Antimicrobial Chemotherapy, Dye Synthesis and Smart Bandages
Dr Robert B. Smith, University of Central Lancashire

Antimicrobial Chemotherapy
The rise in number of immunocompromised patients (either through infections, nutritional irregularities or medical treatment) has led to an increase in opportunistic fungal infections. We are currently designing new and varied antimicrobials based around the substituted benzothiazole structures. The libraries are showing extremely good potency and recent work submitted to the European Journal of Medicinal Chemistry highlights this potency showing them to be comparable and in some cases better than a range of classic antifungals. Further libraries are currently being synthesised and the work will shortly be moving into mammalian cells. We currently have a small cross collaborative team working on this consisting of MChem, MPharm and MRes students.

Cy7 Dye Synthesis
Detecting and quantifying biomolecules with the use of fluorescent probes is an area of increasing interest and importance. We are currently looking at new methodologies to make structurally enhanced dyes. We have currently identified novel Cy7 dyes which show notably improved fluorescence quantum yield in comparison to current clinical standards ICG and IR820. Over the past year, this work has allowed us to submit a patent (UK Patent Application No 1201641.6; PROCESS FOR DYE PRODUCTION; University of Central Lancashire). This work has also been submitted for publication in the Journal of Sulfur Chemistry. We currently have a cross collaborative team working on this project. This team consists of MChem, MPharm and MRes and Ph.D students. External collaborations have also been set-up with the University of Salford and the University of Ulster.

Wound Management (Smart Bandages)
With the recent increase in bacterial resistance to conventional antibiotics, the early-stage detection and subsequent control of infection has become imperative in the fight against opportunistic pathogens in healthcare. Due to the size and collaborations gained from the project - it has been split into two routes – infection detection and infection control. Infection detection focuses highlighting the early on-set of an infection using dye chemistry and the infection control focuses on the use of photosensitisers. Over the past year, work from these projects has been accepted for publication in Medical Hypothesis and we are now focusing on grant capture. We currently have a small cross collaborative team working on this consisting of a MRes, 2 x Ph.D students and a PDRA. External collaborations have also been set-up with Leeds Met University.

EPSRC Mass Spectrometry Service Centre/Facility
The current projects highlighted above would not have been possible without help from the Facility. We owe this service a great deal of gratitude as without this we could not
have submitted a patent or manuscripts for publication. Without further support from this service we would find it hard to continue producing high quality chemistry and thus the hard work to get these projects established would be wasted. We have acknowledged this service where we have published experimental work and on internal and external seminars we have also acknowledged this high quality service.