



Short course

# Flow Cytometry for Microbiological Water Quality Analysis

16 June 2014

[www.cranfield.ac.uk/sas/flowcytometry](http://www.cranfield.ac.uk/sas/flowcytometry)

This one day short course is jointly organized by the RSC Water Science Forum and Cranfield University. The course introduces flow cytometry (FCM), a powerful diagnostic technology for rapid analysis of microbiological water quality.

## Introduction

Microbiological water quality is one of the greatest challenges for water providers with outbreaks of waterborne disease being hugely expensive. Efficient water treatment processes and system maintenance are key to achieving the goal of zero failures. Regulatory testing for microbiological water quality is currently based on traditional culture based methods, but only around 1% of bacteria are amenable to culture. The data is of limited value for making operational decisions due to the unreliability of results. Flow cytometry as a cultivation-independent method on the other hand detects all bacteria (independent of their culturability) and is thus ideally suited to pro-active collection of microbiological data about system condition and performance.

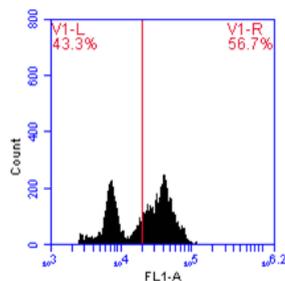
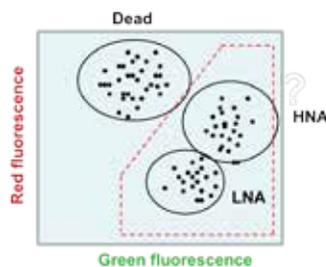
In addition to expert tuition from Cranfield University specialists, delegates benefit from insight from one of the leading experts in the field, Dr Frederik Hammes, and key water industry representatives currently applying the technology. The day will offer a practical introduction into sample analysis with the opportunity to analyse samples of interest (these can be provided by course participants).

## What will I gain?

Delegates will receive an in-depth introduction into the field of flow cytometry for microbiological water quality monitoring and gain expert insight from scientists already using this technology in both a research environment and for field based applications. Applications are diverse and range from assessing numbers of total and intact microbes in raw and finished waters, monitoring the efficiency of water treatment processes, optimising disinfection strategies and assessing the hygiene of distribution systems and regrowth potential of different waters/systems. Attending this workshop presents a unique opportunity to discuss the technology and its applications and to gain hands on experience in the practical application of the technique.

## Who should attend?

Employees of water utilities and academics wishing to utilize flow cytometry for water quality analysis. The course is suitable both for beginners of flow cytometry and people who have already acquired some basic knowledge.



## Course timetable

	Activity	Speakers
9.30	Registration and tea/coffee	
10.00	Welcome	
10.05	Introduction into FCM for microbiological water quality monitoring	Frederik Hammes
10.50	FCM for tap water profiling	Andreas Nocker
11.10	Break	
11.25	Flow cytometric monitoring of standard conditions and irregular events in drinking water systems	Michael Besmer/Frederik Hammes
11.55	Use of FCM to monitor microbiological drinking water quality	Simon Gillespie
12.25	FCM for distribution system monitoring	Andreas Nocker
12.55	Lunch	
13.50	FCM at Yorkshire Water	John Haley
14.30	Demonstration of sample processing and analysis in practice (laboratory)	Andreas Nocker
15.00	Hands on session (processing of samples of choice, laboratory)	All
16.30	Break	
16.45	Data analysis and discussion of questions	All
17.10	Current and future developments	Frederik Hammes, Andreas Nocker, Simon Gillespie, John Haley, All
17.30	End	

## Speakers

### **Dr Andreas Nocker: Lecturer in Microbial Diagnostics**

Dr Nocker's primary field of expertise is the application of cultivation-independent diagnostic methods to detect microorganisms of interest. A special emphasis in recent years has been the combination of rapid detection methods with the assessment of microbial viability. Within his diagnostic portfolio, flow cytometry has become an indispensable method for assessment of general microbiological water quality and for monitoring the efficiency of disinfection. His research in Cranfield is mainly geared towards drinking water microbiology.

### **Dr Frederik Hammes, Group leader in Drinking Water Microbiology, Eawag, Switzerland**

Dr Hammes is an environmental microbiologist, specialising in drinking water microbiology. His research interests include biological stability of drinking water, microbiological analysis of full-scale treatment and distribution systems, and basic research on disinfection processes. In addition, his research includes identifying new methods for analysis of drinking water bacteria, specifically flow cytometry and ATP analysis of suspended bacteria.

### **Simon Gillespie: Head of Scientific Services, Scottish Water**

Mr Gillespie has had a long career in applied science based mainly in analytical laboratories, with occasional forays into process science, in the nuclear, oil and water industries. Since 1989 he has worked for Scottish Water and its predecessor authorities leading teams in both chemistry and microbiology laboratories. He is a generalist, with degrees in chemistry, biology and geology and has been at the forefront of a recent initiative to introduce the use of flow cytometry in Scottish Water for monitoring the microbiological health of the drinking water network.

### **John Haley: Water Quality Compliance Manager, Yorkshire Water**

John has had a long career in the water industry mainly working in the areas of analysis, R&D, process optimisation and regulation, either for water companies or consultants. He holds degrees in chemistry and water resources, and in chemical analysis. Since 2000 he has worked for Yorkshire Water in water quality management roles at the interface between water quality, asset management, regulation and R&D. He also manages the Company's out-sourced laboratory services contract. He was Business Unit sponsor for the R&D project which introduced the use of flow cytometry as a technique for the assessment of the microbiological status of water.

## Fees

The standard cost for this one day course is £285. Discounts are available for multiple bookings and members of professional associations. Please contact us for more information.

## Further information

For details on course content:

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