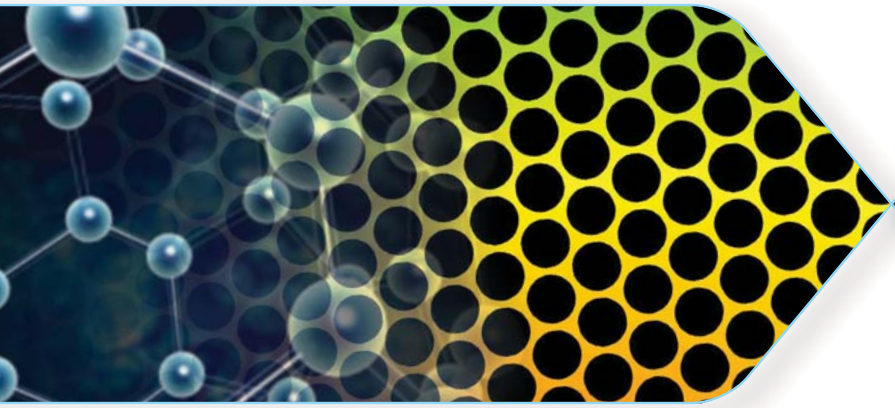
UCD College of Engineering, Mathematical and Physical Sciences Graduate School

UCD School of Chemical and Bioprocess Engineering



The School of Chemical and Bioprocess Engineering is the oldest and largest degree granting school of its type in Ireland, offering degrees up to the level of Ph.D. Since its beginning, over 1,000 engineers have been trained and the School has thus played a crucial role in the development of the Irish economy, where the chemical and allied industries are strongly represented. The title of the school emphasises the strong research and teaching representation in both chemical and bioprocess engineering. The teaching received by undergraduates is strongly supported by the intensive research underway in the School, demonstrated by its position as the most research intensive school of its type in Ireland. In addition, the size of the School means that staff, postgraduate and undergraduate students can communicate freely on a day-to-day basis, fostering a culture of insight, encouragement, and openness.

Taught Programmes:

MEngSc Biopharmaceutical Engineering

The School currently offers a taught full-time Master's programme in Biopharmaceutical Engineering. The biopharmaceutical industry in Ireland is rapidly expanding. This course provides an intensive training in the requisite skills for a professional scientist and engineer in the biopharmaceutical industry. The programme will provide substantial coverage of scientific, technical, management and regulatory issues associated with this industry. The course consists of 12 modules delivered by academic and industrial experts in each relevant area, along with a research project. Modules are delivered in conjunction with The National Institute for Bioprocessing Research and Training (NIBRT) and our partner institutions in NIBRT (Trinity College Dublin, Dublin City University and Sligo Institute of Technology). The programme's teaching methods are highly interactive and varied. Students participate in lectures, workshops, tutorials and practical exercises. Case-studies of US and UK biotech firms, described by senior company executives, are used to illustrate the possibilities and limitations of commercial exploitation of scientific discoveries. A graduate certificate or diploma may be offered for partial completion of the course.

Application Procedure and Further Information

Criterion for admission to this programme is an honours degree or equivalent in an engineering or science discipline. For further details please go to http://www.ucd.ie/chembioeng/biopharma.

It is anticipated that an MEngSc programme in Chemical Engineering will be available from September 2011.

For further information please contact either the School Administrator: Aoife Carney Email: aoife.carney@ucd.ie Tel: +353 1 716 1825
or the School Graduate Co-ordinator: Dr Susan McDonnell Email: susan.mcdonnell@ucd.ie Tel: +353 1 716 1893 Website: http://www.ucd.ie/chembioeng/graduateprogrammes

Major Research Groups within the School

Crystallisation Research Group

A strong focus in the area of particle technology has emerged in the School and project work in this important field has included: modification of crystal habit during crystal growth from solution; on-line control of batch crystallisation; and, an investigation into the use of ultrasound for particle size measurement in crystallising systems.

Material and Molecular Simulation Group

Materials underpin many of the advances seen in other research areas, not only in the chemical and allied industries, but also in the case of the biotech and ICT sectors. It can also be said that the development of materials for new and emerging applications will depend very much on the extent to which the underlying molecular mechanisms governing material behaviour are known and understood. To this end, this group applies the techniques of molecular simulation, in particular, molecular dynamics and Monte Carlo simulations to aid in the understanding of materials and their interaction with their environment.

The Animal Cell Culture Technology Group

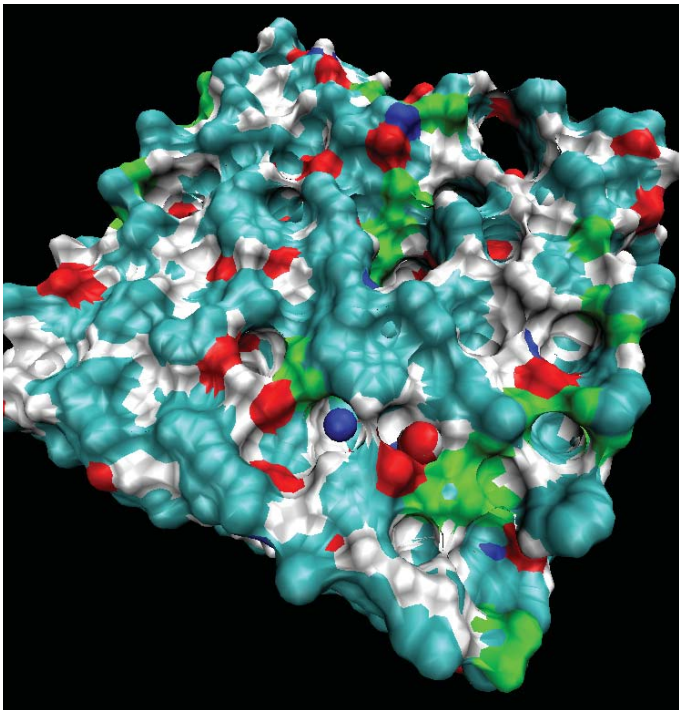
This group was established with SFI support in 2005 in the Department of Chemical and Biochemical Engineering. Conway Institute of Biomolecular & Biomedical Research at University College Dublin is the first and only such group in Ireland dedicated to the process engineering of biotechnological processes involving animal cells based on a combination of engineering, analytical, biological and physiological skills.

Biofilm Engineering

Biofilms are formed when microorganisms form a community at a solid-liquid interface. The complexity of biofilm metabolic behaviour has simultaneously limited our ability to fully exploit engineered biofilms as versatile biocatalysts as well as limiting our complete understanding of why unwanted biofilms are particularly resistant to antimicrobial agents. Our approach involves a combination of experimental investigations with mathematical modelling. We are particularly interested in the interactions between the physico-chemical microenvironment and microbial physiology.

Bioprocess Engineering Research Group

In the Bioprocess Engineering group research is concerned with the characteristics of cell aggregates in suspension cultures of plant cells and the effects of shear stress on such cells and aggregates.
Other projects in this field have studied bacterial growth kinetics, the growth of filamentous organisms in airlift loop reactors, bioprocess scale-up strategies, biofilms, membrane biofilm reactors and the use of two-liquid phase systems for the production of optically active epoxides at high enantiomeric excess.



Multiphase Systems

Projects which deal with Multiphase Systems include, for example: the hydrodynamic and mass transfer characteristics of external loop airlift reactors; breakage models and equilibrium distributions in turbulent dispersions; and, the application of laser holography to the characterisation of liquid/liquid dispersions.

Solar Energy Engineering Group

The Sun is our primary source of energy. The total radiant energy arriving at the Earth's surface is enough to provide over one thousand times the energy required to satisfy all of our domestic, transport and industrial needs. Within the School the research being conducted by the Solar Energy Engineering group aims to develop sustainable technologies and align to the overall need to enhance our renewable energy options by:

- building renewable capacity: next generation, diffuse light, photovoltaics and solar facilitated Hydrogen production (water splitting);
- ameliorating CO_2 emissions: CO_2 capture and solar facilitated fixation of CO_2 (low molecular weight fuel production); and,
- building high-added value industry from research outcomes: Intellectual property and device design.

For further information please contact either the School Administrator: Aoife Carney Email: aoife.carney@ucd.ie Tel: +353 1 716 1825
or the School Graduate Co-ordinator: Dr Susan McDonnell Email: susan.mcdonnell@ucd.ie Tel: +353 1 716 1893 Website: http://www.ucd.ie/chembioeng/graduateprogrammes