

Environmental labs

Faculty of Engineering and the Environment



www.facebook.com/environmental.lab.university.of.southampton

Analytical facilities

The group has the support of dedicated analytical laboratories housing a wide range of equipment used to characterise our feedstocks and the energy products we produce. A selection is shown in the following pages





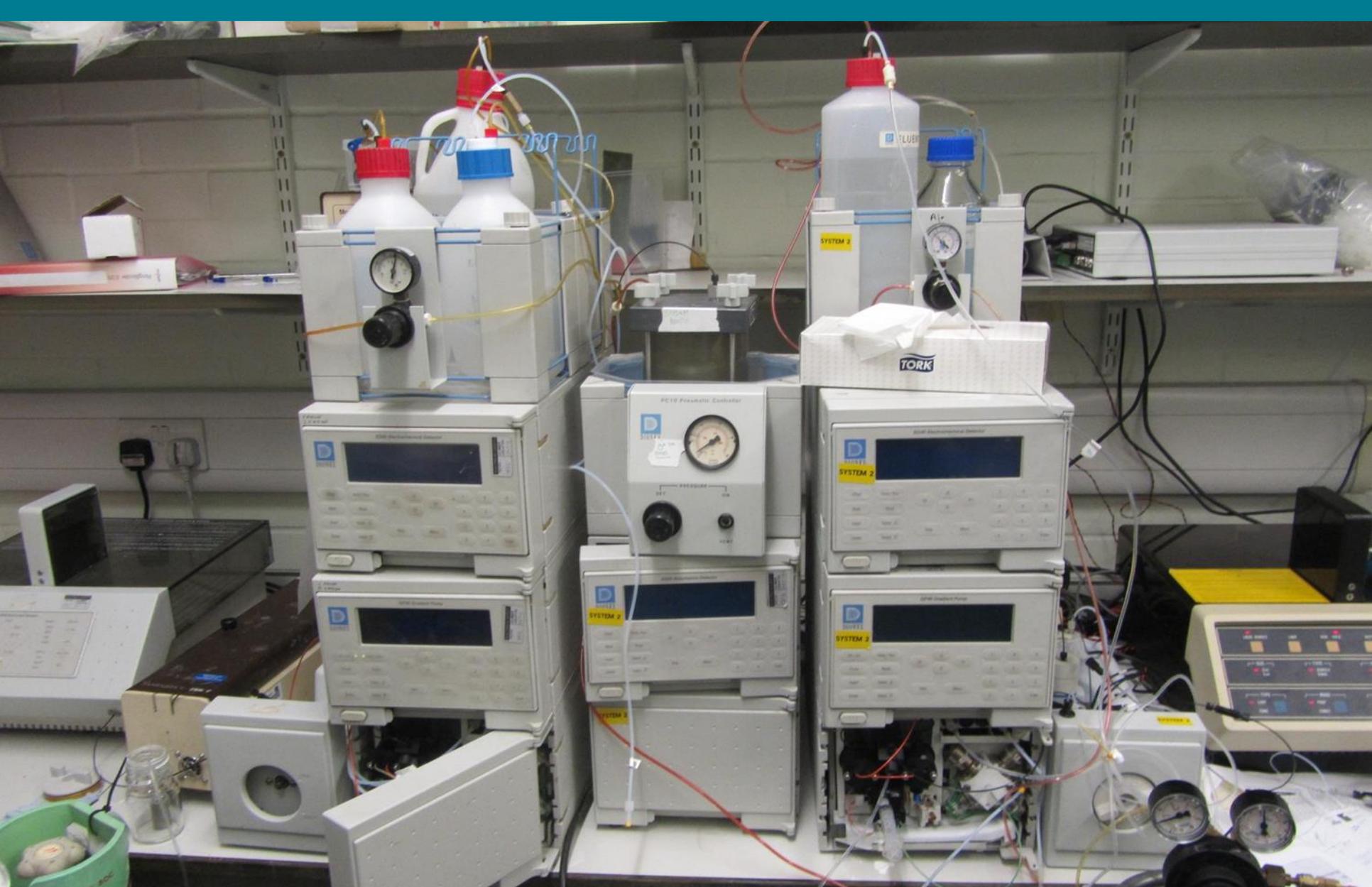
Environmental laboratory



GC analytical lab

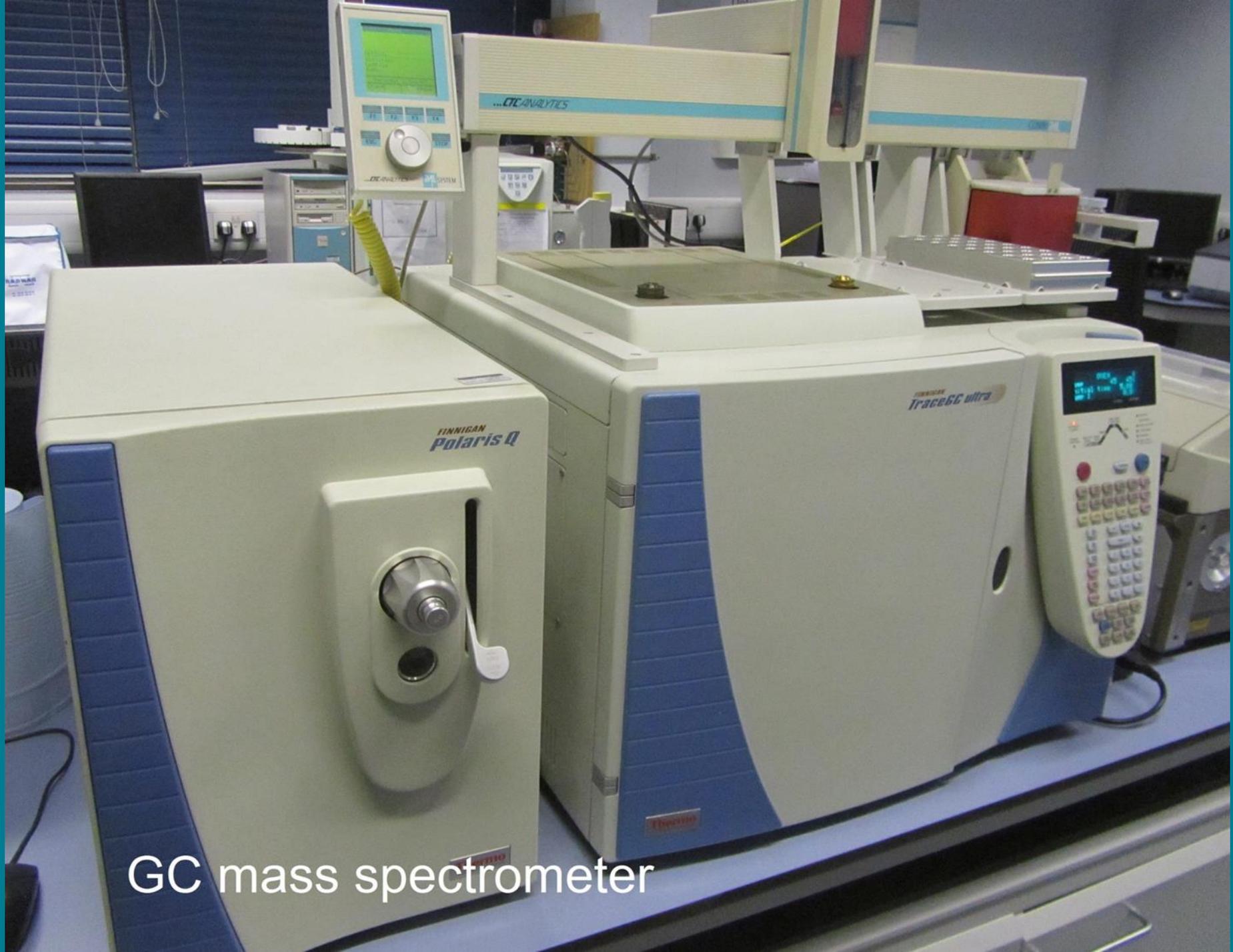


Metrohm ion chromatograph



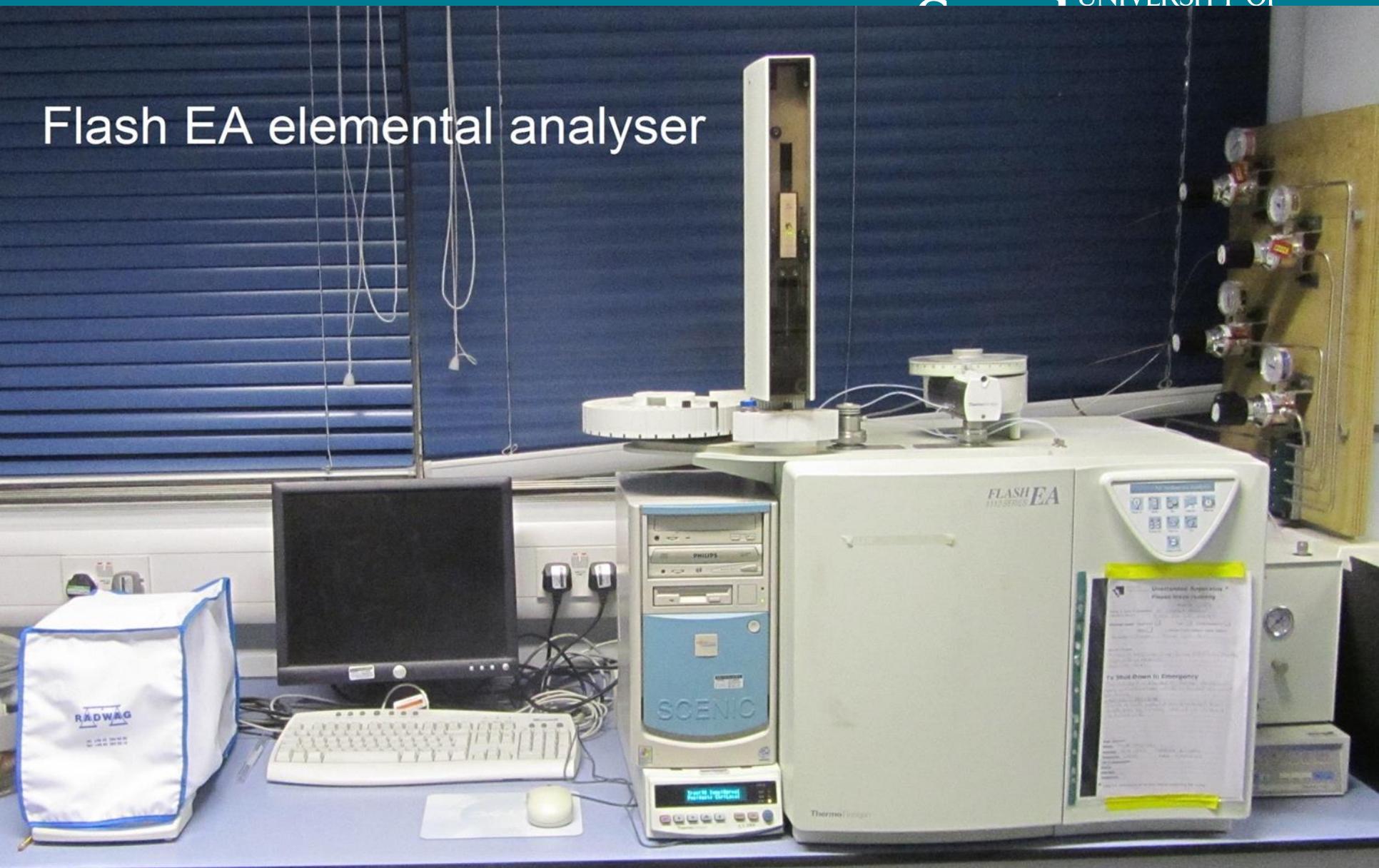
The image shows two identical Dionex HPLC systems set up on a laboratory bench. Each system consists of a stack of three modules: a solvent delivery module at the top with a pressure gauge and a red cap, a pump module in the middle with a pressure gauge and a black knob, and a detector module at the bottom with a digital display and control buttons. The detector modules are labeled 'SYSTEM 2'. The systems are connected to various tubes and wires, and a 'TORK' brand paper towel box is placed on top of the right system. The background shows laboratory shelves with various items, including a computer monitor and a keyboard on the left, and a power outlet on the wall.

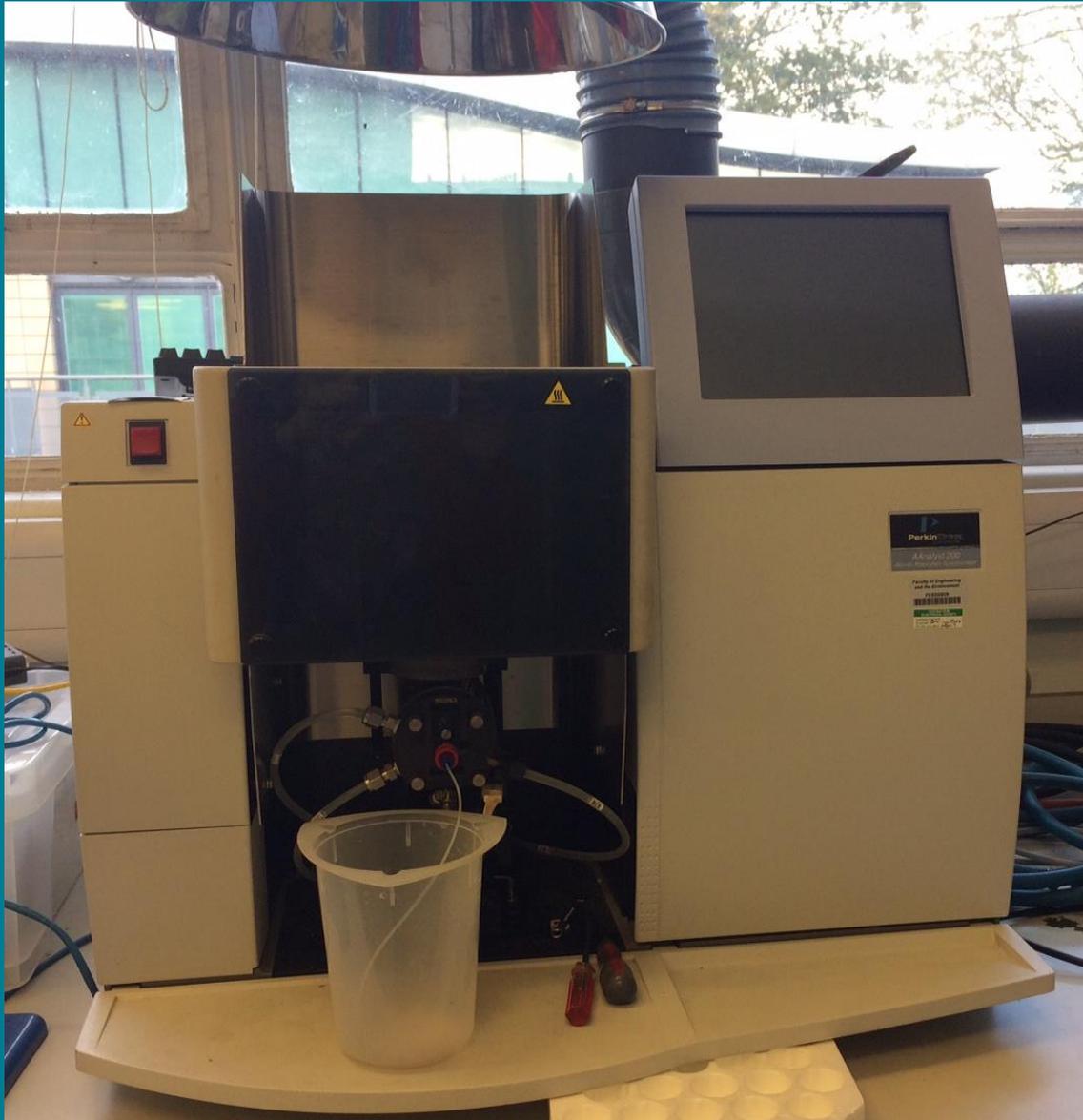
Twin Dionex HPLC with electrochemical and UV detectors



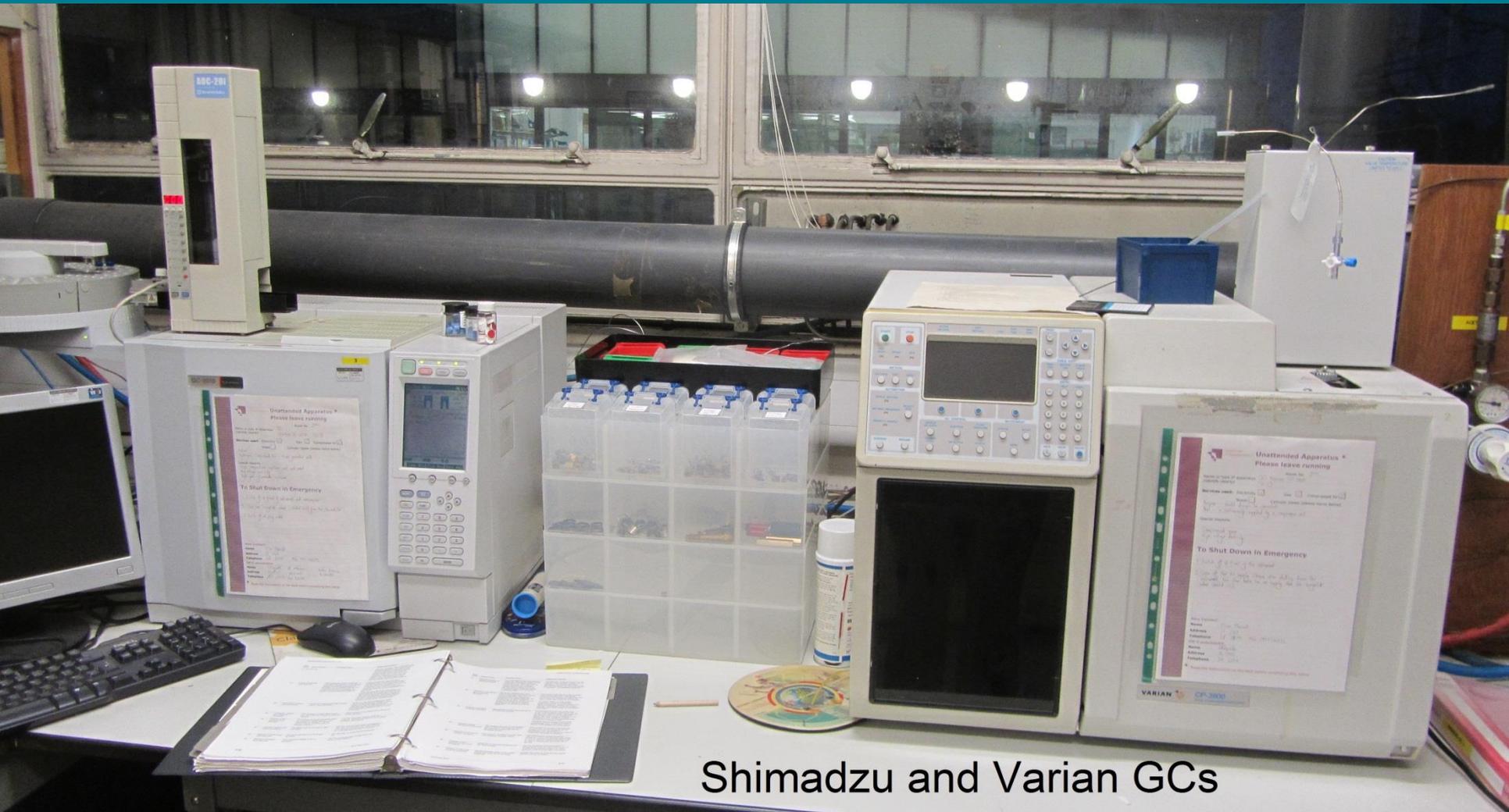
GC mass spectrometer

Flash EA elemental analyser





Atomic absorption
spectrophotometer



Shimadzu and Varian GCs



Atomic fluorescence spectrophotometer



Near infrared (NIR) spectrophotometer

Fluorometer



TOC Analyzer

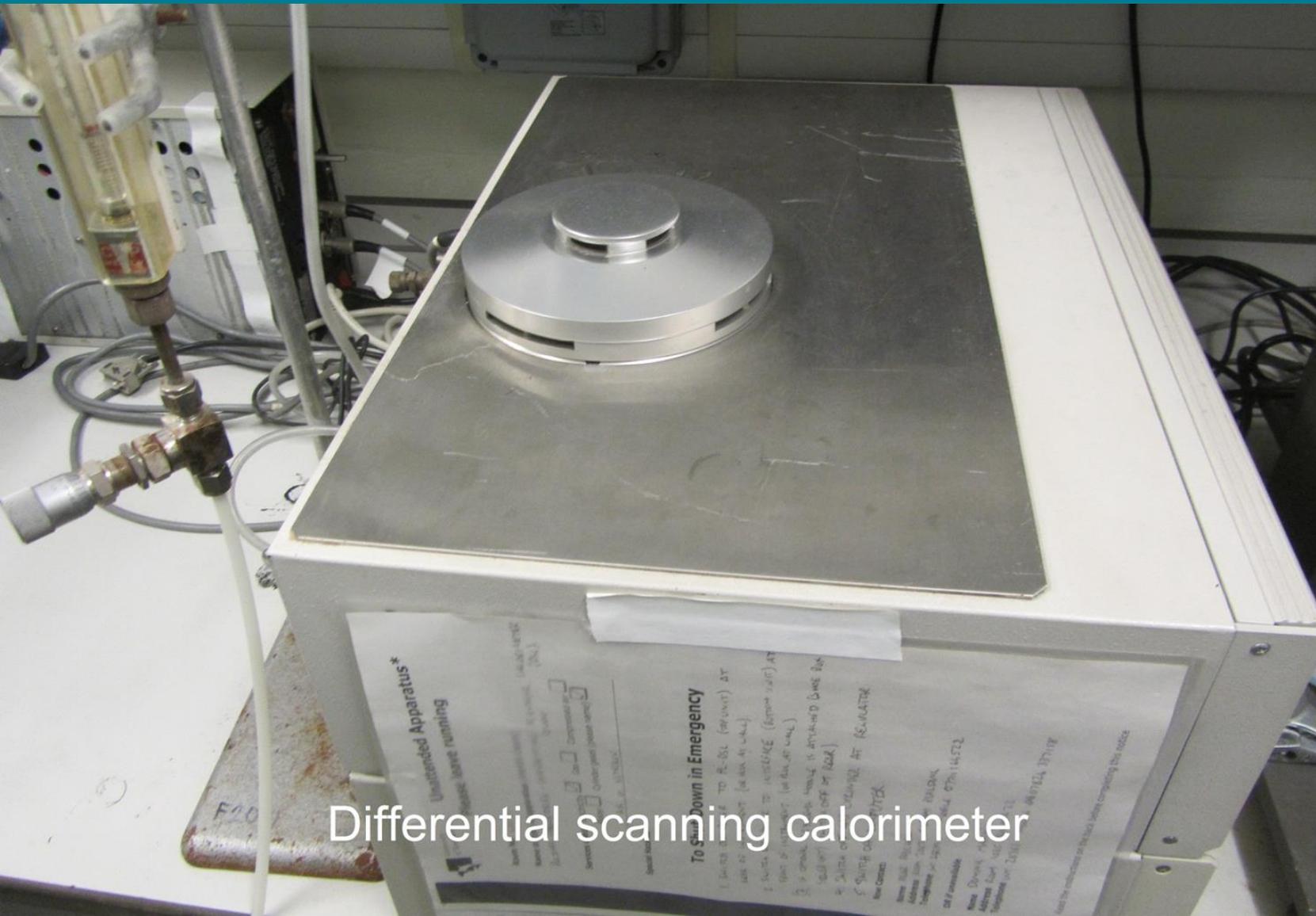


Bran-Luebbe Autoanalyzer





Bomb calorimeter



Differential scanning calorimeter

AKTA cross flow membrane filtration test rig

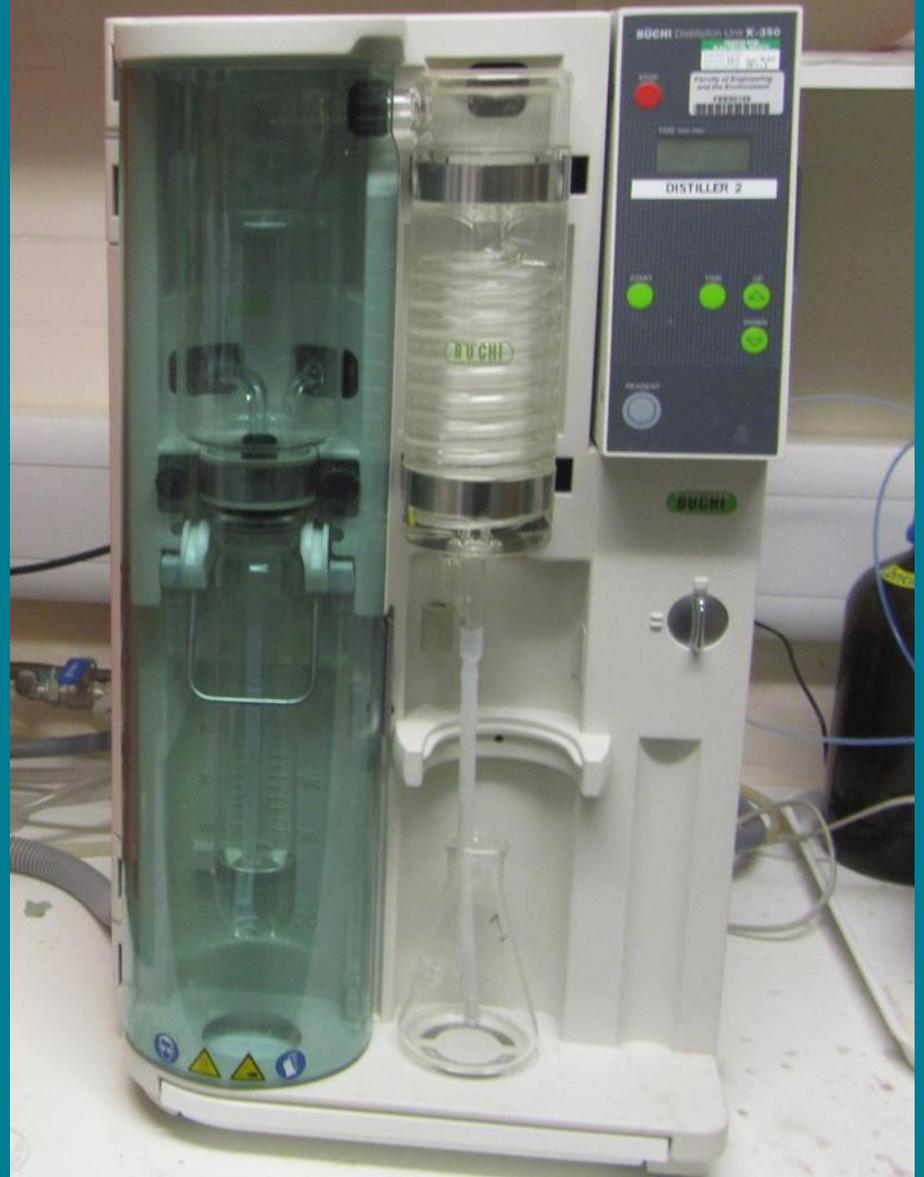


YSI Biochemical Analyzer

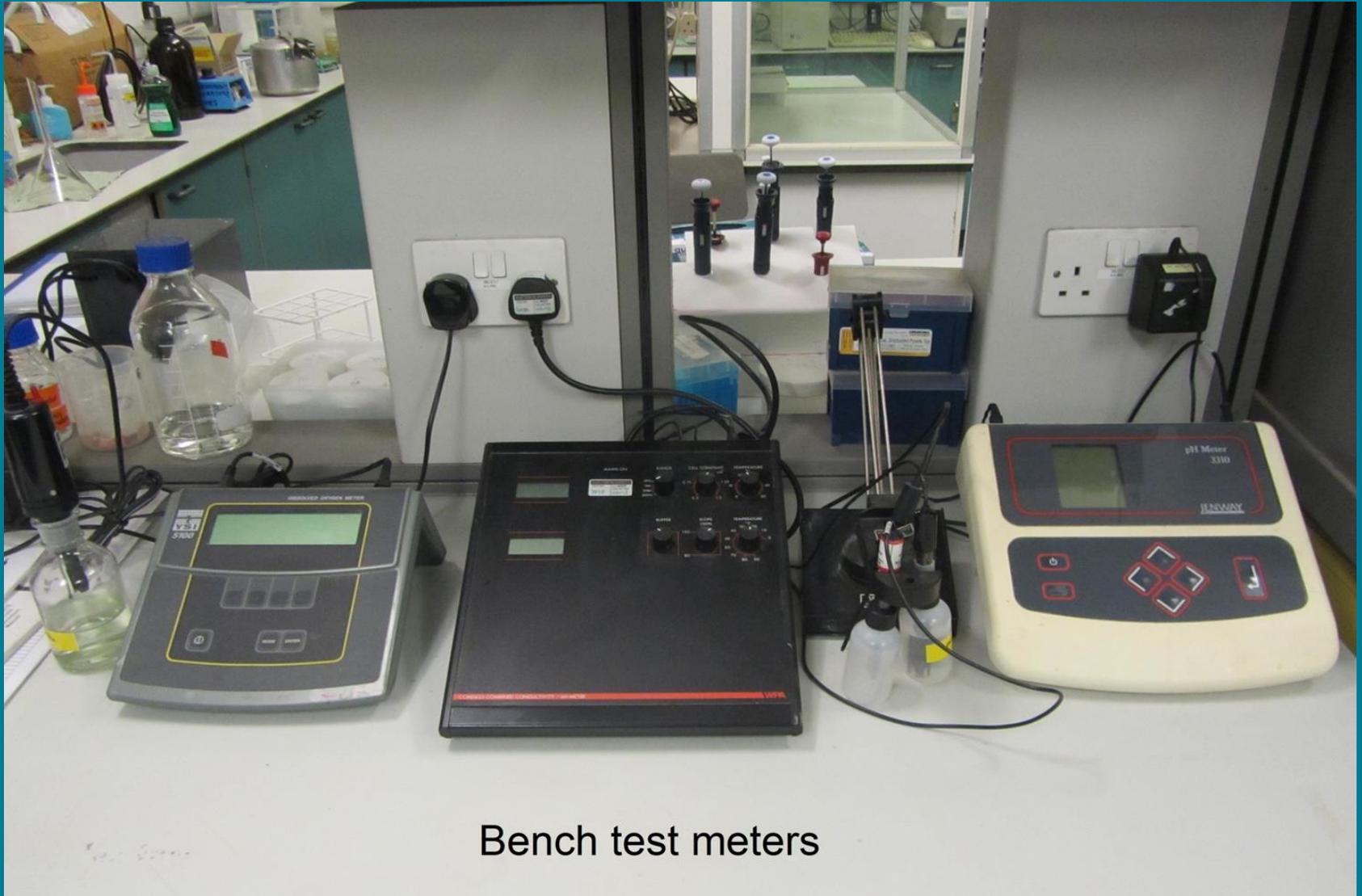




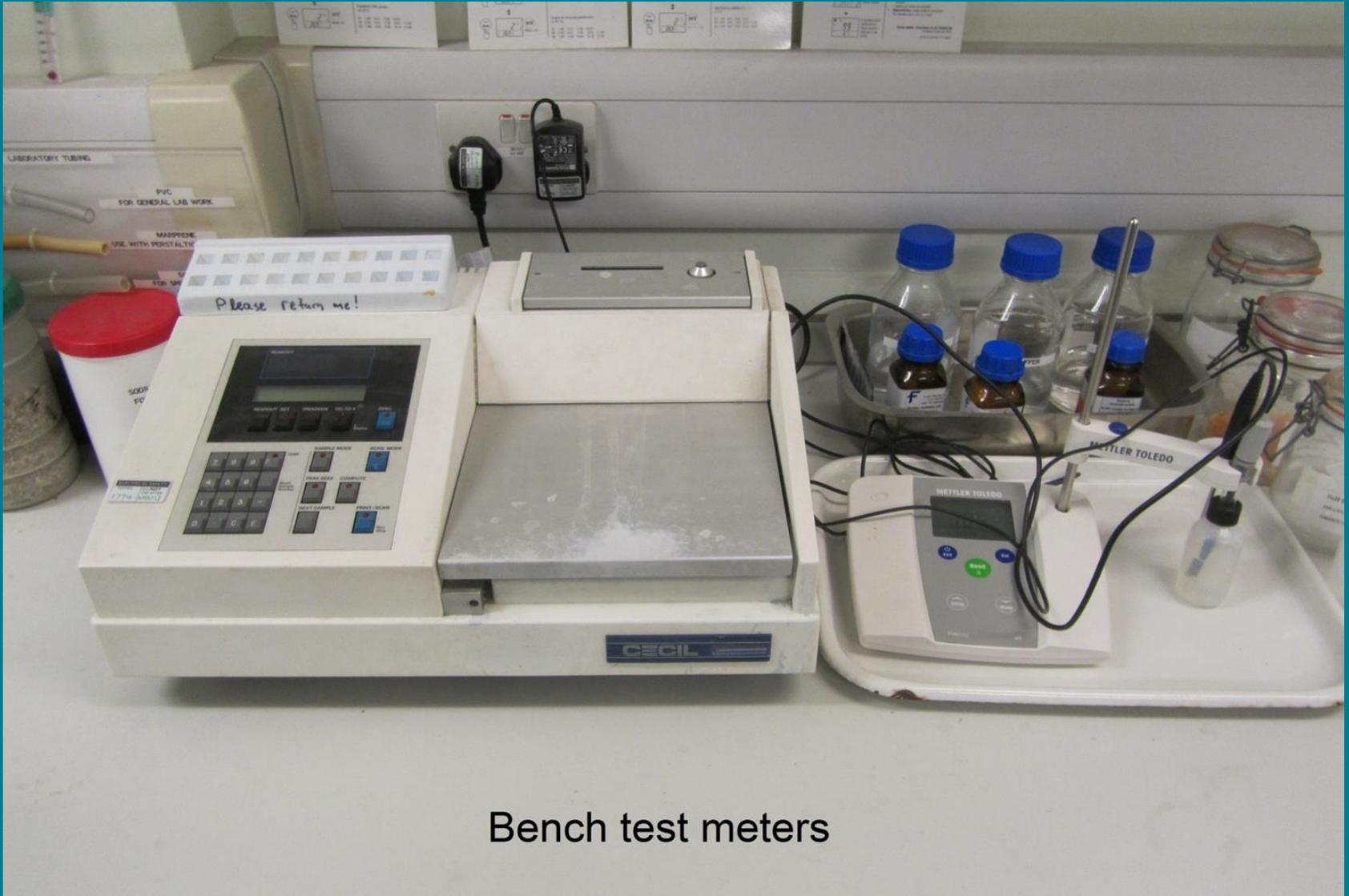
Freeze drier



ammonia distillation



Bench test meters



Bench test meters



autotitrators



Homogeniser



Mortar and Pestle

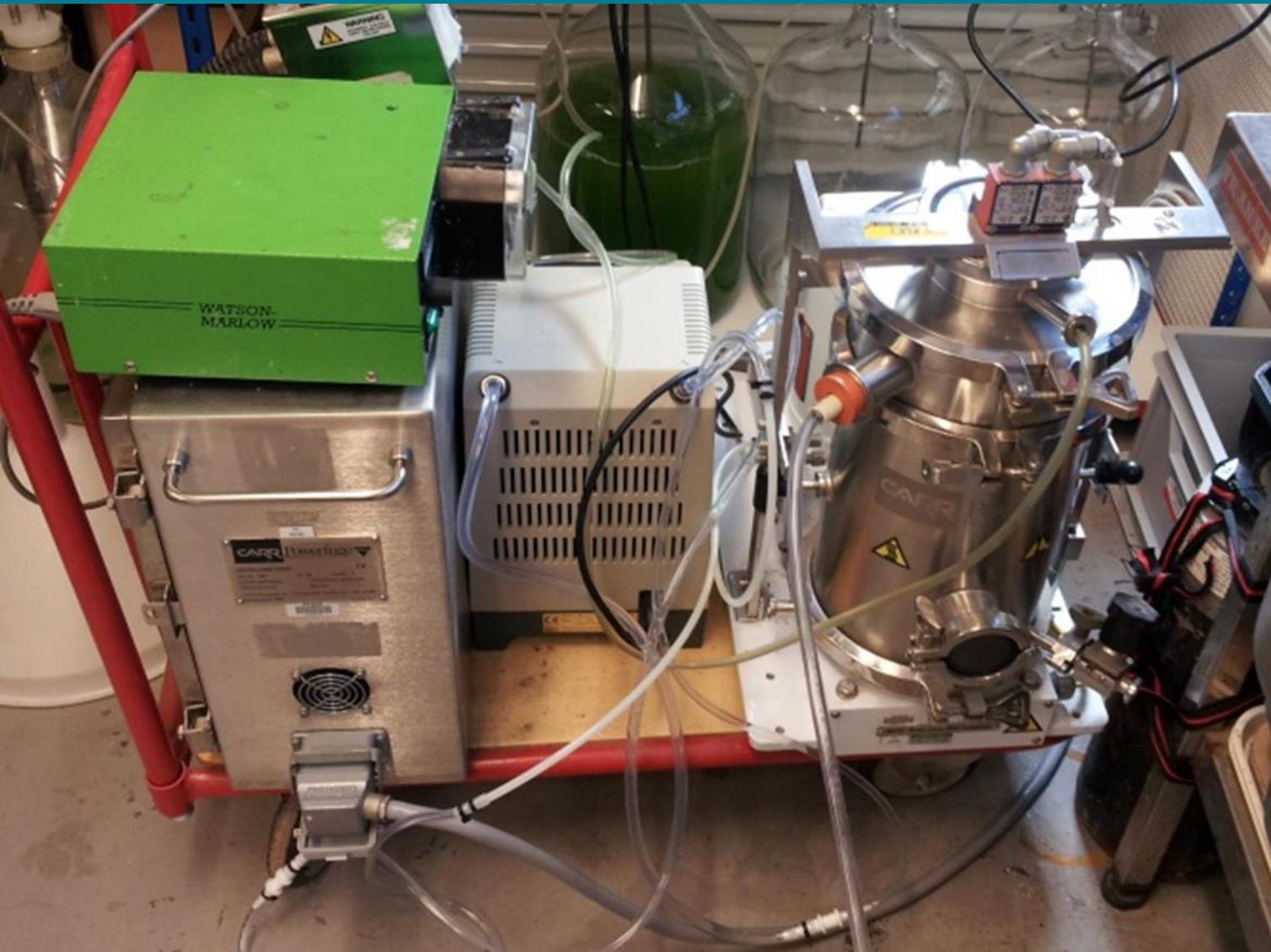


Autoclave



Autoclave

Powerfuge pilot continuous centrifuge





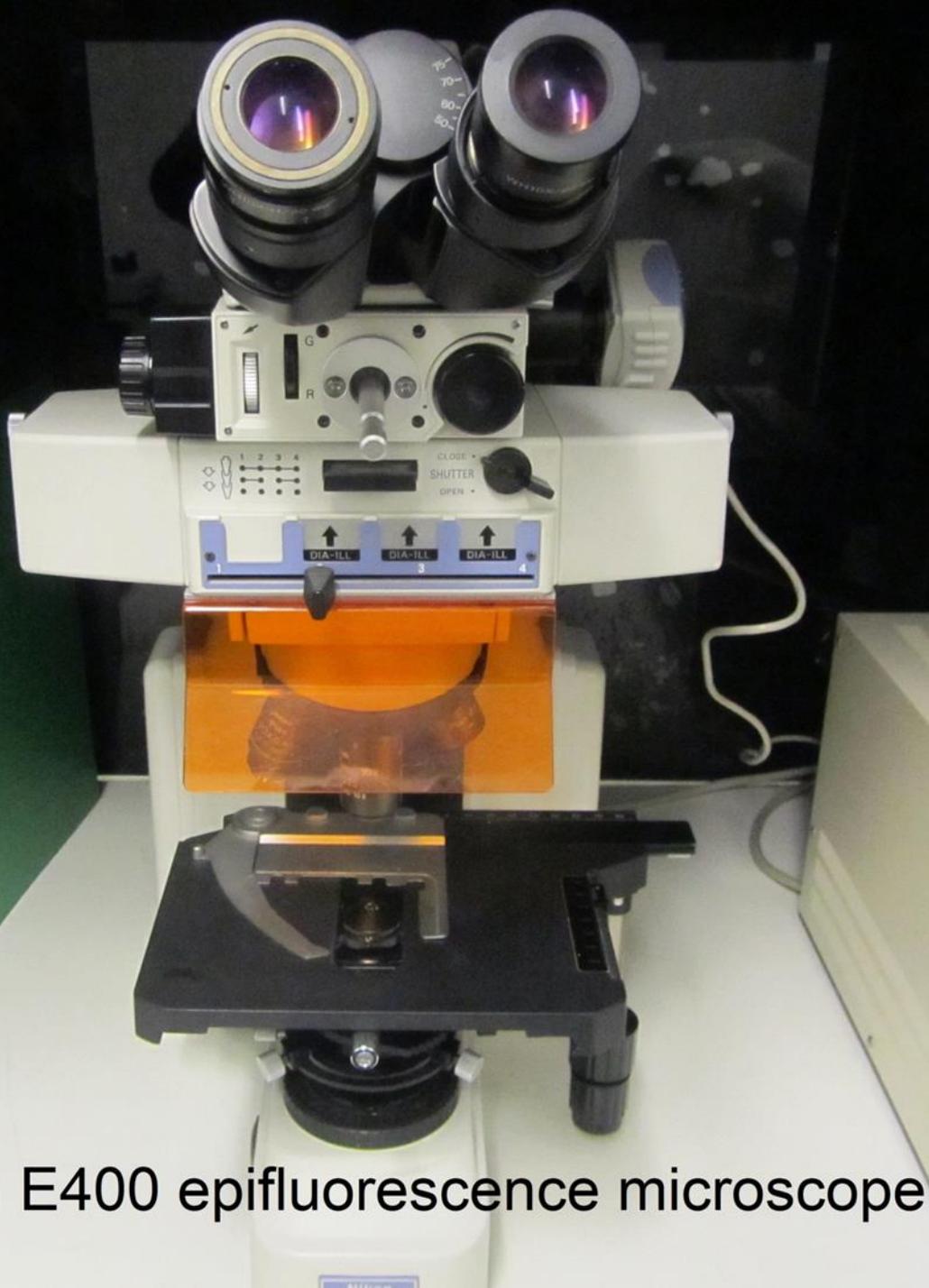
Bench centrifuge



High speed refrigerated bench centrifuge



filtration equipment



Nikon E400 epifluorescence microscope

Experimental facilities

We undertake work at all scales of operation from laboratory studies to the monitoring of commercially operating plant.

Our facilities house over 250 anaerobic digesters of different types and sizes from 0.5 to 100 litres.

These are used in simple batch tests to determine biochemical methane potential (BMP) and for continuous feed kinetic studies to derive design and operational data.

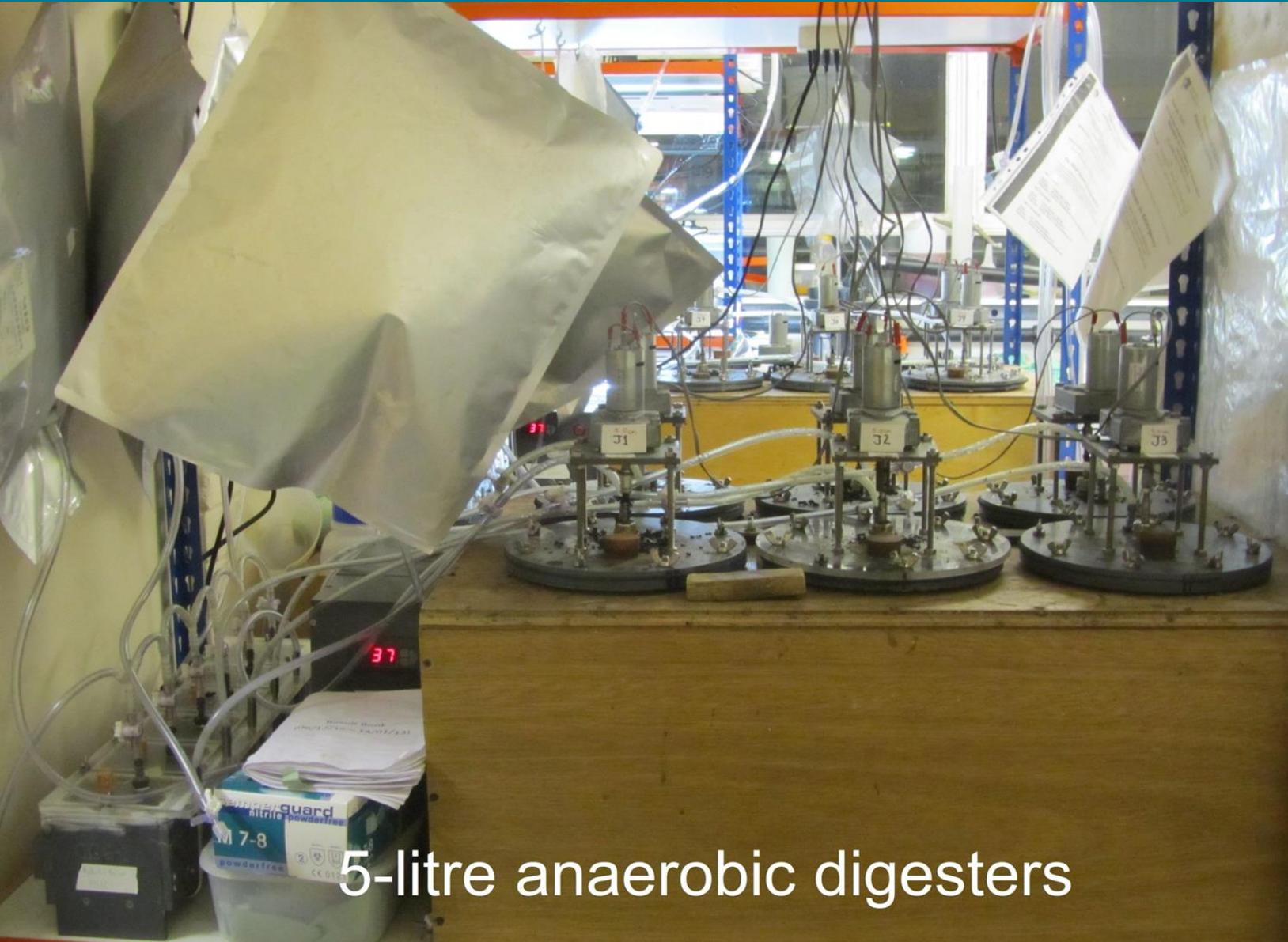
Digester types include: continuously stirred tank reactors (CSTR), Upflow anaerobic sludge blanket (UASB) reactors, anaerobic filters, and anaerobic membrane bioreactors (AnMBR).

These operate over a range of temperatures from ambient to thermophilic using substrates from energy crops to solid wastes and process wastewaters.





2-litre anaerobic digesters



5-litre anaerobic digesters



A bank of anaerobic digesters in the environmental biotechnology laboratory



2-litre stirred batch anaerobic digesters
for biochemical methane potential testing



35-litre anaerobic digesters with ammonia stripping columns

The image shows three identical 100-litre anaerobic digesters arranged in a row. Each digester is a tall, dark cylindrical vessel supported by a yellow metal frame. At the top of each frame, there is a blue electric motor connected to a blue gearbox, which is mounted on a horizontal shaft. Below the motor, a vertical shaft extends down into the digester. At the base of each digester, there is a blue control box with a red emergency stop button and a power switch. The digesters are situated in a room with a concrete floor and a metal ceiling. A white paper is hanging from the leftmost digester's frame.

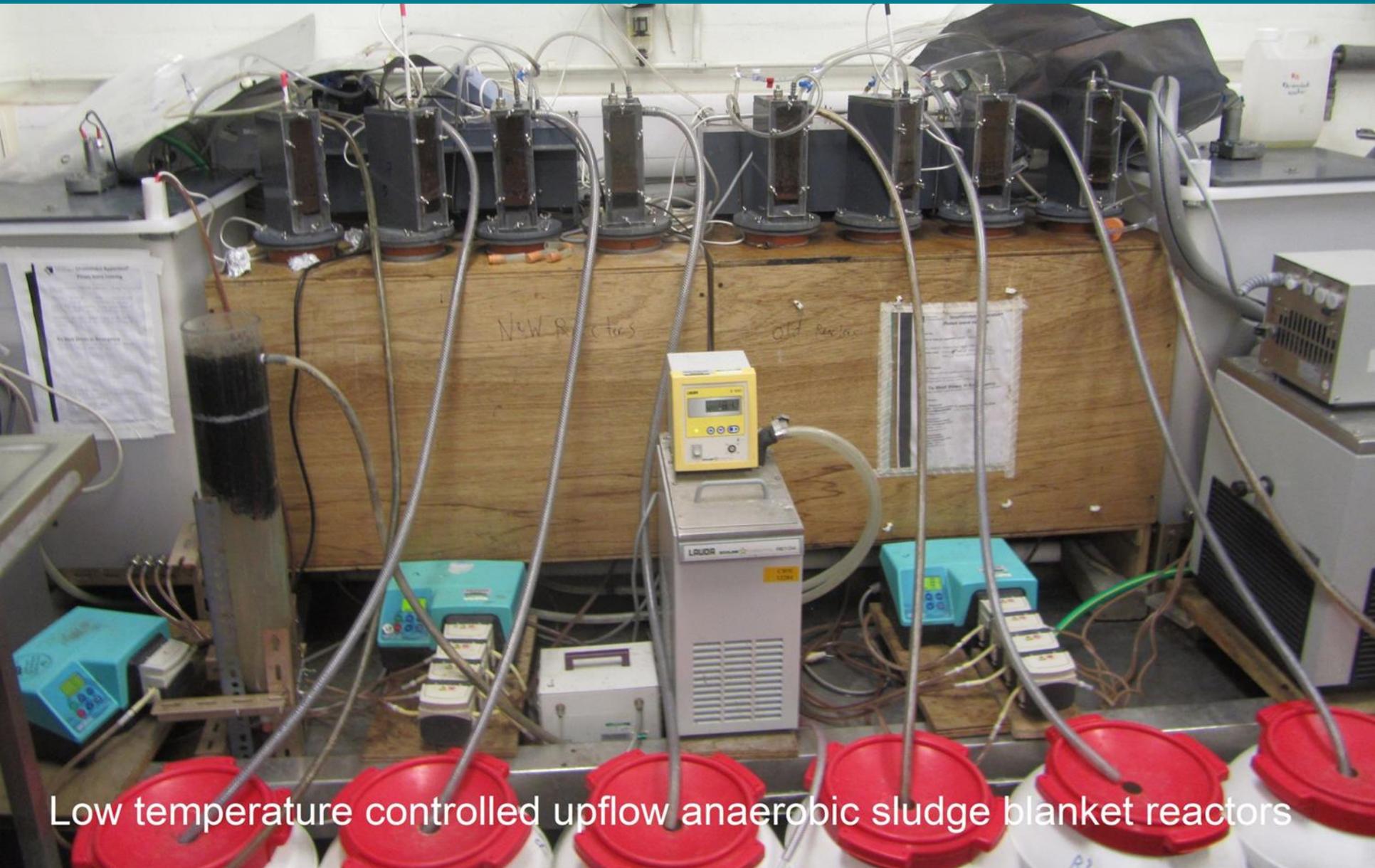
100 litre anaerobic digesters



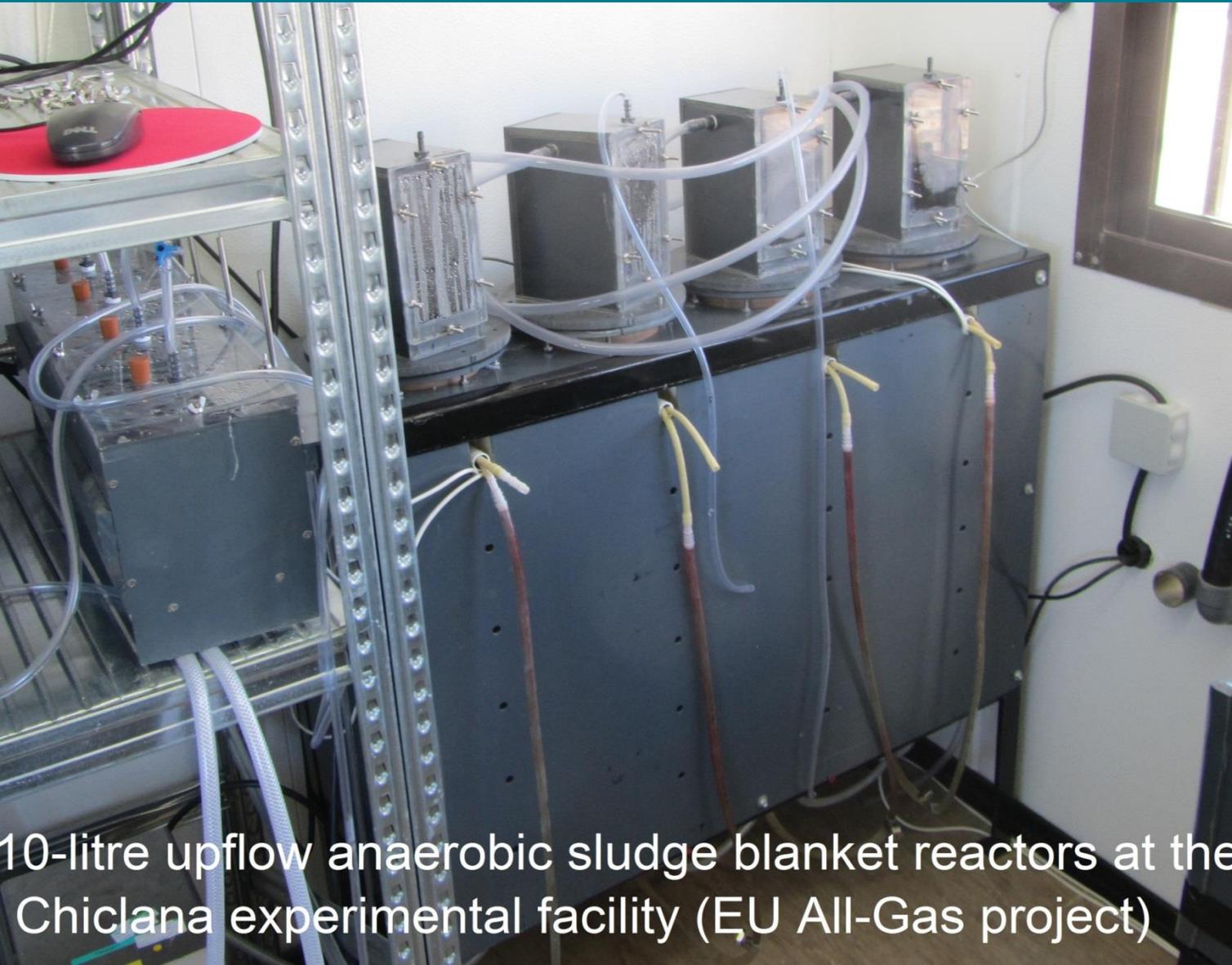
Anaerobic MBR



Gas-sparged AnMBR with
and without particle addition



Low temperature controlled upflow anaerobic sludge blanket reactors



10-litre upflow anaerobic sludge blanket reactors at the Chiclana experimental facility (EU All-Gas project)

lab scale fermentation equipment





Measuring the growth rate of algae



Growing algal starter cultures



Lab-scale instrumented photobioreactors



300-litre photobioreactor
in the greenhouse facility

More information

See also our webpages:

www.bioenergy.soton.ac.uk



www.facebook.com/environmental.lab.university.of.southampton

www.southampton.ac.uk/engineering/research/themes/water_and_environment.page