The NDA group

University Research Strategy

Why do we need academic research?

Decommissioning the UK's civil nuclear legacy is a complex job that will require several generations of workforce to undertake. At all levels of the business, we need dedicated people to enable safe operations on our sites on a day to day basis, as well as to plan years, centuries and even millennia ahead and understand how the work we do now will impact on the communities of the future.

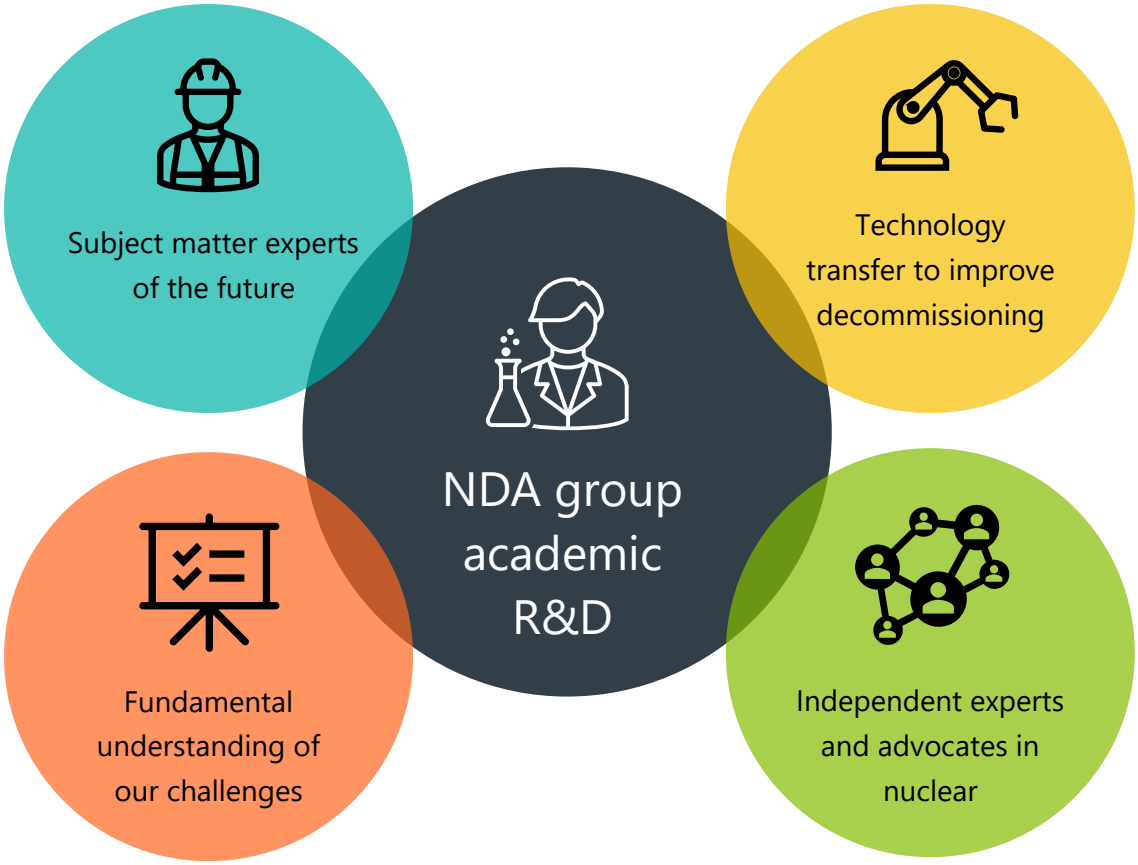
Our Subject Matter Experts (SMEs) across the NDA group and within our supply chain play a key role in all parts of our mission. We need people with high level skills ranging from modelling the surface chemistry of plutonium, managing our costs and safety, through to understanding the impact of decommissioning on local economies. Without these skills, we will not be able to do decommissioning faster, safer and more efficiently.

Postgraduate research in our national universities is a cornerstone in the development of the decommissioning Subject Matter Expert community. The researchers that we support throughout their academic projects typically go on to become specialists and leaders in our programmes and projects, take up roles within our supply chain who are essential to supporting on-site work, or stay on in academia to teach future generations about the challenges of decommissioning. Furthermore, through getting our own people involved in setting the research challenges and supporting the students throughout their projects, we ensure that they stay abreast of the latest thinking and make knowledge exchange happen at source.

University research also plays a unique role in the development of innovations to improve the efficiency of decommissioning on our sites. Whilst our industrial supply chain and our specialists across the NDA group have the ability to advance innovations through the mid to high Technology Readiness Levels, it is so often at academic institutions that these ideas are conceived and the fundamental underpinning research takes place.

Knowledge created through our academic research projects has underpinned strategic advice provided to government, helped us to develop better tools and techniques for dealing with our challenges and assisted us as a business to maintain our intelligent customer mandate. With a robust and diverse national high level

academic skills base, we will ensure that we can supply the nuclear subject matter experts of the future to deliver our mission.



What has changed?

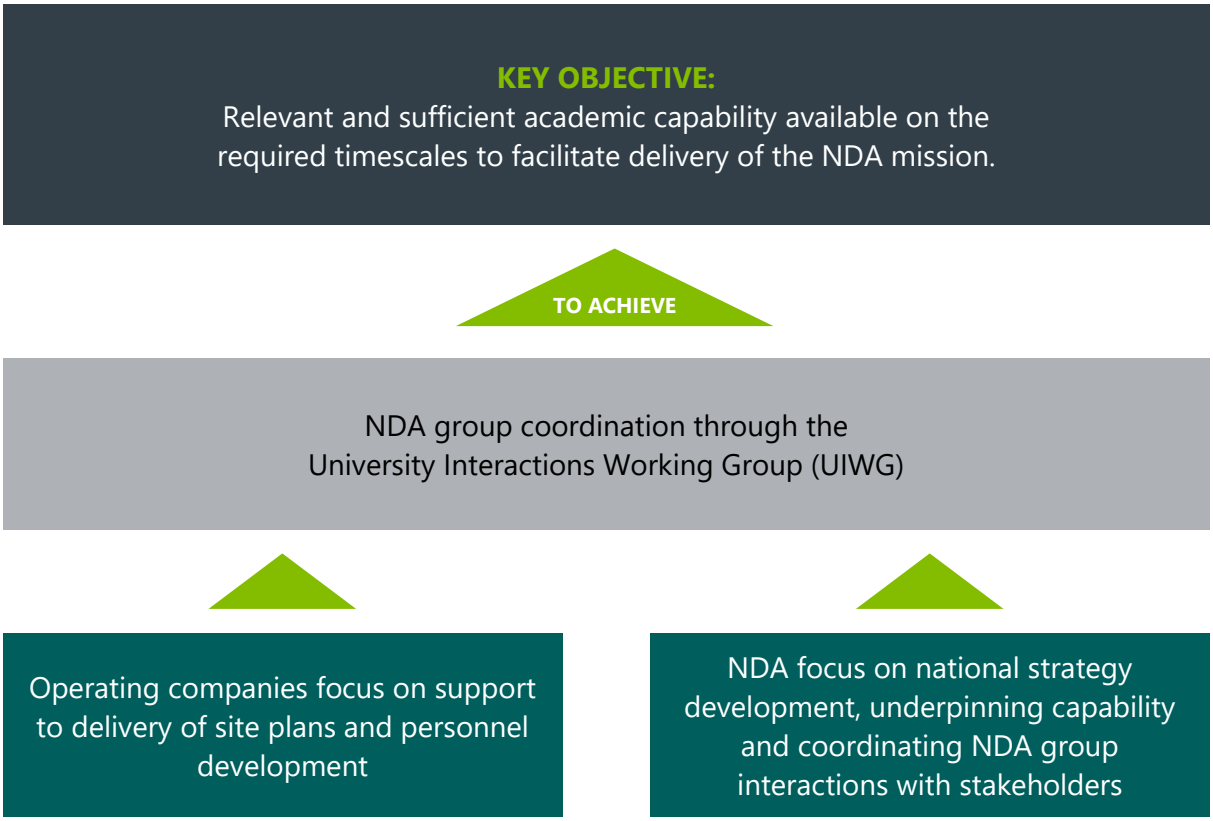
The first NDA University Research Strategy was formulated at a time when the Parent Body Organisation model was in place and our subsidiaries and SLCs were primarily focussed on their site-specific goals. With the formation of One NDA, now is the time to restate our group-wide academic research goals and develop the strategy to meet the needs of the business as a whole.

Other key developments that will influence the new strategy:

- **One NDA:** Bringing all of our sites back to subsidiary status is improving coordination across the group and the merging of SLCs is simplifying our group structure.
- **Brexit:** Academic research projects with EU colleagues have become significantly more complex following the UK's exit from the EU.
- **Expansion of NDA remit:** The UK's AGR reactor fleet will be transitioned into NDA ownership following cessation of generation and defueling.
- **British Energy Security Strategy:** Government strategy indicating that new nuclear will play a significant role in the UK's future energy mix – decommissioning will be a key factor.
- **Focus on sustainability:** Sustainability is now at the forefront of NDA operations – academic R&D will play a key role in the drive to a sustainable business.
- **Uncertainty around Research:** Council funding Targeted calls in decommissioning are ending and further ring-fenced funding is unlikely.
- **Formation of UK Research and Innovation (UKRI):** The UK Research Councils have been brought together under the umbrella of UKRI and are keen to exploit cross-council working.
- **National Nuclear User Facilities (NNUF):** Significant development of advanced active research facilities within UK universities and national laboratories.

A new approach

This new strategy facilitates the interactions of the whole NDA group with the UK's academic research community.



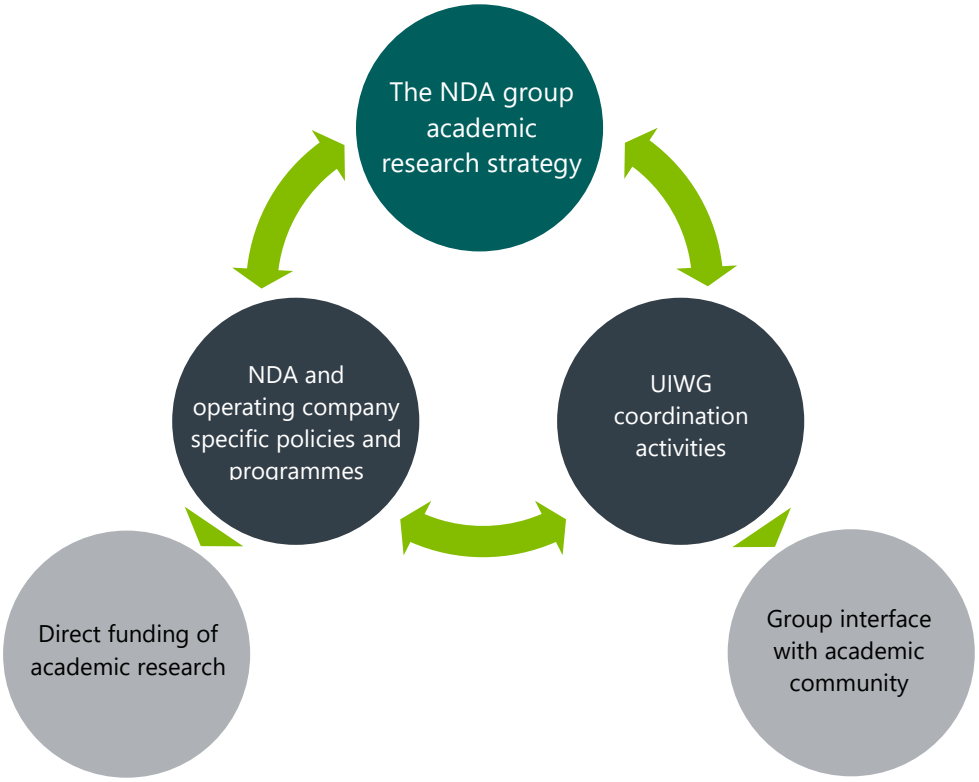
Whilst we expect to collaborate with other key stakeholders such as the National Laboratories, UK Research and Innovation, the Nuclear Innovation and Research Advisory Board and the wider nuclear industry to enhance our academic research portfolio, it is imperative that we as a business stay focussed on our key objective.

By being involved at all levels from setting the challenge through to developing long term academic partnerships, our programme managers and subject matter experts will enhance their knowledge and skills and guarantee that we retain our ability to identify, procure and act as an intelligent customer for new research to support the NDA programme.

Where appropriate, we will support the UK academic community in constructing research proposals relevant to decommissioning. This support may range from

providing advice through to leverage funding, and might apply to national open calls or specifically targeted opportunities.

This academic strategy will be common to the whole of the NDA group and will feed into the wider business plans.



Individual projects will focus on needs driven research as defined through processes such as the Technical Baseline Underpinning Research and Development (TBuRD) and Five Year R&D plans. By working with internal groups such as the Nuclear Waste and Decommissioning Research Forum we will be forward looking and use academic research to innovate and explore new opportunities for decommissioning. Examples of the key themes of research interest across the group can be found in the industry challenge documents.

Operating companies will be responsible for management and governance of their own academic research programmes. Input to, and output from these programmes will be coordinated through the University Interactions Working Group (UIWG) to prevent duplication, enable more strategic interactions in key skills areas and better sharing of outcomes.

The UIWG will act as the main interface between the NDA group and the academic community, associated programmes such as the National Nuclear User Facilities and other key academic research stakeholders such as UKRI, the national laboratories and regulators. UIWG will feed into the senior leadership level via the NDA group Technology and Innovation (T&I) Steering Committee and NDA group T&I Future Challenge Board.

How will we achieve this?

By talking

The people in our business are best placed to identify the key challenges facing decommissioning. We collate those challenges through mechanisms such as discussions with our colleagues and fora like the Nuclear Waste and Decommissioning Research Forum, then communicate them out to the academic community. There are numerous written documents but face to face interaction at meetings and conferences will continue to be an important part of this clearly articulating our challenges and needs, and making that information accessible to a wide audience.

The rest of our stakeholders are important too – we'll need to coordinate our efforts with those of the UK's National Labs, UKRI, AWE, BEIS, UKAEA and many others. This will ensure that we do not duplicate research effort and achieve best value for money to allow the whole industry to benefit and share with each other.

Through these communication routes, we'll influence key funding bodies to support decommissioning-relevant academic research.

By doing

Over the last 2 decades, the NDA group has developed a diverse range of mechanisms to support academic research. The annual NDA PhD Bursary call directly funds research that addresses business-wide challenges by bringing in academic creativity. Innovative concepts such as the Research Support Office and Centre for Innovative Nuclear Decommissioning put academic practitioners at the heart of the SLC operations and ensure two-way knowledge sharing by design.

We will continue to use, review and improve our direct funding mechanisms, learning from each other and sharing best practice across the group. Individual business units will maintain the portfolios and mechanisms best suited to supporting their site programmes. Where there are prospects for consolidating instruments for efficiency across the group, such as contract placement mechanisms, we will adopt these.

We will also look for opportunities to leverage and enhance external research programmes. By combining our funds, knowledge and experience with those of Research Councils, BEIS and the wider nuclear industry, we can build collaborative programmes that meet multiple objectives and have a sum far greater than the individual parts.

CASE STUDY

The TRANSCEND project saw 11 universities forming a consortium to address decommissioning challenges at the PhD and Postdoctoral level. The challenges were set by industry and research scopes defined by the academics. This ensured that the Research Council goals of doing novel science were met along with the industry problems being addressed. The £9.4m consortium was co-funded by the EPSRC, NDA group and participating universities.

Whilst the NDA group has a very specific mission directive, many of our challenges cut across multiple industrial and business management fields. We will look for synergies with wider industry and opportunities to get involved in research that can bring benefit to all parties.

CASE STUDY

The Research Centre for Non-Destructive Evaluation is an academic consortium working to improve NDE tools and techniques that are vital to many of our site operations, as well as other industries. The consortium is funded by multiple industries outside of nuclear as well as ourselves. Knowledge generated is shared equally across the members.

So, what do we get out of this?

Our key outputs are knowledge and people; knowledge to support ongoing operations and future plans, and people to turn those plans into decommissioning.

- Knowledge
    - Better understanding of our plants and processes
    - Underpinning evidence to inform our strategic advice to government
    - Strong safety culture
- People
    - Subject Matter Experts of the future to work on our sites and in our supply chain
    - Academics of the future to communicate our challenge to the next generation of students
    - Suitably Qualified and Experienced Personnel

CASE STUDY

Name: Matthew Nancekievill

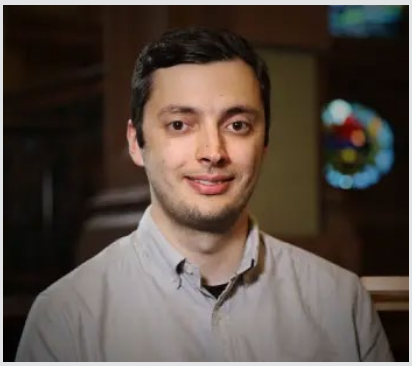
Timeline:

2013 to 2017: NDA sponsored PhD in robotics and underground sensors

2017 to date: Robotics engineer and researcher

- University of Manchester
- Royal Academy of Engineering Enterprise Fellow, 2021-22

Now: Co-founder IceNine – deploying robots to tackle real challenges at DSRL



To turn these outputs into outcomes, we will work closely with our colleagues across the NDA group.

Capability and capacity: We need to know where the business is facing shortages of SMEs and work with the HR teams to make sure that opportunities are available to absorb new SMEs when we create them.

Innovation: Many of our academic research projects will result in low TRL outputs with potential for development into more industry-ready technologies and techniques, including technology transfer from other industries. We will work with our Innovation specialists and make sure those opportunities are available for further progression of concepts.

Diversity: Academic research environments bring a freedom of thought that is unconstrained by the industrial environment. By getting our people involved in the research, we will maintain and improve quality, bring about intellectual diversity and help to promote innovative thinking.

Sustainability: With many academic research projects we expect outcomes on a 5-to-15-year timescale. Sustainability is all about the long term; by embedding our concepts with our students at the outset we guarantee they will be pulling the industry in the right direction in the future.

More information

Example industry challenge documents

- NDA 5yr R&D plan
- SL Future Research and Development Requirements
- Geological Disposal Science and Technology Plan
- NDA Strategy 2021
- Sellafield Ltd annual R&D review

Examples of mechanisms used to support academic research

INDUSTRY-LED INITIATIVES

- NWS Research Support Office
- Centre for Innovative Nuclear Decommissioning
- Centres of Expertise
- Direct postgraduate and postdoctoral funding

COLLABORATIVE RESEARCH PROGRAMMES

- Transformative Science and Engineering for Nuclear Decommissioning
- Research Centre for Non-Destructive Evaluation
- Industrial Cooperative Awards in Science and Technology
- Scottish Research Partnership in Engineering awards
- Impact Acceleration Accounts

CENTRES FOR DOCTORAL TRAINING:

- Growing skills for Reliable Economic Energy from Nuclear
- Nuclear Energy Futures