational Modelling and Finite Elements

"The Civil and Computational Engineering Centre is acknowledged as an internationally leading centre for computational engineering research. Many numerical techniques currently in use in commercial simulation software have originated from Swansea University. The Centre provides several postgraduate programmes, originating from the pioneering and internationally recognised MSc course in Finite Elements Methods developed by Professor Zienkiewicz in the 1960's."

Professor Yuntian Feng, Course Coordinator, College of Engineering

OVERVIEW

Swansea University has been at the forefront of international research in the area of computational engineering. Internationally renowned engineers at Swansea pioneered the development of numerical techniques, such as the finite element method, and associated computational procedures that have enabled the solution of many complex engineering problems.

Computer simulation is now an established discipline that has an important role to play in engineering, science and in newly emerging areas of interdisciplinary research.

Using mathematical modelling as the basis, computational methods provide procedures which, with the aid of the computer, allow complex problems to be solved. The techniques play an ever-increasing role in industry and there is further emphasis to apply the methodology to other important areas such as medicine and the life sciences.

This course provides a solid foundation in computer modelling and the finite element method in particular.

The Civil and Computational Centre, within which this course is run, has excellent computing facilities, including a state-of-the-art multi-processor super computer with virtual reality facilities and high-speed networking.

This MSc is accredited by the Joint Board of Moderators (JBM).

MRes Computer Modelling in Engineering is also offered. For more information, see page 42.

FUTURE CAREER PROSPECTS

Employment in a wide range of industries, which require the skills developed during this course, from aerospace to the medical sector. Computational modelling techniques have developed in importance to provide solutions to complex problems and as a graduate of this course, you will be able to utilise your highly sought-after skills in industry or research.

MODULES

Modules on the course can vary each year but you could expect to study:

- Computational Electromagnetics
- Reservoir Simulation
- Numerical Methods
- Solid Mechanics
- Finite Element Computational Analysis
- Advanced Fluid Mechanics
- Computational Plasticity
- Fluid-Structure Interaction
- Nonlinear Continuum Mechanics
- Computational Fluid Dynamics
- Dynamics and Transient Analysis
- Computational Case Study
- Communication Skills for Research Engineers
- MSc Research Project

LINKS WITH INDUSTRY

The Civil and Computational Engineering Centre has an extensive track record of industrial collaboration and contributes to many exciting projects, including the aerodynamics for the current World Land Speed Record car, Thrust SSC, and the future BLOODHOUND SSC, and the design of the double-decker super-jet Airbus A380.

Examples of recent collaborators and sponsoring agencies include: ABB, Audi, BAE Systems, British Gas, Cinpress, DERA, Dti, EADS, EPSRC, European Union, HEFCW, HSE, Hyder, Mobil, NASA, Quinshield, Rolls-Royce, South West Water, Sumitomo Shell, Unilever, US Army, WDA.

ENTRY REQUIREMENTS

First or second class honours degree in Engineering, Mathematics or similar relevant science discipline.

If you hold an overseas degree, see page 74 for more information on applying as an international student.

If you do not possess an honours degree and have professional experience in a relevant area, see page 74 for more information.

SUITABLE FOR

Those who wish to develop their knowledge and competency in the field of computer modelling, with a focus on the finite element, and taking the skills gained through this course to develop their career in industry or in preparation for a PhD degree.

Those who would like to qualify as a Chartered Engineer, this course is accredited with providing the additional educational components for the further learning needed to qualify as a Chartered Engineer, as set out by UK and European engineering professional institutions.

The modules on this course can also be studied as stand-alone modules for those who are in employment seeking professional development or further knowledge in particular subject fields.

CONTACT DETAILS
College of Engineering
Tel: + 44 (0)1792 295514 | **Email:** engineering@swansea.ac.uk

Taught Degrees

MSc Communication Systems

> I was fascinated by the natural beauty of Swansea before I came here. Swansea University is near the beach so you can walk around the beach at any time. This Master's is very useful to enhance your ability and increase your academic knowledge.
>
> **Zhang Daping, MSc Communication Systems**

OVERVIEW

Through this course you will be provided with an in-depth understanding of the technology and architecture of computer communications, photonics and telecommunication networks, wireless telecommunications and related wireless information technologies.

This is supported with some practical knowledge and skills for project and business management principles.

The practical knowledge and skills you will gain as a student on this course include being presented with the essential element of modern optical communication systems based on single mode optical fibres from the core to the access, evaluating bandwidth-rich contemporary approaches, and also covers advanced networking topics including network performance and network security.

You will also be introduced to technologies underlying the compressions and transmission of digital video over networking platforms, gain knowledge on the channel models and associated impairments that typically limit the performance of wireless systems, and learn to design optimum digital communication receivers for some basic communications channel models.

There will also be the opportunity to develop career skills to meet the changing needs of industry and to contribute to our society in the area of communication systems.

MRes Communication Systems is also offered. For more information, see page 44.

FUTURE CAREER PROSPECTS

Employment in wireless communication systems and network administration, and mobile applications development.

MODULES

Modules on the course can vary each year but you could expect to study:

- Communication Skills for Engineers
- Data Networks
- RF and Microwave
- Signal Analysis and Modelling
- Digital Communications
- Mobile Communication Systems
- Computer Aided Communication System Design
- Multimedia Processing and Communications
- Digital Signal Processing for Communications
- Optical Communications 1
- Optical Communications 2
- Network Performance and Security
- Communication Skills for Engineers
- MSc Communications System Project

LINKS WITH INDUSTRY

This discipline has a good track record of working with industry both at research level and in linking industry-related work to our postgraduate courses. We also have an industrial advisory board that ensures our taught courses maintain relevance.

Our research groups work with many major UK, Japanese, European and American multinational companies and numerous small and medium sized enterprises (SMEs) to pioneer research. This activity filters down and influences the project work that is undertaken by all our postgraduate students.

ENTRY REQUIREMENTS

First or second class honours degree in Electrical or Electronic Engineering or a similar relevant engineering or science discipline.

If you hold an overseas degree, see page 74 for more information on applying as an international student.

If you do not possess an honours degree and have professional experience in a relevant area, see page 74 for more information.

SUITABLE FOR

Those who have a career interest in the field of communication systems, which has been fundamentally changing the whole world in virtually every aspect, and would like to gain lasting career skills and in-depth knowledge to carry out development projects and advanced research in the area of communication systems.

CONTACT DETAILS

Dr Pavel Loskot

Tel: + 44 (0)1792 602619 | **Email:** p.loskot@swansea.ac.uk

Taught Degrees

MSc Computational Mechanics

Erasmus Mundus

> "I gained immensely from the high quality coursework, extensive research support, confluence of cultures and unforgettable friendship."
>
> **Prabhu Muthuganeisan, MSc Computational Mechanics**

OVERVIEW

The Erasmus Mundus MSc Computational Mechanics course is a two-year postgraduate programme run by an international consortium of four leading European Universities, namely Swansea University, Universitat Politècnica de Catalunya (Spain), École Centrale de Nantes (France) and University of Stuttgart (Germany) in cooperation with the International Centre for Numerical Methods in Engineering (CIMNE, Spain).

Through this course you will be provided with in-depth, multidisciplinary training in the application of the finite element method and related state-of-the-art numerical and computational techniques to the solution and simulation of highly challenging problems in engineering analysis and design.

As a student on this course, you will gain a general knowledge of the theory of computational mechanics, including the strengths and weaknesses of the approach, appreciate the worth of undertaking a computational simulation in an industrial context, and be provided with training in the development of new software for the improved simulation of current engineering problems.

There will be a wide choice of specialisation areas (i.e. fluids, structures, aerospace, biomedical) by incorporating modules from the four universities and this allows you to experience postgraduate education in more than one European institution.

In the first year, you will follow an agreed common set of core modules leading to common examinations in Swansea or Barcelona. In addition, an industrial placement will take place during this year, where you will have the opportunity to be exposed to the use of computational mechanics within an industrial context. For the second year, you will move to one of the other Universities, depending upon your preferred specialisation, to complete a series of taught modules and the research thesis.

For information on the Erasmus Mundus Scholarships that are available to highly qualified students with outstanding academic records, see page 72.

This course is fully accredited by the Institution of Civil Engineers (ICE), Institute of Highway Engineers (IHE), the Chartered Institution of Highways and Transportation (CIHT) and the Institution of Structural Engineers (IStructE).

For further details and to apply, visit:
www.cimne.com/cm-master

FUTURE CAREER PROSPECTS

The next decade will experience an explosive growth in the demand for accurate and reliable numerical simulation and optimisation of engineering systems. Computational mechanics will become even more multidisciplinary than in the past and many technological tools will be, for instance, integrated to explore biological systems and submicron devices. This will have a major impact in our everyday lives. Employment can be found in a broad range of engineering industries as this course provides the skills for the modelling, formulation, analysis and implementation of simulation tools for advanced engineering problems.

MODULES

Modules on the course can vary each year but you could expect to study the following core modules (together with elective modules):

- Numerical Methods for Partial Differential Equations
- Finite Element Method
- Continuum Mechanics
- Computational Solid Mechanics
- Finite Element in Fluids
- Computational Structural Mechanics and Dynamics
- Computational Wave Propagation
- Extended Finite Element Method and Level Set Techniques
- Multi-Scale Structural Analysis
- Materials Modelling for Numerical Simulations
- Numerical Techniques for Partial Differential Equations in Fluids
- Research Project Plan
- MSc Thesis
- Practical Training

LINKS WITH INDUSTRY

You will have the opportunity to apply your skills and knowledge in computational mechanics in an industrial context.

As a student on this course you will be placed in engineering industries, consultancies or research institutions that have an interest and expertise in computational mechanics. Typically, you will be trained by the relevant industry in the use of their in-house or commercial computational mechanics software.

You will also gain knowledge and expertise on the use of the particular range of commercial software used in the industry where you are placed.

ENTRY REQUIREMENTS

First or second class honours degree in Engineering, Applied Mathematics, Physics or a similar relevant science discipline.

If you hold an overseas degree, see page 74 for more information on applying as an international student.

If you do not possess an honours degree and have professional experience in a relevant area, see page 74 for more information.

SUITABLE FOR

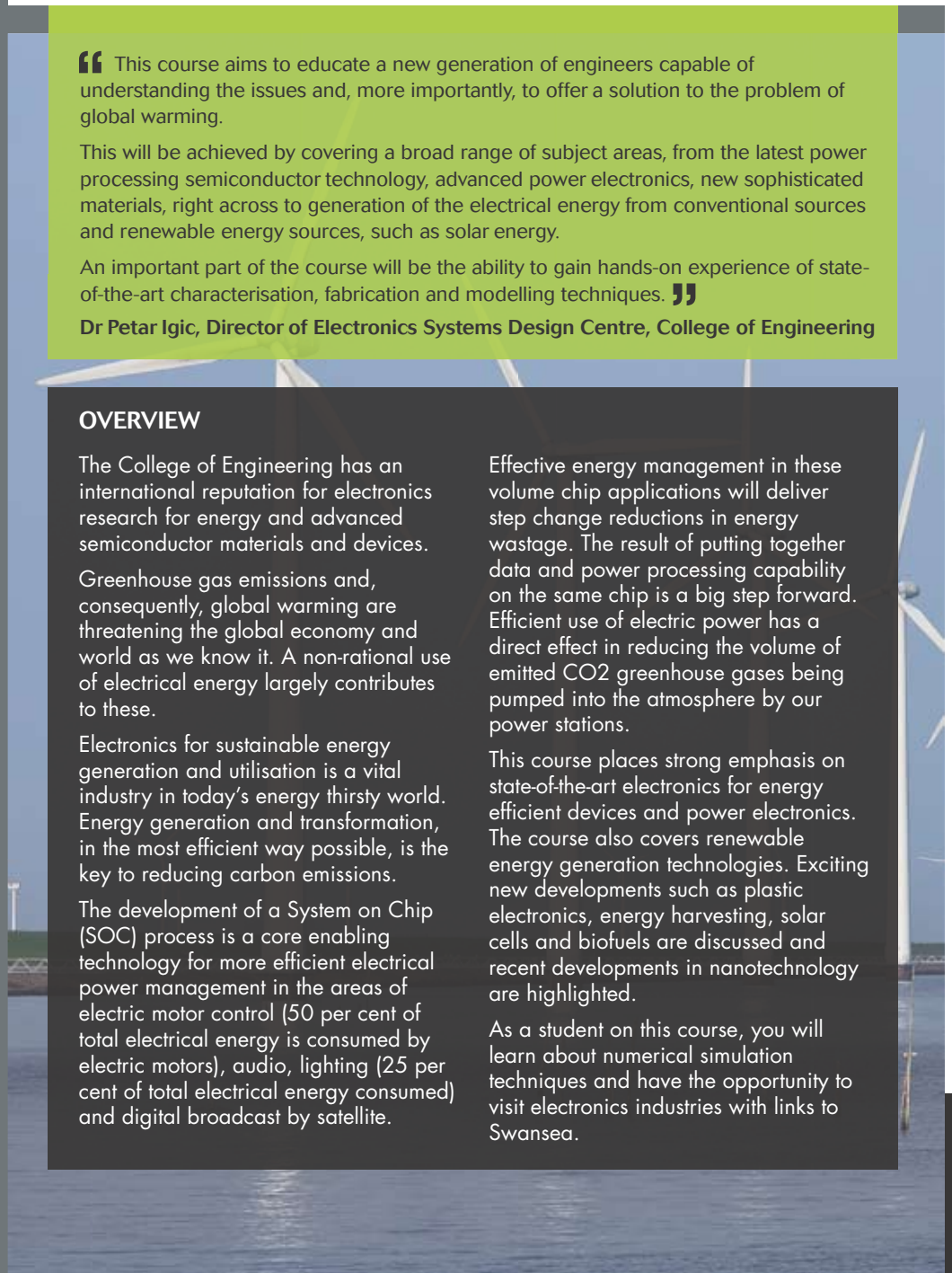
Those who wish to develop their knowledge and competency in the field of computational mechanics with applications in solids, fluids and interdisciplinary fields. Students may take the Master's as a professional terminal degree or in preparation for a PhD degree.

Those who would like to qualify as a Chartered Engineer, this course is accredited with providing the educational components for the further learning matching sections, as set out by the Civil Engineers (ICE), Institute of Highway Engineers (IHE), and the Institution of Structural Engineers (IStructE), and other UK and European engineering professional institutions.

CONTACT DETAILS
Dr Antonio J Gil
Tel: + 44 (0)1792 602552 | **Email:** a.j.gil@swansea.ac.uk

Taught Degrees

MSc Electronics Technology for Sustainable Energy



"This course aims to educate a new generation of engineers capable of understanding the issues and, more importantly, to offer a solution to the problem of global warming.

This will be achieved by covering a broad range of subject areas, from the latest power processing semiconductor technology, advanced power electronics, new sophisticated materials, right across to generation of the electrical energy from conventional sources and renewable energy sources, such as solar energy.

An important part of the course will be the ability to gain hands-on experience of state-of-the-art characterisation, fabrication and modelling techniques."

Dr Petar Igic, Director of Electronics Systems Design Centre, College of Engineering

OVERVIEW

The College of Engineering has an international reputation for electronics research for energy and advanced semiconductor materials and devices.

Greenhouse gas emissions and, consequently, global warming are threatening the global economy and world as we know it. A non-rational use of electrical energy largely contributes to these.

Electronics for sustainable energy generation and utilisation is a vital industry in today's energy thirsty world. Energy generation and transformation, in the most efficient way possible, is the key to reducing carbon emissions.

The development of a System on Chip (SOC) process is a core enabling technology for more efficient electrical power management in the areas of electric motor control (50 per cent of total electrical energy is consumed by electric motors), audio, lighting (25 per cent of total electrical energy consumed) and digital broadcast by satellite.

Effective energy management in these volume chip applications will deliver step change reductions in energy wastage. The result of putting together data and power processing capability on the same chip is a big step forward. Efficient use of electric power has a direct effect in reducing the volume of emitted CO2 greenhouse gases being pumped into the atmosphere by our power stations.

This course places strong emphasis on state-of-the-art electronics for energy efficient devices and power electronics. The course also covers renewable energy generation technologies. Exciting new developments such as plastic electronics, energy harvesting, solar cells and biofuels are discussed and recent developments in nanotechnology are highlighted.

As a student on this course, you will learn about numerical simulation techniques and have the opportunity to visit electronics industries with links to Swansea.

MODULES

Modules on the course can vary each year but you could expect to study:

- Energy Efficient Electronics Technologies
- Wide Band-Gap Electronics
- Advanced Power Electronics and Drives
- Modern Control Systems
- Power Generation Systems
- Communication Skills for Engineers
- Probing at the Nanoscale
- Soft Nanotechnology
- Environmental Assessment and Legislation
- Computational Case Study
- MSc Research Project

FUTURE CAREER PROSPECTS

Employment in the growing renewable energy sector, power electronic and semiconductor sector, and electric/hybrid vehicle industry.

LINKS WITH INDUSTRY

BT, Siemens, Plessey, GE Lighting, Schlumberger, Cogsys, Morganite, Newbridge Networks, Alstom, City Technology, BNR Europe, Philips, SWALEC, DERA, BTG, X-Fab, ZETEX Diodes, IQE, IBM, TSMC, IR, Toyota, Hitachi.

ENTRY REQUIREMENTS

First or second class honours degree in Electrical and Electronic Engineering, Physics or a closely related subject.

If you hold an overseas degree, see page 74 for more information on applying as an international student.

If you do not possess an honours degree and have professional experience in a relevant area, see page 74 for more information.

SUITABLE FOR

Graduates who may want to extend their technical knowledge and professional applicants, who may like to be provided with fast-track career development. This MSc addresses the skills shortage within the power electronics for renewable energy sector.

CONTACT DETAILS
Dr Petar Igic
Tel: + 44 (0)1792 602132 | **Email:** p.igic@swansea.ac.uk

MSc Electrical and Electronic Engineering

"As an Enhanced Academic Partner of the Institution of Engineering and Technology (IET) we are able to give our students a great start to a career in electronic and electrical engineering.

We provide our students with access to state-of-the-art equipment and work closely with top companies in the UK and world-wide."

Dr Andy McCowen, Course Director, College of Engineering

OVERVIEW

Through this course you will develop specialist skills aligned with the College of Engineering's research interests and reflecting the needs of the electrical and electronics industry.

This MSc covers the ability to apply the knowledge gained in the course creatively and effectively for the benefit of the profession, to plan and execute a programme of work efficiently, and to be able, on your own initiative, to enhance your skills and knowledge as required throughout your career.

Industry-standard equipment, such as a scanning tunnelling microscope for atomic scale probing or an hp4124 parameter analyzer for power devices, is used for simulation, implementation and communication.

There will be the opportunity to choose and apply suitable prototyping and production methods and components, gain knowledge in constructing and evaluating advanced models of various manufacturing techniques, and be able to differentiate, analyse and discuss various product lifetime management solutions and how they affect different sectors of industry.

This MSc is accredited by the Institution of Engineering and Technology (IET). Swansea University is an Enhanced Academic Partner of IET.

FUTURE CAREER PROSPECTS

Employment in industry, research centres, government or as entrepreneurs in a wide range of careers, from a design and development role for electronic and electrical equipment or as a technological specialist contributing to a multi-disciplinary team in a range of fields, including medicine, travel, business and education.

MODULES

Modules on the course can vary each year but you could expect to study:

- Probing at the Nanoscale
- Data Networks
- Digital Communications
- Energy Efficient Electronics Technologies
- Advanced Power Electronics and Drives
- Modern Control Systems
- Wide Band-Gap Electronics
- Power Generation Systems
- Network QoS and Control
- RF and Microwave
- Signal Analysis and Modelling
- Digital Signal Processing for Communications
- Lasers
- Project Planning
- MSc Research Project

LINKS WITH INDUSTRY

This discipline has a good track-record of working with industry both at research level and in linking industry-related work to our postgraduate courses. We also have an industrial advisory board that ensure our taught courses maintain relevance.

Our research groups work with many major UK, Japanese, European and American multinational companies and numerous small and medium sized enterprises (SMEs) to pioneer research. This activity filters down and influences the project work that is undertaken by all our postgraduate students.

ENTRY REQUIREMENTS

First or second class honours degree in Electrical or Electronic Engineering or a similar relevant engineering or science discipline.

If you hold an overseas degree, see page 74 for more information on applying as an international student.

If you do not possess an honours degree and have professional experience in a relevant area, see page 74 for more information.

SUITABLE FOR

Those who would like to qualify as a Chartered Engineer, this course is accredited with providing the educational components for the further learning needed to qualify as a Chartered Engineer, as set out by the Institution of Engineering and Technology (IET) and other UK and European engineering professional institutions. In addition, as an Enhanced Academic Partner, Swansea University is able to fund student membership of the IET for the duration of their MSc studies.

The modules on this course can also be studied as stand-alone modules for those who are in employment seeking professional development or further knowledge in particular subject fields.

CONTACT DETAILS
Dr Andy McCowen
Tel: + 44 (0)1792 295478 | **Email:** a.mccowen@swansea.ac.uk

Taught Degrees

MSc Materials Engineering

> “The quality of the research and postgraduate training programmes in the Materials Research Centre have been recognised through the Queen’s Anniversary prize, with the award citation defining materials engineering at Swansea as a ‘recognised centre of excellence, with an international reputation.”
>
> **Dr Cris Arnold, Senior Lecturer, College of Engineering**

OVERVIEW

This course focuses on the College of Engineering’s main research strengths of materials for aerospace applications and steel technology. Taught modules will allow you to specialise in one of these areas to a certain degree and the course also includes modules on financial, management and environmental aspects of engineering.

Through this course you will be provided with training and experience in a broad range of topic areas, including metallurgy and materials selection, modern methods used for engineering design and analysis, the relationship between structure, processing and properties for a wide range of materials, materials and advanced composite materials, structural factors that control the mechanical properties of materials, and modern business management issues and techniques.

This course will provide you with the depth of knowledge and breadth of abilities to meet the demands of the international materials industry.

MRes Materials Engineering is also offered. For more information, see page 45.

FUTURE CAREER PROSPECTS

Materials engineering underpins almost all engineering applications and employment prospects are excellent.

Employment can be found in a very wide range of sectors, ranging from large-scale materials production through to R&D in highly specialised advanced materials in industries that include aerospace, automotive, manufacturing, sports, and energy generation, as well as consultancy and advanced research.

Materials engineering knowledge is vital in many fields and our graduates go on to successful careers in research and development, product design, production management, marketing, finance, teaching and the media, and entrepreneurship.

MODULES

Modules on the course can vary each year but you could expect to study:

- Aerospace Materials Engineering
- Ceramics
- Composite Materials
- Polymers: Properties and Design
- Physical Metallurgy of Steel
- Environmental Analysis and Legislation
- Recycling Technology
- Professional Development for Engineers
- Entrepreneurship for Engineers
- Strategic Project Planning
- Simulation Based Product Design
- Research Dissertation
- MSc Research Project

LINKS WITH INDUSTRY

The internationally leading materials research conducted at Swansea is funded by prestigious organisations such as Rolls-Royce, Airbus and Tata Steel.

Other companies sponsoring research projects include Akzo Nobel, Axion Recycling, BAE Systems, Bayer, Cognet, Ford, HBM nCode, Jaguar Land Rover, Novelis, QinetiQ, RWE Innogy, Timet, TWI (Wales), as well as many smaller companies across the UK.

These industrial research links provide excellent opportunities for great research and employment opportunities.

We also pride ourselves in the extensive collaborations with international companies such as BAE Systems, Rolls-Royce, EADS and Airbus.

ENTRY REQUIREMENTS

First or second class honours degree in Engineering or a similar related discipline.

If you hold an overseas degree, see page 74 for more information on applying as an international student.

If you do not possess an honours degree and have professional experience in a relevant area, see page 74 for more information.

SUITABLE FOR

This course is an excellent route for those who have a first degree in any scientific or technical subject and would like to become qualified in this field of materials engineering.

CONTACT DETAILS
College of Engineering
Tel: + 44 (0)1792 295514 | **Email:** engineering@swansea.ac.uk

MSc Mechanical Engineering

> “Every single day at the College of Engineering has been a learning process for me. The MSc in Mechanical Engineering involves leading world-class professors, tutors and academics with whom we were lucky to be associated. There is also a great peer group too.
>
> I would like to pursue a PhD at Swansea University and become an entrepreneur. The College of Engineering has helped immensely with these ambitions.”
>
> **Arnab Dasgupta, MSc Mechanical Engineering**

OVERVIEW

Mechanical engineering at Swansea maintains a high standard of teaching and research, set in a relaxed and sociable atmosphere. The course is stimulating and our graduates are rewarded with excellent job prospects.

This course will provide you with a high quality overview of the techniques of modern mechanical engineering, presenting examples of use from a wide range of disciplines and industries. It will also equip you with the ability to make informed judgements on the most appropriate approach to a range of mechanical engineering problems.

The course covers the development of mechanical engineering tools, methods and techniques for problem solving, the use of these tools and techniques for real world applications, the ability to formulate an accurate representation of sets of experimental data, and business and management methods and their application in the field of engineering.

The research project undertaken as part of the course is industrially relevant and the topics of the course are of high industrial relevance.

This course is accredited by the Institution of Mechanical Engineers (IMechE).

FUTURE CAREER PROSPECTS

The modules on this course are of high industrial relevance and the benefits to employability are immediate in a wide range of industries.

MODULES

Modules on the course can vary each year but you could expect to study:

- Product Lifecycle Management
- New Product Introduction
- Advanced Fluid Dynamics
- Condition Monitoring
- Dynamics and Transient Analysis
- Optimisation
- Modern Control Systems
- Entrepreneurship for Engineers
- Simulation Based Product Design
- Computational Intelligence in Engineering
- Strategic Project Planning
- Group project
- MSc Research Project

LINKS WITH INDUSTRY

Members of staff work closely with a range of industries through knowledge transfer projects, consultancy and strategic research, which informs the practical problems used in our teaching.

Within Wales we have close interaction with large companies such as Tata Steel and Ford, as well as small and medium-sized enterprises (SMEs). Across the UK there is or has been recent work with companies such as Astra-Zeneca, British Aerospace, Qinetiq, GKN and Rolls-Royce whilst further afield there is close working with companies such as SKF (Netherlands), Freeport (USA), One Steel (Australia), and Barrick Gold (USA) to name a few.

ENTRY REQUIREMENTS

First or upper second class honours degree in Mechanical Engineering or a similar relevant engineering or science discipline (for example, physics or mathematics).

If you hold an overseas degree, see page 74 for more information on applying as an international student.

If you do not possess an honours degree and have professional experience in a relevant area, see page 74 for more information.

SUITABLE FOR

Those who would like to qualify as a Chartered Engineer, this course is accredited with providing the educational components for the further learning matching sections, as set out by the Institution of Mechanical Engineers (IMechE), and other UK and European engineering professional institutions.

Practising engineers will have the chance to improve their understanding of mechanical engineering by attending individual course modules.

CONTACT DETAILS
Dr Mike Clee
Tel: + 44 (0)1792 295250 | **Email:** m.j.clee@swansea.ac.uk

MSc Medical Radiation Physics

> “I have found studying at the College of Engineering wonderful. All the facilities were provided and everything in the College of Engineering encourages you to do better.
>
> I have enjoyed the student life with my friends at the University and my favourite memories of the course are the teamwork of the students.”
>
> **Abdulielah K.Almutairi, MSc Medical Radiation Physics**

OVERVIEW

This course builds on the highly successful research partnerships between the College of Engineering, the College of Medicine and Swansea NHS Trust, including the Multidisciplinary Nanotechnology Centre and NanoHealth initiatives, and ongoing work in state-of-the art radiotherapy modelling techniques, body composition and tissue characterisation.

This course will provide you with the necessary knowledge and understanding of fundamental aspects of the use of radiation in medicine in order that you are conversant in medical terms, human physiology and radiation mechanisms.

A direct link to clinical practice is provided through hands-on instruction with equipment used routinely in the hospital setting, which will prepare you for research and clinical practice in a rapidly changing field, including tuition in computer modelling, human engineering and the medico-legal issues they imply.

As part of the course, you will learn about the function of the medical physicist and clinical engineer in diagnostic and therapeutic medicine and gain the knowledge to meet the needs of modern and emergent clinical practice including tuition in legislative and medico-ethical issues, and tissue engineering.

This course has been accredited by the Institute of Physics and Engineering in Medicine (IPEM). IPEM is the professional body that works with physical science, engineering and clinical professionals in academia, healthcare services and industry in the UK and supports clinical scientists and technologists in their practice through the provision and assessment of education and training.

FUTURE CAREER PROSPECTS

This course will prepare you for research and clinical practice in a rapidly changing field, including tuition in computer modelling, human engineering and the medico-legal issues they imply. It will enable you to develop the potential to become a leader, defining and influencing medical practice.

For a medical physicist career path, the role includes opportunities for laboratory work, basic and applied research, management and teaching, offering a uniquely diverse career. In addition there is satisfaction in contributing directly to patient treatment and care.

MODULES

Modules on the course can vary each year but you could expect to study:

- ▷ Cell Culture and Bioreactor Design
- ▷ Introductory Medical Physics
- ▷ Physics of the Body
- ▷ Radiation Physics
- ▷ Medical Imaging
- ▷ Nuclear Medicine and Diagnostic Radiology
- ▷ Radiation Protection
- ▷ Radiotherapy Physics
- ▷ Nanoscale Simulation
- ▷ Ethics Safety and Regulation in Engineering
- ▷ Strategic Project Planning
- ▷ MSc Research Project

LINKS WITH INDUSTRY

The close proximity of Swansea University to two of the largest NHS Trusts in the UK outside of London, as well Velindre NHS Trust (a strongly academic cancer treatment centre), offers the opportunity for collaborative research through student placements.

The academic staff of this discipline have always had a good relationship with industrial organisations, which are the destination of our medical engineering graduates. The industrial input ranges from site visits to seminars delivered by clinical contacts.

ENTRY REQUIREMENTS

First or second class honours degree in Engineering or the Physical Sciences, Radiological Sciences or similar relevant discipline.

If you hold an overseas degree, see page 74 for more information on applying as an international student.

If you do not possess an honours degree and have professional experience in a relevant area, see page 74 for more information.

SUITABLE FOR

An accredited MSc, in combination with an NHS or equivalent training programme, is currently the main route for graduates seeking the professional qualification of Clinical Scientist in Medical Physics.

This course also provides the necessary further learning needs to meet the academic requirements for Chartered Physicist status.

This course is designed to offer flexibility for students from industry, in particular the NHS trusts, which includes the provision of a part-time two-year Master’s programme and the opportunity to conduct certain practical components of the course in the workplace in cooperation with employers.

CONTACT DETAILS
Dr Richard Hugtenburg
Tel: + 44 (0)1792 602720 | **Email:** r.p.hugtenburg@swansea.ac.uk

Taught Degrees

MSc Nanomedicine

> “The MSc in Nanomedicine gives the student an overview of the current technologies in nanotechnology which are being deployed in medicine in applications as varied as drug delivery and imaging.”
>
> **Professor Paul Rees, Centre for NanoHealth, College of Engineering**

OVERVIEW

The application of nanotechnology to human health promises to revolutionise medicine in the 21st century. Imaging and manipulation of matter at the nanoscale will allow diagnosis and treatment of disease at the molecular level leading to early intervention to prevent disease and personalised medicine.

At Swansea University, the Colleges of Engineering and Medicine have created a vibrant inter-disciplinary environment that is producing research of the highest quality in the areas of nanodevices, nanotoxicology, tissue engineering and nanoparticle diagnostics. This success has led to the creation of a £22 million research centre - the Centre for NanoHealth (CNH) which will house a unique micro-nanofabrication clean room embedded within a biological research laboratory and with immediate access to clinical research facilities run by local NHS clinicians.

This MSc course is unique within the UK in that it draws upon expertise in both engineering and medicine to cover a broad range of subject areas, from the latest nanoscale fabrication technology to medical applications of nanotechnology and the increasingly important area of nanotoxicology. There is an emphasis throughout on the application of nanotechnology in a medical environment and the course is constructed to ensure that students from a non medical/biological background have a comprehensive introduction to medicine. Similarly the engineering components are structured so that students from a life science background can readily acquire the background mathematical skills required.

This course will provide you as a student with the knowledge, motivation, and self-learning skills required for continuous professional development during your future career and provides valuable experience of working on complex projects both as an individual and team member.

Our aim is for students to develop the potential to become future leaders and champions of nanohealth.

MODULES

Modules on the course can vary each year but you could expect to study:

- Introductory Medical Physics
- Probing at the Nanoscale
- Bio-Nanotechnology
- Soft Nanotechnology
- Principles of Nanomedicine
- Nanotoxicology
- Introduction to Bio-Informatics
- Project Planning
- Colloids and Interface Science
- Ethics, Safety and Regulation
- Communication Skills
- MSc Research project

FUTURE CAREER PROSPECTS

As a student on this MSc, you will learn a large number of techniques for the fabrication, characterisation and measurement of nanoparticles and devices using nanotechnology which will prepare you for a career in a wide range of high-tech industries.

The course is focused on the medical applications of nanotechnology which aligns well to the large number of biotechnology companies that have emerged over the last few years. You will be exposed to research within the Centre for NanoHealth to be fully prepared for continued academic progress to a higher research degree.

LINKS WITH INDUSTRY

The Centre for NanoHealth has a large number of industrial users and partners including Boots, GE Healthcare, Amnis Corporation, and Biostatus. The course and projects undertaken will expose you as a student to the work of these companies with the University.

ENTRY REQUIREMENTS

First or second class honours degree in a physical sciences or engineering discipline. Applicants with a degree in a life sciences or medical discipline will be considered on a case by case basis following an interview.

If you hold an overseas degree, see page 74 for more information on applying as an international student.

If you do not possess an honours degree and have professional experience in a relevant area, see page 74 for more information.

SUITABLE FOR

Those who are interested in how the use of nanotechnology is starting to influence the field of diagnostic and remedial medicine, and have a previous degree in a science or engineering subject.

CONTACT DETAILS
Professor Paul Rees
Tel: + 44 (0)1792 295197 | **Email:** p.rees@swansea.ac.uk

MSc Nanoscience to Nanotechnology

> “I found that the MSc Nanotechnology covered a broad range of topics. This really opened my mind to the potential possibilities of the field and to consider future careers in areas that I had not previously thought of. This course has allowed me to find the right area of research to continue to a PhD.”
>
> **Chris Barnett, MSc Nanoscience to Nanotechnology**

OVERVIEW

The growth of nanotechnology is one of the most exciting developments in science and engineering in recent years. Much of the research in this field is interdisciplinary in nature, drawing expertise from different areas across the life science, physical science and engineering disciplines.

This course covers a broad range of subject areas, from the latest semiconductor fabrication technology through to biological and medical applications, with the emphasis throughout on characterisation and control of materials on the nanoscale. It covers the techniques necessary for scientific investigation at these very small dimensions and the very latest research developments in this rapidly evolving area.

As a student on this course, you be able to comprehend the fundamental principles of physics and engineering, which have consequences for nanotechnology, and to gain an understanding of how the general concepts of scientific research are transferred to engineering applications and products.

This MSc will also enable you to apply appropriate techniques for designing, imaging and evaluating nanostructures, whilst gaining a knowledge of mathematic models and their application within a research project through interpreting quantitative and qualitative data.

The course utilises the facilities in the Multidisciplinary Nanotechnology Centre, which has a state-of-the-art nanotechnology laboratory suite (500m2) housing cutting-edge fabrication and characterisation facilities.

MRes Nanoscience to Nanotechnology is also offered. For more information, see page 50.

MODULES

Modules on the course can vary each year but you could expect to study:

- Probing at the Nanoscale
- Bio-Nanotechnology
- Soft Nanotechnology
- Nanoscale Simulation
- Nanoscale Structures and Devices
- Wide Band-Gap Electronics
- Principles of Nanomedicine
- Nano(geno)toxicology
- Introduction to Bio-Informatics
- Strategic Project Planning
- Colloid and Interface Science
- Ethics, Safety and Regulation in Engineering
- Communication Skills for Research Engineers
- MSc Research project

FUTURE CAREER PROSPECTS

As a student on this course, you will be provided with the qualities needed for employment in technology or higher research degrees requiring the exercise of initiatives, specialist knowledge, personal responsibility and decision making in complex and unpredictable contexts.

LINKS WITH INDUSTRY

Work within the Multidisciplinary Nanotechnology Centre places a strong emphasis on the development of applications-driven research and the transfer of technology from the laboratory to the work place or health centre. Interaction with industry is therefore a key component of the Centre’s strategy and we have collaborated with major multinational companies such as Agilent, Boots and Sharp, as well as a number of smaller Welsh-based companies.

ENTRY REQUIREMENTS

First or second class honours degree in Engineering or similar relevant science discipline.

If you hold an overseas degree, see page 74 for more information on applying as an international student.

If you do not possess an honours degree and have professional experience in a relevant area, see page 74 for more information.

SUITABLE FOR

Those who want to develop an understanding of the techniques available to fabricate and investigate nanoscale structures, and to be able to present, understand, evaluate, and interpret qualitative and quantitative data, develop arguments and make judgements based on fundamental concepts of nanoscale engineering.

The modules on this course can also be studied as stand-alone modules for those who are in employment seeking professional development or further knowledge in particular subject fields.

CONTACT DETAILS
College of Engineering
Tel: + 44 (0)1792 295514 | **Email:** engineering@swansea.ac.uk

Taught Degrees

Research Degrees

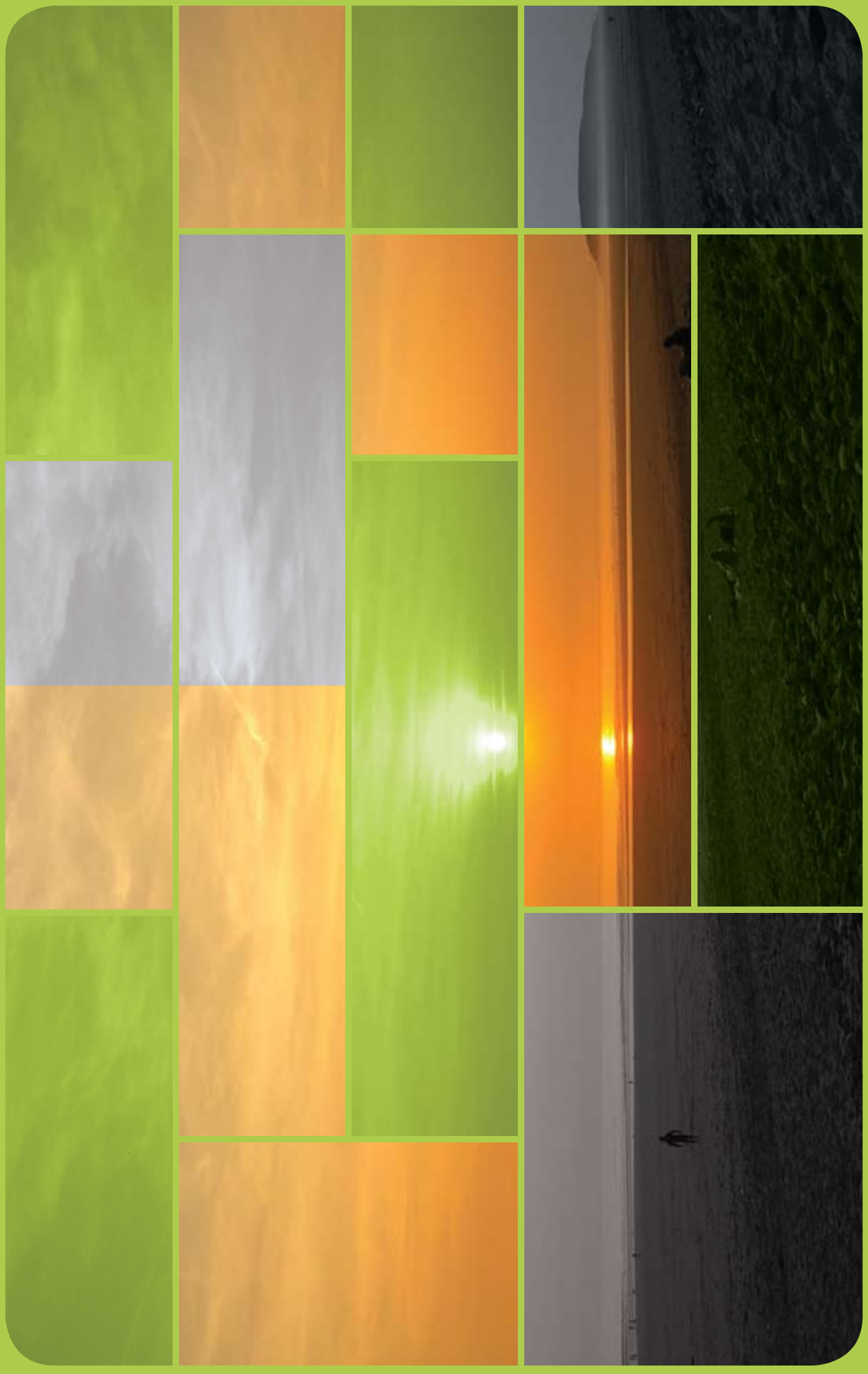


Image by Daniel Thompson, student, College of Engineering

Research degrees at the College of Engineering

Our research degrees can enhance your career prospects in industry or research, help you gain extensive and specialised research skills, and allow you to explore a specific area in depth, which in turn can push the boundaries of our understanding of engineering.

We offer the following research degrees:

PHD

Degree Structure: Typically three years in duration. Students undertake supervised research.
Assessment: A thesis of no more than 100,000 words is submitted, which demonstrates original research that contributes significantly to the subject area, and assessment is in the form of an oral examination (viva).

MPHIL

Degree Structure: Two or three years' full-time study (four to five years' part-time). Students undertake supervised research.
Assessment: A thesis of no more than 60,000 words is submitted, which demonstrates original research that contributes significantly to the subject area, and assessment is in the form of an oral examination (viva).
In some cases, there may be opportunities for students to continue onto a PhD.

The above are offered in a wide range of research areas.

Take a look at the research strengths (on our website and in pages 60 to 70) in our three world-class research centres: Civil and Computational Engineering Centre, Materials Research Centre, and Multidisciplinary Nanotechnology Centre.

Once you have identified a topic area within which you would like to work, we recommend that you submit a research proposal and discuss this with an Admissions Tutor for the subject area before making an application. Contact details can be found on our website or email **engineering@swansea.ac.uk** to express your interest.

ENGD

Degree Structure: Four-year scheme with taught modules and an industry-linked project. Prepares students for research and industry leadership careers.
Assessment: Successful completion of taught modules and a thesis of no more than 100,000 words is submitted, which demonstrates original research that contributes significantly to the subject area, and assessment is in the form of an oral examination (viva).

For more information on all the EngD degrees that we offer, see pages 52 to 57.

MRES

Degree Structure: Combination of taught modules (60 credits) and a research thesis, which presents the outcome of a significant research project (120 credits) over 12 months full-time study. An MRes (Master of Research) provides relevant training to acquire the knowledge, techniques and skills required for a career in industry or for further research.
Assessment: A thesis of no more than 40,000 words is submitted. The research project can be carried out in industry or at Swansea University.

For more information on all the MRes degrees that we offer, see pages 42 to 51.

MSC BY RESEARCH

Degree Structure: One year full-time study (or two to three years part-time). Individual programme of research with no taught modules, enabling students to pursue a research-based programme of study.
Assessment: A thesis of no more than 40,000 words. In some cases, there may be opportunities for students to continue onto an MPhil or PhD.

The MSc by Research schemes are as follows:

- ▷ Aerospace Engineering
- ▷ Bio-process Engineering
- ▷ Chemical Engineering
- ▷ Civil Engineering
- ▷ Desalination and Water Re-use
- ▷ Electrical and Electronic Engineering
- ▷ Intelligent Wireless Networks for Healthcare
- ▷ Materials Engineering
- ▷ Mechanical Engineering
- ▷ Medical Engineering
- ▷ Membrane Technology
- ▷ Micro Sensors and Actuators
- ▷ Nanoelectronics
- ▷ Nanotechnology
- ▷ Simulation Driven Product Design
- ▷ Telecommunication Systems
- ▷ Tissue Engineering and Regenerative Medicine

MRes Computer Modelling in Engineering

"I was attracted to the MRes course at Swansea as the subject matter was just what I was looking for.

I previously worked as a Cardiovascular Research Assistant at the Murdoch Children's Research Institute in Melbourne. My employer, the Head of the Cardiology Department, encouraged me to develop skills in modelling as this has a lot of potential to help answer some current questions and controversies in the field. I was looking for a Master's level course that could provide me with computational modelling skills that I could apply to blood flow problems, particularly those arising from congenital heart disease.

The College of Engineering at Swansea is certainly a good choice. In the computational modelling area, it is one of the leading centres in the world (they wrote the textbook, literally). A lot of people I knew in Swansea initially came to study for a couple of years, but then ended up never leaving. I can see how that could happen."

Jonathan Mynard, MRes Computer Modelling in Engineering, then PhD at the University of Melbourne, currently post-doctoral fellow at the Biomedical Simulation Laboratory, University of Toronto, Canada

OVERVIEW

Computer simulation is now an established discipline that has an important role to play in engineering, science and in newly emerging areas of interdisciplinary research.

Using mathematical modelling as the basis, computational methods provide procedures which, with the aid of the computer, allow complex problems to be solved. The techniques play an ever-increasing role in industry and there is further emphasis to apply the methodology to other important areas such as medicine and the life sciences.

This MRes programme consists of two streams: students may choose to specialise in either structures or fluids. The taught modules provide a good grounding in computer modelling and in the finite element method, in particular.

The Civil and Computational Centre, within which this course is run, has excellent computing facilities, including a state-of-the-art multi-processor super computer with virtual reality facilities and high-speed networking.

This MSc is accredited by the Joint Board of Moderators (JBM).

MODULES

Taught modules on the course can vary each year but you could expect to study:

- Numerical Methods
- Solid Mechanics
- Advanced Fluid Mechanics
- Dynamics and Transient Analysis
- Communication Skills for Research Engineers
- Finite Element and Computational Analysis

FUTURE CAREER PROSPECTS

Employment in a wide range of industries, which require the skills developed during this course, from aerospace to the medical sector. Computational modelling techniques have developed in importance to provide solutions to complex problems and as a graduate of this course, you will be able to utilise your highly sought-after skills in industry or research.

LINKS WITH INDUSTRY

The Civil and Computational Engineering Centre has an extensive track record of industrial collaboration and contributes to many exciting projects, including the aerodynamics for the current World Land Speed Record car, Thrust SSC, and the future BLOODHOUND SSC, and the design of the double-decker super-jet Airbus A380.

Examples of recent collaborators and sponsoring agencies include: ABB, Audi, BAE Systems, British Gas, Cinpress, DERA, Dti, EADS, EPSRC, European Union, HEFCW, HSE, Hyder, Mobil, NASA, Quinshield, Rolls-Royce, South West Water, Sumitomo Shell, Unilever, US Army, WDA.

ENTRY REQUIREMENTS

First or second class honours degree in Engineering, Mathematics or a similar relevant science discipline.

If you hold an overseas degree, see page 74 for more information on applying as an international student.

If you do not possess an honours degree and have professional experience in a relevant area, see page 74 for more information.

SUITABLE FOR

Those who are interested in gaining a solid understanding of computer modelling, specialising in either structures or fluids, and taking the skills gained through this course to develop their career in industry or research.

Those who would like to qualify as a Chartered Engineer, this course is accredited with providing the additional educational components for the further learning needed to qualify as a Chartered Engineer, as set out by UK and European engineering professional institutions.

CONTACT DETAILS
College of Engineering
Tel: + 44 (0)1792 295514 | **Email:** engineering@swansea.ac.uk

Research Degrees

MRes Communication Systems

"I have enjoyed my research with my supervisor and have one patent sorted, published two IEEE letters (a well-cited journal in the area of communications) and one IEE letter (an internally renowned peer-reviewed journal) - my dream has come true!"

Arun Raaza, MRes Communication Systems

OVERVIEW

This MRes programme provides an excellent teaching and research environment with international recognition for the advancement and dissemination of knowledge communication and photonic systems, which provides lasting career skills for students.

Along with the taught component, this MRes contains a substantial research component that involves independent research. As a student on this programme, you will have the opportunity to progress a research project linked to an industrially relevant problem under joint supervision of an academic and a participating industrial researcher.

In addition, the MRes project includes a series of lectures that deal with research techniques including research methodologies, philosophy and principles, ethics, experimental design, managing research project progress, data analysis and presentation, and technical and scientific writing.

MODULES

Taught modules on the course can vary each year but you could expect to study:

- Data Networks
- Signal Analysis and Modelling
- Digital Communications
- Computer Aided Communications System Design
- Optical Communications 1
- Communication Skills for Research Engineers
- MRes Research Project

For more information on entry requirements, career prospects, links with industry and contact details, see page 20.

MRes Materials Engineering

"The MRes Materials Engineering is designed as a stepping point to a research career in the materials profession. The modules are important training elements which enhance the student's experience of the major research project, which forms the majority of the degree. The scheme combines elements of aerospace, steel and environmental technologies, reflecting our research strengths."

Dr Cris Arnold, Senior Lecturer, College of Engineering

OVERVIEW

This MRes degree includes modules covering a range of areas within the materials discipline, which are linked to the College of Engineering's main research strengths of aerospace materials, environmental materials and steel technology.

This degree is accredited by the Institute of Materials, Minerals and Mining (IOM3).

MODULES

Taught modules on the course can vary each year but you could expect to study:

- Aerospace Materials Engineering
- Physical Metallurgy of Steel
- Environmental Analysis and Legislation
- Recycling Technology
- Professional Development for Engineers
- Entrepreneurship for Engineers
- Project Planning
- MSc Research Project

For more information on entry requirements, career prospects, links with industry and contact details, see page 28.

MRes Steel Technology (Steels Training and Research Innovation Partnership)

"I completed my BEng Materials Engineering at Swansea University and continued to study here on the MRes Steel Technology as it was a fantastic chance to complete an industry-led research project.

I decided to study at the College of Engineering because of the links with industry and I would like to stay here and become a researcher or go into industry and become a Chartered Engineer.

I've enjoyed the MRes and I'm looking forward to more work in research through the EngD Steel Technology that I have a place on."

Chris Melvin, MRes Steel Technology (STRIP)

OVERVIEW

The Steels Training Research and Innovation Partnership (STRIP) was born out of the need to fill the knowledge gap that exists in the Welsh steel industry. Over its six-year lifespan STRIP will train over 78 high calibre individuals who can contribute to the knowledge economy.

The STRIP scheme aims to produce high calibre MRes graduates with the necessary skills required to drive the Welsh steel industry forward, cementing a manufacturing base in this country for years to come.

The STRIP MRes degree is an industrially led, one-year Master's scheme.

On this scheme, you will have the opportunity to embark on a large research project related to the metals industry and be provided with the breadth of advanced knowledge and abilities to meet the demands of the UK steel technology sector.

A number of technical and non-technical courses will be given at the start of the scheme to ensure you have a solid base from which to tackle the research project, which is aimed at a specific materials or engineering problem within the steel industry.

The training covers a broad range of topic areas, ranging from metallurgy and materials selection to modern methods used for engineering design and analysis, through to business and financial planning skills and time management and presentational skills.

An appreciation will be developed of the financial constraints imposed on industry, as well as health and safety considerations, environmental issues, and experience in modern business management methods.

The STRIP project is funded through the European Social Fund via the Welsh European Funding Office.

STRIP MRes studentships come with a bursary of £12,500 per annum.

This MRes degree is also offered as a three year part-time Integrated Graduate Development Scheme (IGDS).

This MRes is accredited by the Institute of Materials, Minerals and Mining (IOM3).

MODULES

Taught modules on the course can vary each year but you could expect to study:

- Advanced Steel Metallurgy
- Corrosion and Coating Technology
- Steel Processing
- Risk Assessment and Management
- Professional Development for Engineers
- Elements of Materials Selection
- Project Planning
- MRes Project Thesis

FUTURE CAREER PROSPECTS

Through this scheme, you will be provided with the detailed technical knowledge and experience required for a successful career at a technical or management level within the modern steel industry.

At the end of the scheme, you will have a higher level qualification along with crucial experience of industry allowing you to more quickly enter into the world of work and contribute fully to this important sector.

LINKS WITH INDUSTRY

The MRes degree is linked to the steel industry and has very strong links with Tata Steel, Vector International, BASF, Surecast, EM Coatings and GE.

Research projects are fully funded by industry and are therefore involved with cutting-edge, industrially relevant challenges. Topics are diverse, ranging from development and testing of new steels for automotive use, to production and evaluation of novel coatings for sustainable construction. As a researcher you will either be embedded within the company or split between the company and the University dependent on equipment needs.

ENTRY REQUIREMENTS

First or second class honours degree in Engineering or a similar related discipline.

Applicants are required to be EU citizens and must be prepared to move to the convergence area of Wales at the point of enrolment.

Candidates who do not possess an honours degree but who have sufficient professional experience in a relevant area, which replicates the application of theory from undergraduate studies in a relevant discipline, are assessed on a case-by-case basis.

SUITABLE FOR

Those who would like to develop high level research skills whilst gaining experience within industry, which is critical for employment.

The part-time MRes degree is suitable for graduates already in full-time employment in the steel sector. Individual modules are taken separately by means of short duration intensive courses lasting one week each.

CONTACT DETAILS
Dr David Penney
Tel: + 44 (0)1792 606706 | **Email:** d.penney@swansea.ac.uk

Research Degrees

MRes Environmental Management

> The MRes in Environmental Management is designed to meet the increasing need for graduates with a higher level knowledge of environmental management principles, including waste treatment, recycling and environmental impact assessment. Although it has an engineering bias to it, the course is quite multidisciplinary and should appeal to students from a wide range of academic backgrounds who have an enthusiasm for the environmental aspects of their subject.
>
> **Dr Cris Arnold, Senior Lecturer, College of Engineering**

OVERVIEW

Environmental management has become a necessity for many organisations as they respond to commercial, regulatory and consumer pressures. The international standard for environmental management systems, ISO 14001, is increasingly being implemented by industry and governmental organisations to satisfy these pressures and provides a structured basis for achieving continual environmental improvement, for maintaining regulatory compliance and for the prevention of pollution. In many cases it can lead to significant cost savings.

Through this MRes degree, great emphasis is placed on obtaining the practical skills necessary for working in environmental management, with almost two-thirds of the course marks coming from the research project. Many of the projects will be based in industry or in governmental organisations, which enhances the relevance of the research undertaken.

There is a wide choice of research projects across the College of Engineering and our research centres and the projects will be matched to students according to academic background and area of interest. Past projects have included the computational modelling of environmental systems, multi-process optimisation, water safety planning, recycling technology and the impacts of environmental legislation and law.

The MRes is recognised and accredited in parts by the Institution of Chemical Engineers (IChemE).

MODULES

Taught modules on the course can vary each year but you could expect to study:

- Power Generation Systems
- Environmental Engineering Practice
- Environmental Analysis and Legislation
- Materials Recycling Techniques
- Professional Development
- Entrepreneurship for Engineers
- Project Planning
- MRes Research Project

FUTURE CAREER PROSPECTS

This MRes can lead to employment in both the private and public sectors, in a wide range of areas including waste and water treatment, energy generation, recycling and resource management, as well as in health, safety and environmental agencies.

LINKS WITH INDUSTRY

This scheme has significant links with industry, mainly through the major research project, the majority of which are linked to an external commercial organisation. In many cases, these will be with industrial manufacturing companies both large (such as Tata) to small (such as Tubex) while others have significant involvement with companies in the alternative energy sector or in water treatment. We also have strong links to local authorities and collaborative projects are possible in the areas of recycling and waste treatment.

ENTRY REQUIREMENTS

First or second class honours degree, ideally in a related discipline including engineering, physics, chemistry, environmental or biological science, or management science. Other non-related disciplines are considered on a case-by-case basis.

If you hold an overseas degree, see page 74 for more information on applying as an international student.

If you do not possess an honours degree and have professional experience in a relevant area, see page 74 for more information.

SUITABLE FOR

Those who are interested in gaining a solid understanding of the relevance, development, and implementation of environmental management processes.

Those who would like to qualify as a Chartered Engineer, this course is accredited with providing the educational components for further learning needed to qualify as a Chartered Engineer, as set out by the Institution of Chemical Engineers (IChemE), and other UK and European engineering professional institutions.

CONTACT DETAILS
College of Engineering
Tel: + 44 (0)1792 295514 | **Email:** engineering@swansea.ac.uk

Research Degrees

MRes Nanoscience to Nanotechnology

"The course provided an excellent, broad introduction to nanoscience and nanotechnology. The lab sessions were my favourite part of the taught modules. Being able to image atoms using the-state-of-the-art facilities at the Multidisciplinary Nanotechnology Centre was definitely a thrill. The project allowed me to get a real taste of research, to help me decide whether a PhD was for me."

Simon Gregory, MRes Nanoscience to Nanotechnology

OVERVIEW

The growth of nanotechnology is one of the most exciting developments in science and engineering in recent years. Much of the research in this field is interdisciplinary in nature, drawing expertise from different areas across the life science, physical science and engineering disciplines.

This MRes covers a broad range of subject areas, from the latest semiconductor fabrication technology, to biological and medical applications, with the emphasis throughout on characterisation and control of materials at the nanoscale.

The focus of this programme is on both the techniques necessary for scientific investigation at these very small dimensions and the very latest research developments in this rapidly evolving area.

A key part of this programme is the ability to gain hands-on experience of state-of-the-art fabrication and characterisation techniques.

The MRes consists of formal lectures, plus a project of individual research that takes place in the Multidisciplinary Nanotechnology Centre at the College of Engineering.

This course is accredited by the Institution of Chemical Engineers (IChemE).

MODULES

Taught modules on the course can vary each year but you could expect to study:

- ▷ Probing at the Nanoscale
- ▷ Soft Nanotechnology
- ▷ Nanoscale Simulation
- ▷ Nanoscale Structures and Devices
- ▷ Bio-Nanotechnology
- ▷ Communication Skills for Research Engineers
- ▷ MRes Research Project

For more information on entry requirements, career prospects, links with industry and contact details, see page 36.

MRes Steel Process and Product Development (part-time)

Integrated Graduate Development Scheme (IGDS)

"The Integrated Graduate Development Scheme (IGDS) in Steel Process and Product Development is an ideal opportunity to gain the critical technical knowledge required for anyone looking to progress into higher level management within a steel processing arena.

The modules of the scheme are the 'swiss army knife' to anyone in a technical or engineering role and the thesis part is an ideal opportunity to become a recognised 'expert in field' by researching and trialling new technologies to progress manufacturing excellence and world class processing within your work's area."

Mark Fryer, IGDS Graduate

"This course was a very worthwhile experience. It is exceptionally tailored to the steel industry and particularly Tata Strip Products (TSP) UK. The structure works very well with work/study balance. The time between exam and course fits very well with full-time work. The course content gives a complete understanding of iron and steel making processes and complete theory behind each process from raw material to coil through to market production."

Gavin Thomas, IGDS Graduate

OVERVIEW

The Materials Research Centre (MRC) has pioneered postgraduate degrees that are tailored to the needs of industry and produce top-quality research.

The Centre's IGDS Scheme (part-time MRes) is fully funded by Tata Steel. It is an ideal degree scheme for those with a diverse technical but not a specialist background to obtain relevant training on courses delivered at the University on topics specific to the steel industry (12 modules worth 60 credits), as well as carrying out an industrially relevant project, at their industrial site (worth 120 credits), earning the prestigious MRes qualification in three years of part-time study.

This course follows the format of MRes degrees with specific options to satisfy the requirements of the steel industry.

The course is accredited with the Institute of Materials, Minerals and Mining (IOM3) and can be used for progression towards qualifying as a Chartered Engineer.

CONTACT DETAILS

Bev Williams, Integrated Graduate Development Scheme (IGDS)

Tel: + 44 (0)1792 295242 | **Email:** b.j.williams@swansea.ac.uk

Research Degrees

EngD Steel Technology (Steels Training Research and Innovation Partnership)

"The course is ideal if you would like to gain a postgraduate qualification whilst also engaging with industry.

We work with a number of companies including Tata Steel, Vector International, BASF, Surecast, EM Coatings and GE."

Dr David Penney, STRIP Project Manager, College of Engineering

OVERVIEW

The Steels Training Research and Innovation Partnership (STRIP) was born out of the need to fill the knowledge gap that exists in the Welsh steel industry.

The STRIP scheme aims to produce high calibre EngD graduates with the necessary skills required to drive the Welsh steel industry forward, cementing a manufacturing base in this country for years to come.

The EngD combines a taught component covering various technical and non-technical subjects with a large research project similar to that in a normal PhD, culminating in the publication of a thesis.

Projects are typically in the field of process metallurgy, product and applications, automotive, coatings and corrosion, and computer modelling.

This EngD enables talented students from an engineering or science background to study for a doctorate and gain valuable industrial experience at the same time.

Training and experience is also provided in a broad range of topic areas, ranging from metallurgy and materials selection to modern methods used for engineering design and analysis, business and financial planning skills, time management and presentational skills.

The STRIP project is funded through the European Social Fund via the Welsh European Funding Office.

STRIP EngD studentships come with a bursary of £16,600 per annum.

This EngD is accredited by the Institute of Materials, Minerals and Mining (IOM3).

FUTURE CAREER PROSPECTS

Graduates of this EngD often go on to work with their sponsoring company and achieve significant positions within the business.

As a student on this programme you will gain detailed technical knowledge and the experience required for a successful career at a technical or management level within the modern steel industry.

MODULES

Taught modules on the course can vary each year but you could expect to study:

- Communication Skills
- Project Planning
- Materials Selection
- Process Evolution in the Steel Industries
- Steel Processing
- Stainless Steels
- Personal Development for Research Engineers
- Aluminium and its Alloys
- Coated Steel Products
- Environmental Issues
- Process Optimisation
- Physical Metallurgy of Ferrous Alloys
- Steelplant Challenge
- Through Process Modelling
- Safety Training
- Health and Safety Management
- Business Process Engineering
- Financial Issues for Management
- Investment Appraisal for Engineers
- Management Science Techniques
- Effective Management
- Employee Relations

LINKS WITH INDUSTRY

This industry-linked EngD benefits from close collaboration with companies from within the steel industry, including Tata Steel, Vector International, BASF, Surecast, EM Coatings and GE.

ENTRY REQUIREMENTS

First or upper second class honours degree in an engineering or science related discipline.

Applicants are required to be EU citizens and must be prepared to move to the convergence area of Wales at the point of enrolment.

Candidates who do not possess an honours degree but who have sufficient professional experience in a relevant area, which replicates the application of theory from undergraduate studies in a relevant discipline, are assessed on a case-by-case basis.

SUITABLE FOR

Those who would like to gain advanced knowledge that will be of relevance to the steel industry, and be able to meet the demands of the broader UK manufacturing base particularly in the metals sector.

CONTACT DETAILS
Dr David Penney
Tel: + 44 (0)1792 606706 | **Email:** d.penney@swansea.ac.uk

Research Degrees

EngD Manufacturing Advances Through Training Engineering Researchers (MATTER)

> MATTER provides an exciting opportunity to work at the interface between academia and industry on cutting edge advanced manufacturing projects sponsored by some of the UK's largest industries. EngD training provides individuals with excellent employability prospects with 95 per cent of graduates achieving employment on graduation.
>
> **Dr James Sullivan, Lecturer, Materials Research Centre, College of Engineering**

OVERVIEW

The MATTER EngD is an exciting venture funded by the Engineering and Physical Sciences Research Council (EPSRC) through Swansea University. It will support 26 EngD students over the next four years, from October 2011.

MATTER was developed to provide doctoral level research in advanced manufacturing across three themes: aerospace, automotive and packaging.

These themes are critical manufacturing areas for the UK economy and the development and improvement of new manufacturing processes and products will ensure the rapid growth and competitiveness of these sectors.

Projects are four years in duration comprising of a doctoral level research project with an additional 120 credits of taught modules to enhance knowledge of advanced manufacturing and business skills. This provides the research engineer with an excellent portfolio of skills when entering the work place.

MATTER EngD studentships come with a bursary of up to £16,500 per annum and all fees are fully paid by the scheme.

The taught modules are accredited by a variety of institutes depending on the area of research, such as the Institute of Materials, Minerals and Mining (IOM3), Institution of Mechanical Engineers (IMechE) etc.

MODULES

Taught modules on the MATTER EngD can vary each year but all research engineers will study generic professional and management training modules along with technical modules, tailored specifically to each research project. This enhances the employability of the research engineer.

FUTURE CAREER PROSPECTS

Currently 95 per cent of our graduating EngDs from the College of Engineering secure employment on graduating with excellent salaries.

LINKS WITH INDUSTRY

Projects are industry led with industrial and academic supervisors. Research engineers will be expected to spend at least 50 per cent of their time working with their industrial sponsor.

Expected project areas include computer modelling, metallurgy, advanced materials and processing, coatings technology, advanced printing, rapid prototyping and manufacture. Current industrial partners include Tata Steel, Airbus, TIMET and the BLOODHOUND SSC project.

ENTRY REQUIREMENTS

First or second class honours degree in Engineering or similar related discipline.

To be eligible for a full award (stipend and fees), a student must have:

- Settled status in the UK, meaning they have no restrictions on how long they can stay, and
- Been 'ordinarily resident' in the UK for three years prior to the start of the grant. This means they must have been normally residing in the UK (apart from temporary or occasional absences), and
- Not been residing in the UK wholly or mainly for the purpose of full-time education (this does not apply to UK or EU nationals).

SUITABLE FOR

Graduates with a minimum of an upper second class degree in Engineering or a Physical Science.

CONTACT DETAILS

Dr James Sullivan

Email: j.h.sullivan@swansea.ac.uk

Research Degrees

EngD Structural Metals for Gas Turbine Applications

EPSRC/Rolls-Royce Strategic Partnership Structural Metals for Gas Turbines

> “The vision of this programme is to create an integrated partnership of three eminent universities, namely the universities of Birmingham, Cambridge and Swansea, with a world-leading gas turbine industry, together with the strategic long-term support of the Engineering and Physical Sciences Research Council (EPSRC), to inspire a generation of innovative, metallurgical engineers skilled in cutting-edge technologies and networked to best exploit their collective skills.”
>
> **Professor Martin Bache, Director - Institute of Structural Materials, College of Engineering**

OVERVIEW

The Doctoral Training Partnership (DTP) under the EPSRC Strategic Partnership in Structural Materials for Gas Turbines provides a focus for metallurgical research across the aerospace, marine and energy sectors.

The science and technology underpinning these themes targets both the development of novel disruptive structural metallic systems and the efficient exploitation of existing materials.

This is a UK-leading doctoral training programme, combining the strengths of all three university partners with their industrial collaborators. Combining three universities with the UK’s industrial expertise in the development of gas turbine technologies in a commercial environment yields a strong partnership.

Central to the quality of the research environment for DTP students is the long-term commitment of industry to a partnership with academia. Leading-edge research and trained engineers are critical to the future of UK industry.

Rolls-Royce, for example, has long been a pioneer of University Technology Centres (UTCs) and continues to invest in both people and infrastructure into this widely acclaimed mechanism of collaboration. Such an environment is essential to enable students to achieve their potential, since these projects will often be largely company-based, while supported by academic supervision and university facilities of the highest standards.

DTP student research projects will address the strategic needs of the UK gas turbine industry, namely structural metallic systems, within the scope of the Partnership. They will support the major post-doctoral activities described in an associated core EPSRC Research Programme (and especially those with a five to ten-year horizon). One overall objective will be to integrate ever more closely major research themes to maintain international competitiveness, for example that alloy development activities have a manufacturing route to market and produce components (systems) whose performance in service can be predicted accurately.

At the College of Engineering, we offer regular EngD projects (or PhDs based at the University if more appropriate) focusing on our long-standing academic and technical expertise in mechanical characterisation and component lifing.

This programme is awaiting accreditation by the Institution of Materials, Minerals and Mining (IOM3), the Institution of Mechanical Engineers (IMechE) and the Royal Aeronautical Society (RAeS).

MODULES

Individual training portfolios are designed to underpin the specific field of EngD research. Training modules can be selected from any of the three collaborating universities and can vary each year but at Swansea you could expect to study:

- Holistic Gas Turbines and Materials Selection
- Mechanical Testing and Data Analysis
- Environmental Degradation
- Titanium Alloys for Aero-Engine Applications
- Creep: Mechanisms and Lifing
- Damage Tolerance and Component Lifing

FUTURE CAREER PROSPECTS

Graduates of an EngD often go on to work with their sponsoring company and achieve significant positions within the business.

As a student on this programme you will gain detailed technical knowledge and the experience required for a successful career at a technical or management level within the aerospace, marine and energy sectors.

LINKS WITH INDUSTRY

Course presenters on this programme include a mix of world-leading academics from the three universities, technical specialists from Rolls-Royce and their supply chain partners, plus external experts in the gas turbine and structural metals field.

ENTRY REQUIREMENTS

First or upper second class degree in Materials Engineering/Science, Mechanical Engineering, Aerospace Engineering or the Physical Sciences. Prospective students must complete a rigorous set of academic and industrial-based interviews. Stipends and bench fees to support these projects are provided by EPSRC. To be eligible for a full award (stipend and fees), a student must have:

- Settled status in the UK, meaning they have no restrictions on how long they can stay, and
- Been ‘ordinarily resident’ in the UK for three years prior to the start of the grant. This means they must have been normally residing in the UK (apart from temporary or occasional absences), and
- Not been residing in the UK wholly or mainly for the purpose of full-time education (this does not apply to UK or EU nationals).

Applications are considered against specific project descriptors raised in liaison with our industrial partners. Although students can enrol against EngD projects throughout the year, a focused recruitment drive is conducted during the spring semester for projects starting in October each year.

SUITABLE FOR

Those who would like to gain advanced knowledge and abilities to meet the demands of the aerospace, marine and energy sectors, with a focus on structural metals.

CONTACT DETAILS

Applicants should provide a CV and covering email to:

Professor Martin Bache **Email:** m.r.bache@swansea.ac.uk

Research Centres

Aerial view of Swansea University by Man Li Lam, Student, College of Engineering

Research centers at the College of Engineering

Research activity is undertaken by internationally recognised research groups within three world-class research centres at the College of Engineering:

- ▷ Civil and Computational Engineering Centre
- ▷ Materials Research Centre
- ▷ Multidisciplinary Nanotechnology Centre

"I explored the application of elastohydrodynamic principles in my research studies of non-Newtonian ink flowing through the printing rollers contact nip. The work involved both experimental studies and computer modelling or simulations.

I conducted experimental work at a few printing companies on actual running printing machines located in Norwich, Bristol and Peterborough, whilst at the same time carried out experimental and computer modelling work at the College of Engineering.

Among so many higher education institutions in the UK, Swansea University has the reputation of providing good degrees in engineering. Coupled with the location of Swansea by the sea, the University enticed me to further my studies there - for both my undergraduate degree and PhD. At Swansea, you can have a balance of enjoying life and at the same time tackling the challenging subjects of engineering.

During the PhD, my supervisors supported me well in my work throughout the four years - and it was really unforgettable.

I believe the College of Engineering has provided me with a strong educational foundation to guide me to be where I am today. All I can say is that, the overall seven years that I have spent in Swansea provided me with a "priceless" career today."

Chong Hooi Lim, PhD completed in the Welsh Centre for Printing and Coating, Multidisciplinary Nanotechnology Centre, currently Senior Executive Director in a Plastics Injection Moulding and Electronics Manufacturing Services company

"I had decided on my undergraduate course that I did not want to work in industry, but that research was what interested me, so I explored the opportunities that were available at Swansea University.

Swansea University offers a lot of activities and training courses which all help to develop personal and professional skills that are of great benefit for working life. I enjoyed the opportunities to present my research findings to groups of peers and industry professionals at conferences. This gave me more confidence in myself and presenting my work.

Both my MRes and PhD were in civil and mechanical engineering. My research involved investigating the use of implants for the treatment of the fracture of human bone using computer modelling and programming software. I received EPSRC funding for both my MRes and PhD, which allowed me to pursue my research and dedicate myself to it full time.

Studying at the College of Engineering directly led to me securing my current job role. Whilst my postgraduate work particularly focused on a biomedical application, it involved writing computer code, using finite element simulation software and applying structural mechanics. Due to this, I was offered a job in the Civil and Computational Engineering Centre. I was able to secure the role due to the confidence I developed from the work I had done and the contacts I had built up within the College of Engineering during my time as a student.

The College of Engineering has excellent teaching and research facilities and the staff are friendly and helpful. There are opportunities to pursue research in many different areas, with a multitude of real world applications. Presenting work at conferences and publishing papers is actively encouraged, which is ideal for a career in further research."

Victoria Kidgell, MRes Computer Modelling in Engineering, PhD completed in the Civil and Computational Engineering Centre, currently a Research Technologist for the Simulation based Product Design (SBPD) Knowledge Transfer Centre (KTC) at the College of Engineering

"I decided to do an EngD after my interest developed during my BEng Mechanical Engineering course. I was attracted to the College of Engineering after seeing an advert for the course that caught my attention, and it looked very, very interesting. I then met Professor Dave Worsley at Port Talbot Steelworks and he definitely reinforced my interest in doing a research course at the College of Engineering.

I started my undergraduate degree later than most, after working in the oil and gas industry since leaving school. After completing my BEng I was conscious that I just had an undergraduate degree and thought it was important to do further research.

I completed my EngD, which examined the factors affecting quality on continuous annealing progressing lines, and have since returned to the oil and gas industry in a role I couldn't have done before I gained further qualifications.

I found it beneficial that my EngD incorporated experience with industry, namely Corus (now Tata Steel), which gave me an understanding of how companies work and how to react to different situations. Gaining my EngD helped open doors and made me stand out from the crowd."

Paul Saunders, completed EngD in the Materials Research Centre, currently Principal Mechanical Engineer at Mustang Engineering

Civil and Computational Engineering Centre

> The Civil and Computational Engineering Centre has been one of the leading players in revolutionising the industrial engineering analysis practice, from slow and expensive experimental testing to efficient and cheap computational modelling.
>
> **Professor Oubay Hassan, MBE, Head of the Civil and Computational Engineering Centre**

Over the last 30 years, Swansea University has been at the forefront of international research in the area of computational engineering. Engineers at Swansea have pioneered the development of numerical techniques, such as the finite element method and associated computational procedures that have enabled the solution of many complex engineering problems.

The Civil and Computational Engineering Centre represents an unrivalled concentration of knowledge and expertise supported by state-of-the-art research facilities. When the RAE results are turned into a weighted average, civil engineering at Swansea ranked second in the UK for research quality. The Centre is recognised as a Centre of Excellence by the Welsh Government.

RESEARCH THEMES

Current research encompasses a range of themes in the area of computational and applied mechanics, including:

- Applied Mechanics
- Biomedical Engineering
- Casting
- Computational Electromagnetics
- Computational Fluid Dynamics
- Environmental Modelling
- Geotechnics
- High-Performance Computing
- Error Estimation
- Computer-based Simulation of Polymer Processing
- Human/Computer Interfaces
- Intelligent and Adaptive Computing
- Inverse Problems and Imaging
- Marine Energy
- Mesh Generation
- Multi-Physics Modelling
- Partical-Based Meshless Methods
- Powder Compaction
- Structural and Multidisciplinary Optimal Design
- Tidal Stream and River Turbines
- Virtual Reality and Visualisation of Computational Data
- Simulation of Multi-Fracturing Solids and Particulate Media

CURRENT FUNDING AWARDS

ASTUTE (Advanced Sustainable Manufacturing Technologies) is an ambitious project designed to work with the manufacturing industry in West Wales and the Valleys in all aspects of manufacturing including design and materials, to support companies facing the challenges of the 21st century.

The project is backed by £14.3 million from the EU's Convergence European Regional Development Fund through the Welsh Government. Led by Swansea University, it brings the combined skills and expertise of eight Welsh universities to assist the manufacturing sector in applying advanced engineering techniques to improve their performance in financial terms and in reducing their environmental impact.

LINKS WITH INDUSTRY

The Centre has an extensive track record of industrial collaboration and has significantly contributed to a number of prestigious projects, such as the aerodynamic design of the THRUST Supersonic Car, which currently holds the world land-speed record, and Airbus A380, the largest civilian aircraft to-date.

Currently, the Centre is aerodynamically designing the BLOODHOUND SSC, which will attempt to create a new world land speed record of 1000mph.

The Centre is a preferred academic partner for BAE Systems, in the areas of both computational electromagnetics and computational engineering.

CENTRE FACILITIES

The Centre has access to one of the most advanced university computing facilities in Europe. Hardware includes a 450 cpu Cluster, high-end graphics workstations and high-speed network links. Extensive software packages include both in-house developed and 'off-the-shelf' commercial.

Active research and industrial applications include:

- Computational Fluid Dynamics
- Structural Analysis and Structural Optimisation
- Geomechanics
- Geometry Modelling and Grid Generation
- Graphical User Environments and Solution Visualisation
- High Performance Computing
- Computational Electromagnetics
- Materials Processing and Injection Moulding
- Bio-Medical
- Water and Environmental Engineering

CONTACT DETAILS
Professor Oubay Hassan
Tel: + 44 (0)1792 295251 | **Email:** o.hassan@swansea.ac.uk

Research Centres

Materials Research Centre

> We aim to give our postgraduates a stimulating, productive and rewarding experience. Our work is closely aligned to the needs of our industry partners. This leads to rewarding careers for graduates and significant opportunity to see research transformed into products.
>
> **Professor Dave Worsley, Head of the Materials Research Centre, College of Engineering**

The Materials Research Centre (MRC) has pioneered postgraduate degrees that are tailored to the needs of industry and produce top quality research. This successful approach is demonstrated by a research grant portfolio in excess of £40 million.

The quality of the research and postgraduate training programmes in the MRC have been recognised through the Queen's Anniversary Prize, with the award citation defining materials engineering at Swansea as a 'recognised centre of excellence, with an international reputation.'

The Centre's Engineering Doctorate (EngD) degrees provide specialist programmes that integrate training and research in collaboration with the power/aerospace industries and steel technology sector. These programmes offer opportunities for research with the challenge of solving real industrial problems. PhD programmes focus on fundamental aspects of materials development, processing and application.

The Centre's Master's programmes cover MSc and research Master's together with part-time degrees for individuals who wish to up-skill or re-train while working.

The Materials Research Centre incorporates the following internationally recognised research groups:

- Institute of Structural Materials
- Corrosion and Functional Coatings
- Grain Boundary Engineering
- Environment and Sustainable Materials
- Steel Technology

RESEARCH THEMES

Key research themes include:

- Design against failure by creep, fatigue and environmental damage
- Structural metals and ceramics for gas turbine applications
- Grain boundary engineering
- Recycling of polymers and composites
- Corrosion mechanisms in new generation alloys and coatings
- Development of novel strip steel grades (IF, HSLA, Dual Phase, TRIP)
- Functional coatings for energy generation, storage and release

CURRENT FUNDING AWARDS

The SPECIFIC (Sustainable Product Engineering Centre for Innovation in Functional Coatings) project is a unique research and development facility consisting of a multidisciplinary, international consortium led by staff from the MRC within the College of Engineering and Tata Steel. The £20 million project includes a £9.5 million award from the EPSRC and TSB to develop functional coatings to turn buildings into power stations. SPECIFIC is based in a state-of-the-art facility close to the University campus incorporating new laboratories and offices and housing 55 researchers from the University and industry.

The EPSRC Strategic Partnership in Structural Materials for Gas Turbines in collaboration with Rolls-Royce is a major initiative designed to extend the capability of existing high temperature metallic systems and develop novel alloys for potential use within a twenty-year horizon (the so called "Vision 20" materials). In partnership with Birmingham and Cambridge universities, this £50 million scheme supports post-doctoral level research and a Doctoral Training Centre with a rolling cohort of approximately 30 EngD and PhD students at Swansea University. Key supply chain industries are also engaged, including TIMET, the leading producer of commercial titanium products in Europe, and TWI (Wales), a centre of excellence for the non-destructive inspection of aerospace materials.

The College of Engineering has been selected as one of five universities in the UK to host a new EPSRC-funded Industrial Doctorate Centre in Manufacturing Engineering. MATTER (Manufacturing Advances through Training Engineering Researchers) is an exciting new venture that will support 26 EngD students over the next four years. MATTER has been developed to provide doctoral level research in advanced manufacturing across three themes: aerospace, automotive and packaging. These themes are critical

CENTRE FACILITIES

Specialist research facilities include:

- Comprehensive computer systems for specialist and general purposes.
- World-leading equipment for characterisation of the mechanical properties of metallic, ceramic, polymeric and composite materials.
- Extensive range of laboratories housing scanning electron microscopes with full microanalysis and electron backscatter diffraction capabilities.
- New facilities at both SMaRT and SPECIFIC that house state-of-the-art equipment for characterising aerospace materials and creating functional coated materials for steel and glass respectively.

manufacturing areas for the UK economy and the development and improvement of new manufacturing processes and products will ensure the rapid growth and competitiveness of these sectors.

Through our excellent long-term links with major companies, we receive funding from our main collaborators:

- **Rolls-Royce**
  The Institute of Structural Materials at Swansea is a core member of the Rolls-Royce University Technology Centre in Materials. This is part of a global initiative, with regular liaison with Rolls-Royce centres based in the USA, Germany and Singapore. This venture supports a wide ranging research portfolio with a rolling value of £6.5 million per annum addressing longer term materials issues, plus a newly incorporated commercial company (Swansea Materials Research and Testing Ltd – SMaRT) to address shorter term investigations with an annual turnover in business to the value of £1 million.

- **Tata Steel**
  Funding of over £6 million to continue our very successful postgraduate programmes with Tata Steel, which has led to new developments in areas of novel steels for automotive applications, environmentally-friendly coatings for corrosion protection and photovoltaic materials for low cost energy generation.

- **Airbus**
  £650,000 funding over next two years to characterise the performance of composite materials for primary aircraft structures, in partnership with the Welsh Composites Centre at Swansea University.

LINKS WITH INDUSTRY

The SPECIFIC project is a collaboration led by Swansea University and Tata Steel with a range of companies such as BASF, Akzo Nobel, Pilkington and Vale Inco together with University groups from across the UK. Here university staff and postgraduates work in a shared open innovation space with industrialists to develop next generation coatings for buildings that will harvest, store and release solar energy.

Other companies sponsoring research projects include Akzo Nobel, Axion Recycling, BAE Systems, Bayer, Cognet, Ford, HBM nCode, Jaguar Land Rover, Novelis, QinetiQ, RWE Innogy, TIMET, TWI (Wales), as well as many smaller companies across the UK.

These industrial research links provide great opportunities for our students, giving both excellent research and employment opportunities.

CONTACT DETAILS
Professor Dave Worsley
Tel: + 44 (0)1792 295285 | **Email:** d.a.worsley@swansea.ac.uk

Multidisciplinary Nanotechnology Centre

> The Multidisciplinary Nanotechnology Centre at Swansea has pioneered the development of multidisciplinary teams to enable groundbreaking engineering and is now a major world player in the area of nanohealth.
>
> **Professor Huw Summers, Head of the Multidisciplinary Nanotechnology Centre, College of Engineering**

Engineering at the nanometre scale is one of the greatest challenges in the modern world and has the potential to revolutionise the way we live our lives, from smart materials and ultra-small devices through to site-specific medical diagnosis and drug delivery within the human body.

Founded in 2002, the Multidisciplinary Nanotechnology Centre (MNC) has developed an international reputation in many fields that stretch traditional engineering concepts to the extreme.

This has been made possible by radical thinking that combines engineering with physics, chemistry, biology and medicine. The MNC has an active strategy to develop projects that bridge traditional disciplines to provide a step change in technology.

Recent investment in the field of nanomedicine has led to the creation of a £22 million Centre for NanoHealth, a unique facility that links collaborative research between the MNC and the College of Medicine in Swansea, which are both recognised for their world-class research in the emerging area of nanomedicine.

RESEARCH THEMES

Key research activity within the MNC includes:

- Nanomedicine and Bio-Nanotechnology
- Nanomaterials and Nanosensors
- Rheometry
- Theoretical Modelling
- Polymers at interfaces and in thin films
- Nano-Optics and scanning near-field optical microscopy
- Wide Band-Gap Semi-Conductors
- Photonics
- Wireless Technologies and Networks

The MNC is home to a number of established centres, including:

- **Welsh Centre for Printing and Coating**
  A world-leading research centre focusing on investigating printing and coating as a manufacturing process. It has purpose-built fully-equipped air-conditioned laboratories for measurement of printed and coated products. It also has access to industrial printing facilities and works closely with all components in the supply chain, including ink, substrate and machinery suppliers.
- **Centre for Complex Fluid Processing**
  Recognised as a centre of expertise with a proven track record of collaboration with large and small companies. It is leading in the fields of membrane separation, processes, bioprocess technology, food technology, rheometry, colloids and interfaces, atomic force microscopy and nanotechnology.
- **Electronics Systems Design Research**
  World-leader in semiconductor device modelling and the group's groundbreaking research includes power IC technology and the application of power electronics in embedded energy generation. It works with many of the leading international companies in the power electronics field.

CENTRE FACILITIES

The MNC's state-of-the-art nanotechnology laboratory suite houses cutting-edge fabrication and characterisation facilities. Equipment includes:

- Two UHV Omicron Nanotechnology SPMs (1 STM/AFM, 1 STM/ESCA and 1 STM/SEM)
- Five Vecco AFMs (2 explorers, 1 Nanoman and 1 Picoforce)
- Two Vecco SNOMs (Aurora II and III)
- Five desktop SPM systems
- A variety of spectroscopic techniques are available (XPS, AES, confocal RAMAN, mass spectrometry, ICP spectroscopy and photo correlation spectroscopy for particle sizing down to 1nm)
- Laser diffraction particle sizing
- Free solution electrophoresis BT and gas porosimetry
- Microcalorimetry
- A comprehensive range of rheometers
- Gas liquid chromatography and HPLC

Other equipment includes a fully-equipped clean room for device fabrication, a new biotechnology pilot plant, pilot-scale membrane filtration equipment (micro- to nano-filtration) and reverse osmosis.

▷ **Advanced Communication Systems**
Offers a range of research programmes in optical communications, wireless systems and networks and communications technologies such as microwave antennas and next generation lasers. It has a strong track record in cultivating industry partnerships to provide innovative solutions to complex and technological problems.

LINKS WITH INDUSTRY

Work within the Multidisciplinary Nanotechnology Centre places a strong emphasis on the development of applications-driven research and the transfer of technology from the laboratory to the workplace or health centre.

Interaction with industry is therefore a key component of the Centre's strategy and we have collaborated with major multi-national companies such as Agilent, Boots and Sharp, as well as a number of smaller Wales-based companies.

The Centre for NanoHealth has established external network links nationally and internationally, for example with the European Technology Platform (ETP) Nanomedicine, XGEN, Texas/UK collaborative, and various Knowledge Transfer Networks in Electronics, Senors, Phontonics, and Nanotechnology, as well as HealthTech and Medicines.

CURRENT FUNDING AWARDS

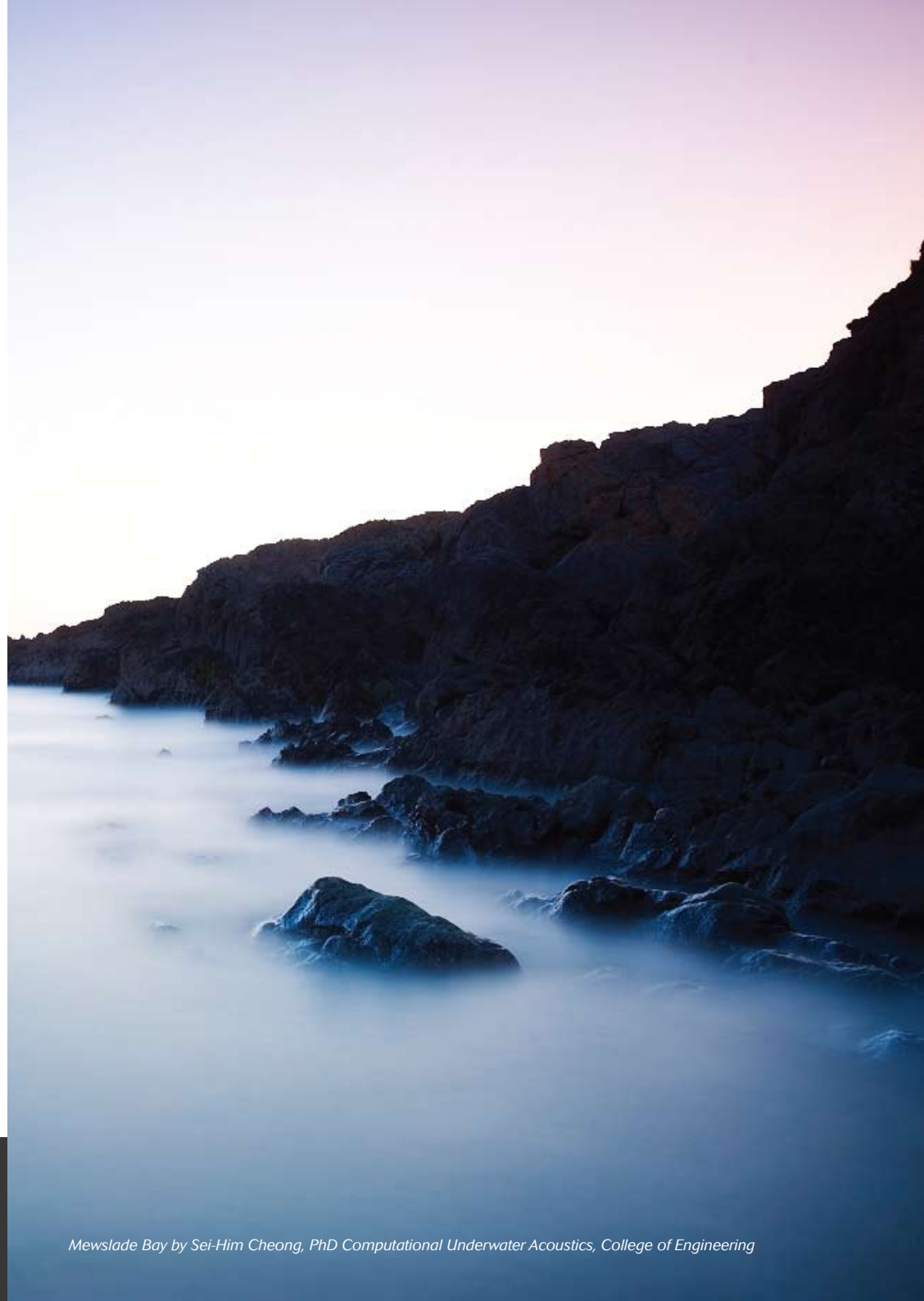
Nanomedicine research within the MNC is funded by over £2 million of research grants from the EPSRC for the development of new metrologies and nanoscale devices for the improvement of health.

Researchers at the MNC are collaborating with Welsh technology companies in a £470,000 research project backed by the Welsh Government's EU funded Academic Expertise for Business (A4B) in the development of a hi-tech diabetes blood glucose monitor.

The Centre for Complex Fluids Processing has been the recipient of a prestigious EPSRC platform grant awarded to world-leading groups with continuity of funding for longer-term research and international networking.

The Electronics Systems Design Research has two centres of excellence funded by the Welsh Development Agency to promote the transfer of academic expertise to local and international companies involved with research and development.

CONTACT DETAILS
Professor Huw Summers
Tel: + 44 (0)1792 602915 | **Email:** h.d.summers@swansea.ac.uk



Mewslade Bay by Sei-Him Cheong, PhD Computational Underwater Acoustics, College of Engineering

Funding your studies

The College of Engineering has a number of scholarships available. Some of these are funded by Swansea University, some are funded by the College of Engineering and others are collaborative funding from public bodies and through our links with industry.

For the latest information on scholarships, visit:
www.swansea.ac.uk/scholarships/postgraduate
and
www.swansea.ac.uk/engineering/scholarships

Erasmus Mundus Scholarships

These are available to highly qualified students with outstanding academic records on the MSc Computational Mechanics.

For more information, visit:
www.cimne.com/cm-master

International Student Scholarships

The University offers a range of scholarships and bursaries for international students.

For full details, visit:
www.swansea.ac.uk/scholarships/international

The International Development Office Scholarship is available to international students with strong academic ability who have accepted an offer of a place at Swansea University, and are in financial need.

The Swansea University Alumni Postgraduate Bursary Scheme entitles alumni of the University, including our most recent graduates, who wish to further their studies at postgraduate level in Swansea, to a fixed fee reduction per annum for the full duration of studies.

The British Council offer a range of scholarship schemes to support international students studying in the UK.

For more information, visit:
www.educationuk.org

MSc Scholarships for UK and EU students

A range of scholarships are available including the Swansea University Master's Scholarships towards the cost of tuition fees. There are also scholarships within the Access to Master's (ATM) scheme, which covers fees and a bursary towards living costs. For more information, visit:
www.swansea.ac.uk/scholarships/taughtmasters

MRes, MSc by Research, MPhil and PhD Scholarships for UK and EU students

There are a range of scholarships available for these programmes including PhD and MPhil projects funded by research councils and MRes and MSc by Research opportunities funded through the Knowledge Economy Skills Scholarships (KESS) scheme. For more information, visit:
www.swansea.ac.uk/scholarships/research

The Steels Training Research and Innovations Partnership (STRIP) is a bursary available for students on the MRes STRIP programme. For more information, see page 46 and visit:
www.swansea.ac.uk/engineering/research/strip

EngD Funding

The Steels Training Research and Innovations Partnership (STRIP) is a bursary available for students on the EngD STRIP programme. For more information, see page 52 and visit:
www.swansea.ac.uk/engineering/research/strip

The EngD Structural Metals for Gas Turbine Applications has a stipend and bench fees to support these projects funded by the Engineering and Physical Sciences Research Council (EPSRC). For more information, see page 56.

Manufacturing Advances through Training Engineering Researchers (MATTER) is an ESPRC-funded programme through Swansea University. The EngD studentships are provided with a bursary and all fees are fully paid by the scheme. For more information, see page 54.

Questions and Answers

I am applying from overseas. What are the entry requirements for international students?

We welcome applications by prospective students from around the world and look for evidence of previous study that is equivalent to the entry requirements stated in each programme description.

The Postgraduate Admissions Office is happy to advise you on whether your qualifications are suitable for entry to the course you would like to study. Please email **admissions@swansea.ac.uk** for further information.

If English is not your first language you will need an acceptable pass in an approved English Language qualification to make sure you get the full benefit of studying at Swansea. We consider a wide range of qualifications, including the Swansea University English Test, the British Council IELTS test (with a score of at least 6.5 and 5.5 in each component). A full list of acceptable English Language tests can be found at: **www.swansea.ac.uk/admissions/acceptableenglishlanguagetests**

The University has its own English Training Service if you think you need to improve your English language skills before beginning your studies. For more information, visit: **www.swansea.ac.uk/elts**

I don't have an honours degree. Can I still apply?

If you do not possess an honours degree but have sufficient professional experience in a relevant area, which replicates the application of theory from undergraduate studies in a relevant discipline, your application will be assessed on a case-by-case basis.

Can I visit the College of Engineering?

Yes. We offer a number of Open Days throughout the year and in addition we are also happy to arrange independent visits. Just contact us!

For more information on open days, visit: **www.swansea.ac.uk/postgraduate/opendays**

Does the College offer part-time or distance learning options?

We offer part-time options. However, all the courses are taught onsite. Distance learning is not available.

More questions?

Take a look at our website:
www.swansea.ac.uk/engineering

Email: **engineering@swansea.ac.uk**

Call: **+44 (0)1792 295514**

How to Apply

Apply online and track your application status at:
www.swansea.ac.uk/applyonline

Apply by post by requesting an application from:

Postgraduate Admissions Office
Swansea University, Singleton Park, Swansea SA2 8PP

Tel: **+44 (0)1792 295358** | Fax: **+44 (0)1792 295110**

Email: **postgraduate.admissions@swansea.ac.uk**

A Welsh language application from is available on request.

Our Admissions Policy

The University welcomes applications and enquiries from all people regardless of age, race, ethnic or national orgion, religious or political beliefs, gender, sexual preferences, marital status, family responsibility, and physical or sensory disability, unless these activities are unlawful or contrary to University policy. The University treats all applicants on individual merits and welcomes applications from candidates with a range of qualifications.

The information we've published in this prospectus is intended as a guide for prospective students thinking about studying at the College of Engineering, Swansea University. It does not form part of any contract, and we have made every effort to ensure that anything we have included is accurate and up-to-date at the time of going to print. Swansea University reserves the right to change our fees, regulations, and services, and to modify, withdraw, or add new courses and degree programmes at any time, without notice.

Design and Layout by
Waters Creative 01792 475558

Swansea University
Prifysgol Abertawe

This brochure is printed on paper made from pulp produced from sustainable sources using vegetable-based inks.

When you have finished with this brochure, please pass it on or recycle.

College of Engineering
Swansea University, Singleton Park, Swansea SA2 8PP

www.swansea.ac.uk/engineering

Tel: +44 (0)1792 295514 **Email:** engineering@swansea.ac.uk

www.twitter.com/SUEngineering

www.youtube.com/user/SUEngineering