

CHARACTERISATION

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Co-Chairs NWDRF-Characterization Working Group

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NWDRF- Characterisation Working Group Activities

Working Group Objectives

To address key concerns of the nuclear industry characterisation community, promote the adoption of good practice in all aspects of the characterisation process, and encourage a culture of continuous improvement

How?

- Promote and communicate good characterisation practice including relevant national and international developments in characterisation (guidance and practice) to the SLC practitioner community
- Promote and communicate developments in analytical and assay methodology
- Identify and recommend areas that require R&D to the NWDRF

PhD call Characterisation topics

- **In-Situ Analysis**

- Improved techniques for the surveillance and characterisation of plant, structures, waste, land and effluents for radiological and chemical contamination
- Remote (field sensing) for contaminated land, buildings, effluents and waste packages
- Improved detectors for more rapid analysis/more flexible deployment/improved information content etc.

- **Rapid and Automated Analytical Techniques**

- More rapid analysis methodology to support automation especially in labour-intensive areas of sample preparation and radionuclide separations to improve analysis cost, turnaround and improved supply-chain capacity

Key focus is on improved analysis/assay capabilities for alpha and beta radionuclides

In-Situ Analysis

Industry Need:

- Remote/Rapid Building, Plant, and Contaminated Land Surveillance
- Remote/Rapid Sampling Techniques for Hazardous Environments
- Improved and/or new techniques for in-situ analysis of contaminated land, buildings, effluents and waste packages



e.g. NDA Bursary supported PhD “Long-Range Scanning Based Detection of Alpha Induced Air-Fluorescence under Daylight Conditions (AI-AF-dc)” University of Lancaster

e.g. NDA Bursary supported PhD “Rapid and Accurate Assessment of Radiologically Contaminated Rubble”, Imperial College, London

Our Customers' "Wish List"

Generic Industry Needs:

- **Characterisation of Materials in Sealed Containers**
 - Improvements in existing non-destructive assay methods e.g. for Fuel/Fissile Material content in cans and other packages
- **In-Line, Real-time materials characterisation**
 - e.g. Fuel/Fissile Material content of sludge during transfer/pumping operations
- **Improvements in Real-Time/Near-Time 'rapid' analysis methods**
 - radiological and chemical analysis
- **Developments in simple universal sampling tools to collect representative samples from solids, liquids or sludges**
 - that can be deployed in constrained spaces (e.g. through small apertures) or at height and potentially in high radiation areas
- **Innovative ways of measuring or estimating the activity of a waste item or package.**

Bursaries awarded in the last round

2017 NDA Bursary supported “ Rapid On-Site Detection of radionuclides using Nanoparticle and Paper-Based Assays”, University of Loughborough – in progress

Develop the use of nanoparticles, lateral flow assays and nanopore technologies for multiplexed simultaneous detection and separation of radionuclides

2017 NDA Bursary supported “Radionuclide Alteration Behaviour of the Cement/Sub-Surface Interface: Key Controls on Mobility”, University of Manchester – in progress

To use geochemical, radiological and spectroscopic techniques to probe the speciation and mobility of radionuclides during cement alteration

Other Examples of Recent Bursaries

2016 NDA Bursary supported “ Development of Novel Test-Stick Extractant Technology for the Rapid Screening of Radionuclides”, University of Southampton– in progress

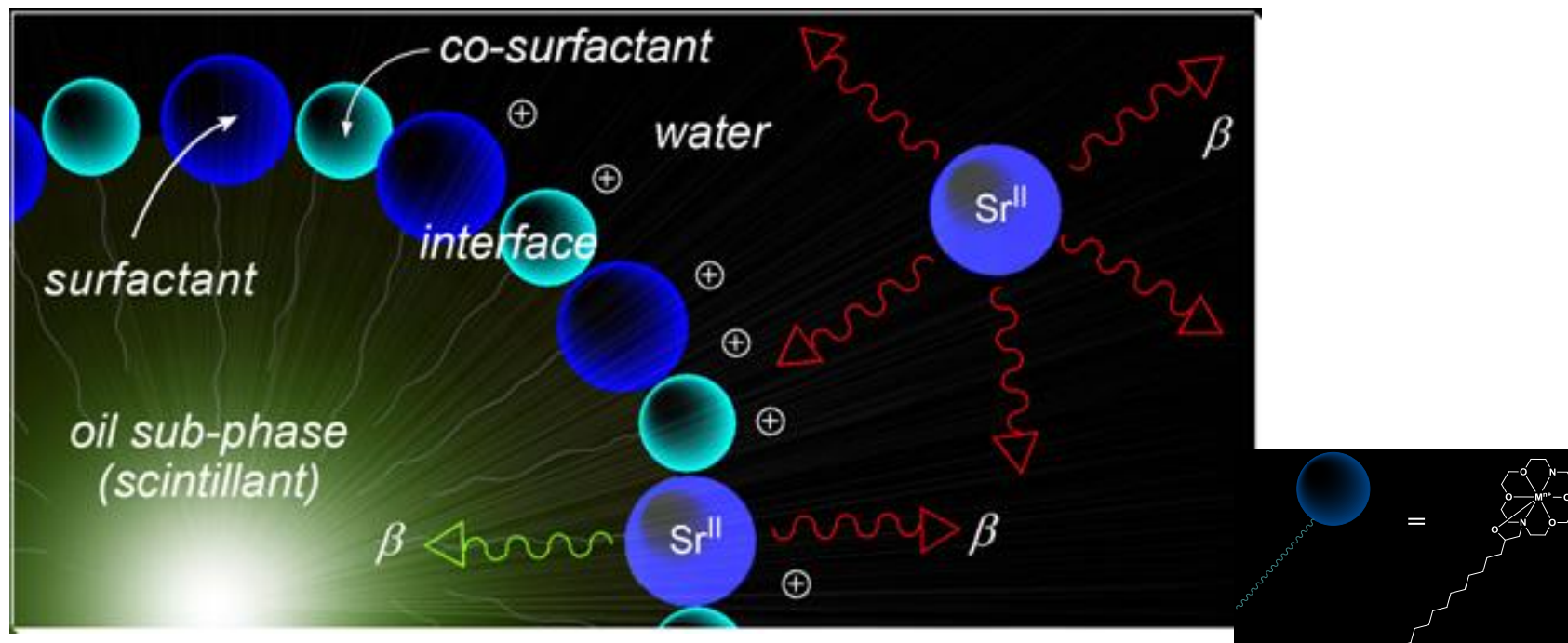
Develop methodologies based on combined Extractant stick and phosphor screen plate reading technology for the rapid separation, identification, and quantification of radionuclides wastes.

2015 NDA Bursary supported “In-situ Real Time Monitoring of Waterborne Low - Energy Betas”, University of Lancaster– in progress

Development of dual scintillator device for continuous monitoring of low-energy betas to high resolution for sea/groundwater

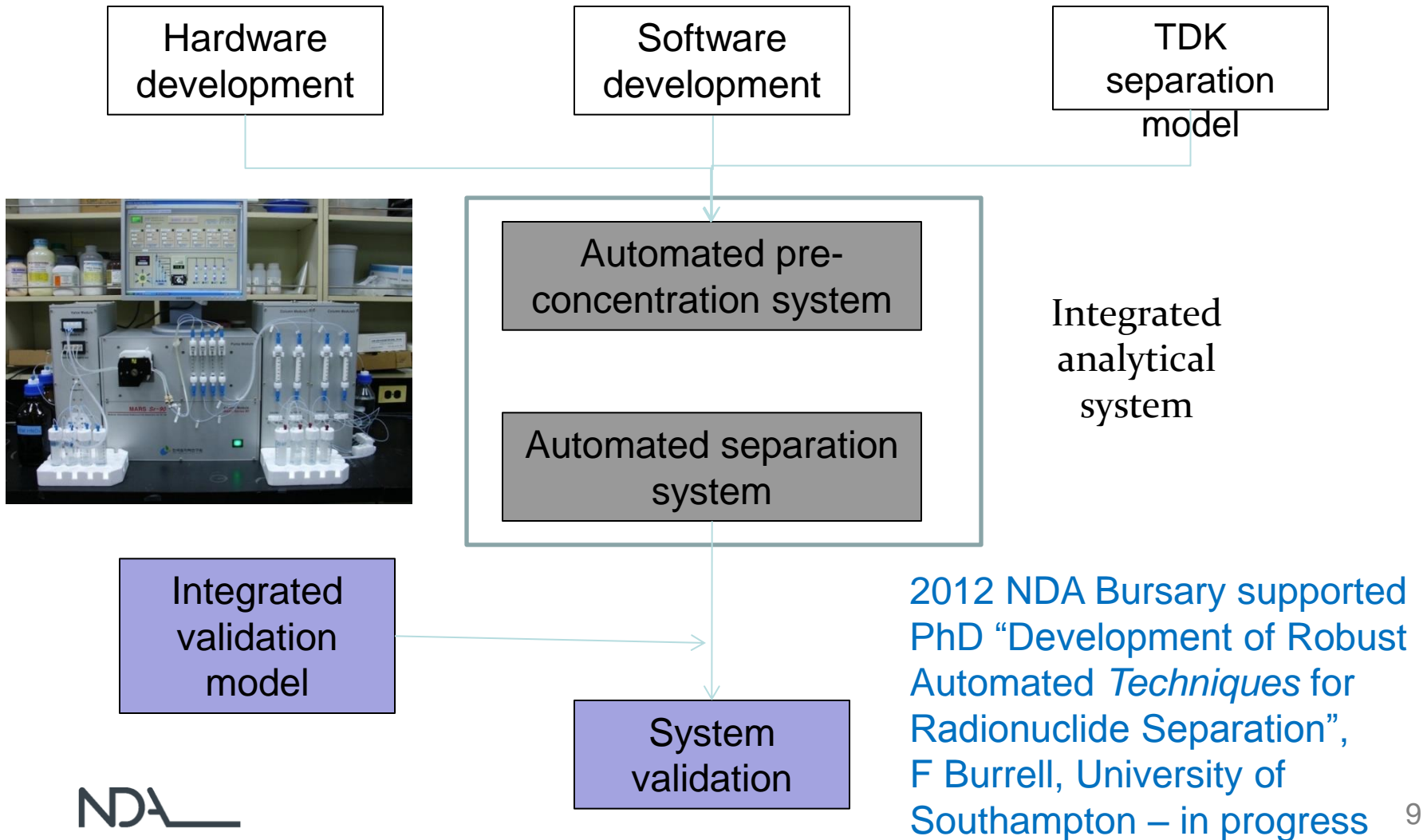
Rapid and Automated Analytical Techniques

2016 NDA Bursary supported PhD “Element specific smart media for fast, low-cost radionuclide analysis”, University of Cardiff – in progress building on earlier work to develop nuclide specific complexants



Courtesy of E.C. Stokes, I.A. Fallis, C.R. Harvey and S.J.A. Pope
School Of Chemistry, Cardiff University and J.J Andrew, DSRL.

Rapid and Automated Analytical Techniques



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Thank you – Questions can be submitted to the NNL and I will respond to them in due course

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