

# Developing sustainable chemical solutions and technologies



# A WORLD LEADING RESEARCH CENTRE

The Green Chemistry Centre of Excellence (GCCE) at the Department of Chemistry, University of York, is a world leading research centre with over 20 years' experience in the area of green chemistry. Our expertise includes the development and implementation of green and sustainable chemical solutions and technologies in both commercial products and industrial processes.

The Centre has around 90 personnel from over 20 countries including academic experts, specialist and support staff as well as postgraduate researchers. Modern research facilities include a range of specialist analytical instrumentation and specialist reactors based on clean technologies, which are available at demonstrator scale in the associated Biorenewables Development Centre (BDC). The Centre is a vital part of the BioYork initiative and is a stakeholder in BioVale.

The GCCE tackles global grand challenges within the context of the UN's 17 sustainable development goals. We develop circular economy solutions supported by life cycle analysis to ensure trust, transparency and traceability.



The Green Chemistry Centre of Excellence (GCCE) is a world leading research centre



We participate in public engagement to raise awareness of green chemistry



We conduct research on the conversion of waste biomass to high value materials

# OUR RESEARCH EXPERTISE

## BIO-BASED MESOPOROUS MATERIALS (B2M2):

Conversion of waste biomass to high value materials, and providing new technologies for bio-waste utilisation and developing future biorefinery systems.

## CLEAN SYNTHESIS:

Utilising bio-based chemicals and greener synthetic methods to produce sustainable chemicals that meet consumer and legislation requirements, such as solvents, polymers and surfactants.

## MICROWAVE CHEMISTRY:

Use of microwave technology for the energy efficient valorisation of waste biomass to produce valuable products, such as liquid and solid fuels and chemicals from sustainable sources.

## ALTERNATIVE SOLVENTS:

Industrially focused research developing safer and more sustainable solvents for a wide range of applications, such as extraction, synthesis, and materials production.

## CO<sub>2</sub> CHEMISTRY:

Research exploring the development of new routes to convert CO<sub>2</sub> into valuable chemicals including cyclic carbonates and polymers.



We utilise bio-based chemicals to produce sustainable chemicals

# FLEXIBLE SOLUTIONS FOR INDUSTRY

The GCCE works closely with industry to deliver competitive tailor-made solutions that are more profitable, less wasteful, less damaging to the environment and more socially acceptable. Our clients come from many sectors and range from small manufacturing enterprises through to large corporations at local to international level.

Our Industrial Engagement Facility (IEF) provides dedicated space to visiting industrial partners, including a hot desk area, laboratory space and access to specialist instrumentation.

## STARBONS LTD

Starbons Ltd, an award-winning micro start-up company, manufactures Starbon®, a patented class of bio-based mesoporous materials capable of being tuned to specific applications. It was formed in 2012 as a spin-out originating from research conducted in the GCCE and is now privately owned.

## MICROWAVE COMMERCIALISATION CLUB (MCC)

The Microwave Commercialisation Club (MCC) is a multidisciplinary team including experts in engineering, microwave technology, biomass chemistry and process management. The EPSRC-funded MCC seeks to promote the application of microwave technology in chemical manufacturing.

## S4 - SUSTAINABLE SOLVENT SELECTION SERVICE

The GCCE has developed the S4 (Sustainable Solvent Selection Service) to replace hazardous solvents and promote benign alternatives. This service is provided to businesses that face restrictions over the use of their usual solvents due to regulations and who seek improved solvent performance.

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*The GCCE is an international flagship for the promotion of sustainable chemistry*

Professor Mark Mascal, UC Davis

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# TRAINING, EDUCATION AND NETWORKS

The GCCE is instrumental in providing high quality training and educational material across higher education and industry, with internal and external continuous personal development programs including online courses and workshops. We deliver excellence in education and training within an infrastructure that produces top quality and employable MSc and PhD graduates in green and sustainable chemistry.

The GCCE develops core partnerships stemming from public engagement to networking on a global scale. It is the hub for a number of important networks that bring together academics, industrialists and other interested individuals and groups from around the world.

## MSC IN GREEN CHEMISTRY AND SUSTAINABLE INDUSTRIAL TECHNOLOGY

Our flagship MSc course in Green Chemistry and Sustainable Industrial Technology ([york.ac.uk/msc-green-chemistry](http://york.ac.uk/msc-green-chemistry)) is the first course of its kind to be accredited by the Royal Society of Chemistry. This prestigious course attracts students from all over the world, and also has a high level of industrial involvement in teaching and in research training, bringing in external experts in law, chemical engineering, energy and business.



Our MSc course attracts students from all over the world



### CASE STUDY: Graduate Training Workshops – RenewChem

RenewChem is a non-competitive club comprising industrial partners looking to further sustainable manufacturing and the circular economy, and includes the first fully integrated Centre for Graduate Training (CGT) in Sustainable Chemical Manufacturing. Delivered through a series of workshops and online courses, this training aims to re-educate current workforces and develop a new generation of entrepreneurial, business-minded sustainable chemists.

### CONTACT DETAILS

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