



Knowledge, skills and experience matrix of the University of Glasgow for IBioIC

Glasgow University www.gla.ac.uk

An IB expertise at the University of Glasgow spans both of the College of Medical, Veterinary and Life Sciences (CMVLS) and the College of Science and Engineering (CSE). Our research covers fundamental issues relevant to the engineering of novel biological systems as well as focused projects aiming towards industrially valuable outcomes. Much of our research is collaborative, involving staff from both of the Colleges, other academic institutions, and our industrial partners.

Some of our principle areas of current IB research are listed below:

Biofuels [Contact IBioIC for Contact Details]

Development of bacterial catabolism based fuel cells. Biosensors based on bacterial electron transfer

Microbial Communities [Contact IBioIC for Contact Details]

Systematic analysis, mathematical modelling, and optimization of microbial communities; uses for waste treatment, water desalination, bioremediation, and anaerobic digestion/ biogas production.

Nano Engineering [Contact IBioIC for Contact Details]

Construction of microfluidic/ 'lab-on-a-chip' systems for genetic manipulations and biosensors.

Diagnostic systems [Contact IBioIC for Contact Details]

Development of microbe-based diagnostic systems for detection of pathogens and chemical substances.

DNA manipulation [Contact IBioIC for Contact Details]

Novel methodologies for DNA sequence assembly *in vitro* and *in vivo*; assembly of metabolic pathways in producer organisms. Applications of recombinase-mediated genetic rearrangements, including cellular sensors and counting systems.

Medical technologies [Contact IBioIC for Contact Details]

Including medical diagnostics, biomedical engineering, and tissue engineering.

Lignin and lignocellulose chemistry [Contact IBioIC for Contact Details]

Heterogeneous catalysis of lignin degradation. Utilization and conversion of lignocellulose feedstock materials.

Solar energy and photosynthesis [Contact IBioIC for Contact Details]

Development of novel materials and methods for solar energy utilization; artificial photosynthetic systems.

Supramolecular structures [Contact IBioIC for Contact Details]

Self-assembling supramolecular structures, synthetic protein mimics.

Protocells [Contact IBioIC for Contact Details]

Artificial cells that can be used for the synthesis of novel proteins and other biomolecules.

Examples of Current IB-related research

include a £5.2M EPSRC-funded programme aiming to develop methods for improvement of water quality (Sloan, Walls, Murphy); a collaborative project with Unilever to develop a robust easy-to-use software pipeline for processing of shotgun metagenome data, for commercial applications (Quince); a £4.2M BBSRC-funded programme to develop novel recombinase-based methods for DNA rearrangements in Synthetic Biology (Colloms, Stark); an international team aiming to develop novel biologically based methods for harvesting solar energy, “Glasgow Solar Fuels” (Cronin, Cogdell, Symes, Gadegaard, Loos); and the Advanced Medical Diagnostics group (Cooper, Glidle, Yin, Neale, Tassieri) which has numerous industrial collaborations and aims to establish a range of microfluidic and cell-based diagnostic technologies.