



Abertay
University



Knowledge, skills and experience matrix of Abertay University for IBioIC

Abertay University www.abertay.ac.uk

Abertay is a small modern university with a long history and is highly regarded for academic and research performance in areas with genuine relevance and impact on society and the economy. Research in the School of Science, Engineering & Technology pertinent to industrial biotechnology is outlined below.

Biofuels & Renewable Energy [Contact IBioIC for Contact Details]

The Biofuels & Renewable Energy team investigates the conversion of cellulosic and food residues using anaerobic digestion (AD) technologies into biogas (methane) and soil fertilizers. Current Abertay research focuses on optimising and modelling biogas production with various food/drink/agricultural residues and municipal solid wastes. Research projects investigate value-added biofuel products from novel biomass sources with a particular focus on novel, low-energy pre-treatment technologies, microbial process and modelling. For example, the application of ultrasound is being evaluated as a new way to pre-treat biomass for enhanced biofuel (biogas, bioethanol) production.

Wastes & Water Treatment and Management [Contact IBioIC for Contact Details]

The Wastes and Water Treatment and Management team undertakes research and knowledge transfer in environmental impact assessment, treatment and management of municipal and industrial wastes, water and wastewater, landfill technology and remediation of contaminated sites. Other areas of research include sustainable decision-making tools and public engagement and communication in decision making, complexity modelling and visualisation, and social aspects of environmental research.

Yeast Biotechnology [Contact IBioIC for Contact Details]

Yeast research at Abertay is concerned with both fundamental and applied aspects of yeast cell physiology. Projects focus on regulation of nutrition, growth, cell division, metabolism, stress and cell death in yeasts of industrial and environmental significance. Work on yeasts for the fermentation industries (brewing, winemaking, distilling, and bioethanol) involves the role of metal ions in optimising alcohol productivity. Related areas of research include generation of value-added products such as fuel alcohol from lignocellulosic processing residues (e.g. spent grains from breweries and distilleries), with a particular focus on novel, low-energy, pre-treatment technologies. The yeast research group aligns with the work of the University's Food Innovation Centre (www.foodinnovation.abertay.ac.uk) which engages with over 150 SMEs in the food and drink sectors of industry.

Sonochemistry/Ultrasonic processing [Contact IBioIC for Contact Details]

Work has involved destroying toxic organic pollutants in water using Advanced Oxidation processes augmented by the use of multi-frequency ultrasound. We have pioneered the use of the Advanced Fenton Process which uses scrap iron along with ultrasound as a much more efficient method for the generation of hydroxyl radicals compared to the normal Fenton reaction. Furthermore, we have been studying the effect of high frequency ultrasound in order to stimulate bioprocesses and this technology is being deployed to investigate rate enhancements in anaerobic digestion and in other biotransformations.

SIMBIOS [Contact IBioIC for Contact Details]

Scottish Informatics Mathematics Biology and Statistics (SIMBIOS) provides research leadership in complex system approaches to solving ecological, biological and environmental problems. The Centre has grown its reputation in soil science by building an expert group of inter-disciplinary researchers. It has world-leading facilities in two X-ray CT machines that allow for the microscopic examination of the internal structure of objects, including soil. We conduct research in biophysical processes, underpinning food security, carbon sequestration and microbial responses to environmental change.

Current Industrial Collaborators

Diageo, Scottish Water, Veolia, Lallemand Inc., Binn EcoPark, Scottish Biofuels Programme (numerous SMEs)