

Selected research topics in Biomedical Engineering: Novel Phenotyping and Diagnostic Tools

**Location:** Library at the institute of forensic medicine (IRM), Pestalozzistrasse 22, Basel

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## *Developing technology for the fast diagnosis of wound infection*

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### **Abstract**

Wound and bladder infection are the two primary causes of hospital acquired (nosocomial) infection. In both cases bacteria can attach to the epithelium and start to grow biofilms. However, while all wounds (and catheterized bladders) are exposed to bacteria, not all become infected. The change in the growth pathway of bacteria in an environment where infection takes hold therefore has to be different than on tissue which does not become infected. We have developed a model of bacterial infection based around early stage biofilm formation and molecular genetic regulation of virulence factor secretion which we use both to qualitatively understand the process of infection and as a way to obtain early stage information about infection prognosis.

We are developing responsive devices which give clear, simple to understand colour change at early stages of wound and (catheterized) bladder infection. Three devices have been developed: an early stage prototype infection detecting wound dressing; a swab device for infection detection and a responsive lozenge which can be placed in the urine drainage bag of a catheterized patient which changes colour before catheter blockage.

### **Curriculum**

Toby obtained his PhD in corrosion research in 1995 from the University of Newcastle upon Tyne in the UK. He quickly moved from corrosion to working on model bio-membranes at the University of Leeds and as an Alexander-von-Humboldt at the Max-Planck Institut für Polymerforschung in Mainz, Germany. He obtained a faculty position at the University of Bath in 2000 and has been there ever since.

The overall theme of Jenkins' research is developing materials for diagnosis and treatment of bacterial infection. In particular point of care diagnostics, antimicrobial delivery systems and new therapeutic moieties (phage, lysins, plasma etc.). He works closely with clinicians, especially the burns team at the Royal Bristol Hospital for Children, with whom he is developing an infection detecting wound dressing. He is also interested in other acute wounds, chronic wounds, skin and urinary tract infections. In his research group he has material scientists, engineers, chemists and microbiologists. The group is focused on trying to solve real clinical problems.