



Transformative Science and Engineering for Nuclear Decommissioning

# TRANSCEND: Collaborative Research Programme in Transformative Science and Engineering for Nuclear Decommissioning

## Overview and Progress

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Transformative Science and Engineering for Nuclear Decommissioning

## Background

- Project started 1<sup>st</sup> October 2018 to 30<sup>th</sup> September 2022, although 12 month extension applied for due to covid-19 impact and delays in accessing active facilities
- £4.59M EPSRC → total £5.73M, plus £3.70M from industry = £9.43M
- World-class University network:



- Key project partners and funders:



Engineering and Physical Sciences Research Council



# Research Areas

## Technical Themes

Integrated Waste Management (Leads: Claire Corkhill / Fred Currell):

- New Materials and Methods for Decontamination of Effluent / Modelling and Experiments for Understanding Pond and Silo Sludge / Behaviour / Wasteform Science

- Focus on areas relevant to hazard reduction and decommissioning

Site Decommissioning and Remediation (Leads: Becky Lunn / Luc Vandeperre):

- Colloidal-Silica Grout / Electrokinetic Ground Remediation / Non-Invasive Monitoring of Soil Contamination, Structural Degradation, Assessment and Repair

- Focus on new technologies for monitoring, remediation and containment to minimise volumes of waste for disposal

Spent Fuels (Leads: David Read / Tom Scott):

- Properties and Reactivity of Bulk Corrosion Products / Pressing Fuel Barrier Corrosion / In-Situ Identification of Nuclear Fuel Materials and Surface Corrosion Products / Prediction of Long-Term SNF Behaviour

- Focus on improved understanding and identification of properties of corrosion products and fuel barrier corrosion issues

Nuclear Materials (Leads: Colin Boxall / Nik Kaltsoyannis):

- Surface Chemistry of  $\text{PuO}_2$  under Conditions Relevant to Interim Storage / Plutonium Immobilisation in Advanced Ceramic Wasteforms

- Focus on option development: interim storage, and incorporation of Pu into wasteforms for disposition

## Cross-Cutting Activities

Facilities (Lead Neil Hyatt):

- Includes EPSRC / NDA / RWM funds for active work

Impact (Leads Jo Renshaw / Ross Springell and Impact Committee):

- Relationships and Networks
- Communication and Dissemination
- Public, Media and Government Engagement
- Training and Development
- Knowledge Transfer and Commercialisation
- Includes Flexi-funds



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## Progress (since last year)

### People:

- Joe Hriljac has moved to full time employment with Diamond Light Source, but maintains honorary position at Birmingham and remains in contact with research. Phoebe Allan has taken over as Birmingham lead, Fred Currell as Theme Lead (Integrated Waste Management)
- Laura Leay left to set up her own consultancy in written science communication
- Had a full cohort of researchers (40 projects), but 2 PhDs left (with 1 having been replaced), 1 PDRA left with post advertised

### Meetings and Publications:

- Leadership Team, Impact Committee and Management Board meetings held December 2020 and May 2021
- International Advisory Group meeting held October 2020
- Technical Theme meetings held December 2020 and May 2021
- In-person Annual Meeting planned for Harrogate November this year
- TRANSCEND session at Waste Management 2022 planned (UK featured country)
- Challenge-led meetings to focus on specific challenges within sector being organised on Pu and digital twins
- 2<sup>nd</sup> newsletter published January 2021, 51 journal and conference publications to date

Website – [transcendconsortium.org](https://transcendconsortium.org) / Twitter – [@Transcend\\_epsrsc](https://twitter.com/Transcend_epsrsc)



## Progress (since last year)

### Research Projects:

- Experimental researchers impacted by covid-19-related laboratory closures, numerical modelling work proceeding largely as planned (although not unaffected). Transferring extra funds for 3-6 month extensions to 4 experimental PDRAs most impacted
- Proposals for EPSRC/NDA/RWM funds for active work submitted, 8 out of 9 approved, 1 awaiting NDA approval
- Technical progress available on Gateway to Research

### Impact and Training:

- 2 BEIS secondments completed, 1 position advertised and 1 being negotiated
- Diamond Light Source and Korea Hydro & Nuclear Power added to International Advisory Group, negotiating including colleagues in Ukraine
- Set up YouTube channel, will include VR activity (joint venture leveraging RAEng funding), 3 videos about project (1 completed, 1 underway, narrated by Jim Al-Khalili), and interviews with researchers. Intention to continually evolve, adding modules on other projects
- Public outreach activity nearing completion, game being developed as route to providing public understanding of research and development needs, opportunities and solutions
- Proposal writing training for PDRAs and early career researchers to be held in conjunction with Annual Meeting

## What's Next

Need to catch-up on work impacted by covid, but extension gives us time

### PDRAs:

- 11 PDRAs EPSRC funded, 1 RWM funded, 1 PDRA position split so 13 in total
- 3 PDRAs were furloughed for short periods of time which helps
- Extra funding for 4 experimental PDRAs, more funding likely to become available
- 1 moved on to another contract temporarily, 3 receiving further funds from industry
- 1 finished (planned), 1 to be replaced

### PhDs:

- Research students will be main issue
- Some obtained UKRI-/university-funded extensions, some extra funding from industry

### In-Person Activities:

- Hopefully will be able to start up activities such as: attendance at science festivals; PDRAs industry placements; summer school training in public, media, industry and government engagement

### Output:

- Continue roll-out of innovative technologies that can be applied on plant
- Impact cases to provide information sheets for BEIS / publications

**DISTINCTIVE Consortium Awards:**

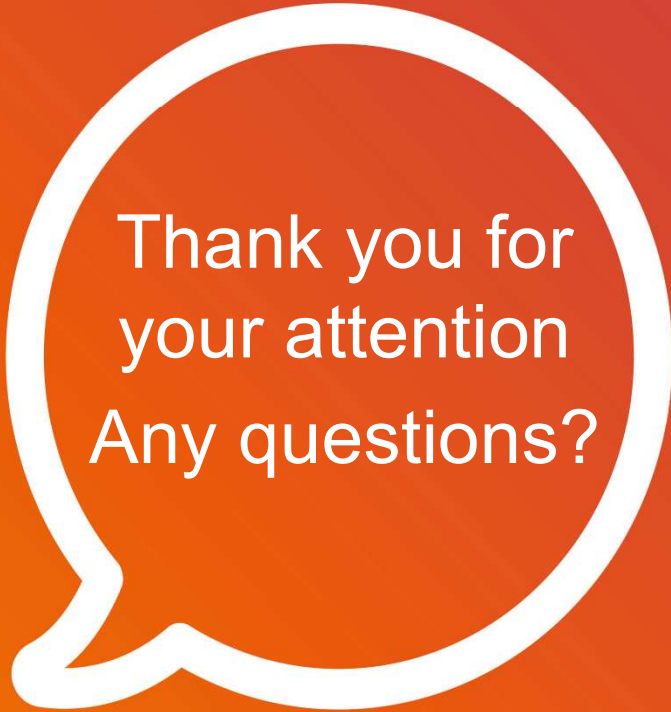
Royal Society of Chemistry, Industry-Academia Collaboration Award 2020

Institution of Chemical Engineers, Global Awards 2020, Public Engagement Award, Highly Commended

Institution of Chemical Engineers, Global Awards 2020, Team Award, Highly Commended

Stephanie Thornber, winner European Nuclear Society High Scientific Council PhD Award 2020

Antonia Yorkshire, winner 2020 Adam Neville PhD Prize



Thank you for  
your attention  
Any questions?