

## Career Prospects

This course will prepare you for employment in a wide range of careers, not just within architecture or other built environment professions.

The knowledge and skills gained in computational methods such as 3D modelling, rendering, animation, parametric design, digital fabrication, and building information modelling (BIM) are highly desired by employers from various industries who are seeking experts with IT skills. Examples include: furniture designers, jewellery design firms, graphic design firms, computer game development firms, and even movie and theatre set design firms. These companies regularly need IT skills, digital fabrication skills, simulation software skills, or custom-software development tools to solve unique design problems.

## About the Welsh School of Architecture

The Welsh School of Architecture at Cardiff University is one of the top-ranked schools of architecture in the UK. Established in 1920, we attract postgraduate students from around the world who benefit from the unique experience of studying and living in the friendly and welcoming capital city of Wales.

Through our research and teaching we seek to create a built environment that enhances people's lives, without destroying the planet for future generations. Our portfolio of postgraduate courses is focused around this aim.



## Contact us

For further details about the programme and how to apply, please contact our Postgraduate Administrator Carys Meredith.

**Email:** [MeredithC5@cardiff.ac.uk](mailto:MeredithC5@cardiff.ac.uk)

**Web:** [www.cardiff.ac.uk/architecture](http://www.cardiff.ac.uk/architecture)

**Welsh School of Architecture**  
Cardiff University  
Bute Building  
King Edward VII Avenue  
Cardiff CF10 3NB

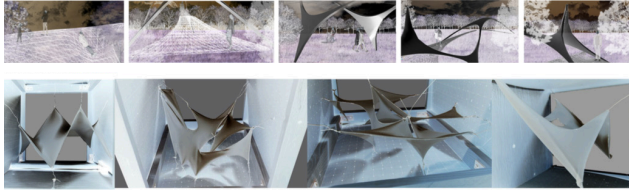


Welsh School of Architecture  
Ysgol Pensaernïaeth Cymru

# MSc Computational Methods in Architecture



This course addresses the need for creative professionals who are equipped with the IT skills, digital fabrication skills, simulation software skills, or the ability to design custom-software development tools to solve unique design problems.



## Programme aims

The ethos of the course is based on the concept of rigorous creativity where algorithmic thinking, systematic parametric design, analytic methods, creative intuition and tectonic sensibilities are integrated into a more innovative design outcome than traditional methods currently allow.

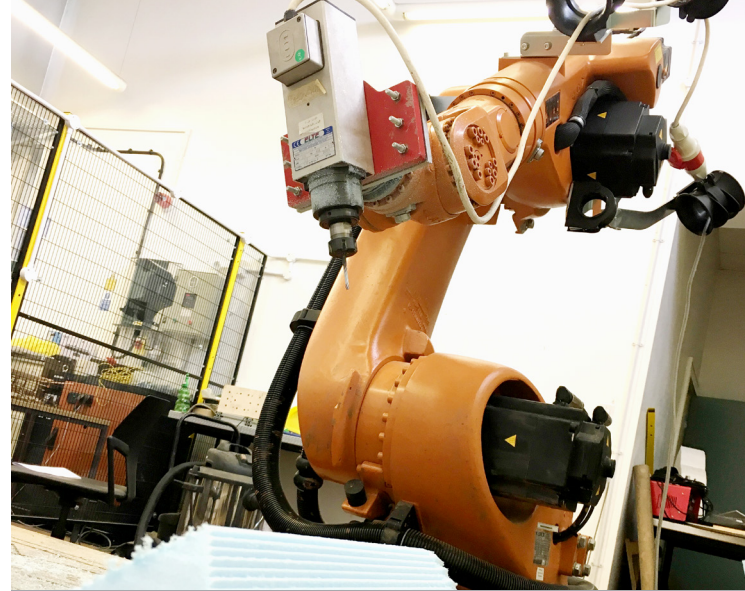
Our multidisciplinary approach will provide students with the knowledge and skills to discover innovative computational methods for use in the creative and design industries.

## Entry requirements

Suitable for graduates in architecture, the built environment, civil engineering, architectural engineering, computer science, or for professionals who wish to develop a specialisation in computational methods in architecture.

Applicants should normally hold a first or upper second class Honours degree. Alternative qualifications or relevant professional experience may be accepted. We also require prospective students to submit a personal statement and portfolio, which should provide evidence of imaginative, conceptual, and systematic thinking, spatial sensibility, technical resolution and overall communication of ideas.

Typical IELTS offer: 6.5 (no less than 5.5 in any individual component).



## Study options

The MSc Computational Methods in Architecture is available as a one year full-time course taught in Cardiff. We also offer a two year part-time version. The course begins every September.

## Programme details

On this course, we will look at form-finding using parametric and generative methods, preparing digital information for further rigorous analysis, and integrating the logic of digital fabrication into the early stages of design. You will learn to build your own digital tools through visual programming and scripting and gain practical experience with our in-house advanced digital fabrication equipment, including a large industrial robotic arm.

You will be taught by experts across the subjects of architecture, computer science and engineering, which will give you a distinctly interdisciplinary approach to looking at design.

This programme is delivered over three semesters. In each semester students will take a mixture of modules totalling 60 credits. Alongside a variety of compulsory and optional taught and project modules, students will develop a project-based dissertation. For a full list of available modules, please visit:

[www.cardiff.ac.uk/study/postgraduate/taught](http://www.cardiff.ac.uk/study/postgraduate/taught)

## Topics covered by the programme

### Introduction to 3D Modelling and Parametric Design:

Introduces the principles of 3D modelling and parametric design, while emphasising their connection to the creative design process. Specifically, you will gain an understanding of the workflows for digital modelling, texturing, animation, lighting and rendering, and generative techniques for the creation of complex assemblies.

**Computational Form Finding:** Explores the use of physical and digital prototyping methods of formfinding for creative design enquiry, including the concepts and techniques of design investigations as well as principles of computational design.

**Algorithmic Design Thinking:** Investigates parametric and generative design patterns and the algorithmic solutions and workflows that address them so you will be able to use general concepts and specific computational algorithms.

**Information Processing in Python:** Learn to extract, store and process information using the Python programming language with fundamental data structures and algorithms, the design and use of databases, regular expressions and the basics of HTML.

**Building Performance Simulation:** Learn to use computational modelling and simulation in design and performance evaluation of increasingly complex energy/environmental systems in buildings.

**Design for Building Performance:** Develops understanding and application of building performance criteria into the architectural design process. You will explore how to combine building performance simulations with optimisation strategies, and how to integrate performance criteria as design driver.

**Computational Design for Fabrication:** Learn about computational design and optimisation techniques that facilitate the fabrication of digital 3D shapes. You will be introduced to advanced digital fabrication techniques including 3D printing, laser cutting, CNC routing, and gain hands-on experience in using these tools to realise geometric models.

**Building and Infrastructure Information Modelling:** Extends understanding of fundamental principles for Building and Infrastructure Information Modelling (BIM) to be applied in building/infrastructure life cycle, including planning, briefing, design, construction, maintenance and demolition.