



innovate

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Celebrating Technical Success

Taking place in Manchester, the second NNL Technical Conference has been declared a great success. The annual conference forms a key part of the strategy to showcase and raise NNL's scientific and technical profile and demonstrate capability to both an external and internal audience.



Dr Mike Carrott, winner of the NNL BEST Award

The programme for the day featured extensive technical contributions from the NNL businesses and the corporate research and development programme. The presentation of the NNL BEST Award took place during the conference (see page 12) and a technical poster competition was also included in the programme for delegates to enjoy and ultimately choose a winner.

Led by Chief Scientist Andrew Sherry and by NNL's Chief Technologists, the packed programme featured defined sessions in each of the NNL business areas. Chief Technologists manage and support the expansion of NNL's technical leadership and capability.

The keynote address was delivered with customary passion and knowledge

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Celebrating Technical Success *(continued from front page)*



In addition to speakers and posters, there were some interactive displays for people to try. Here, delegates try their hand at a robotic simulator

by Dame Sue Ion, Chair of the Nuclear Innovation and Research Advisory Board (NIRAB) and former Technology Director at British Nuclear Fuels plc (BNFL).

Established by Government, NIRAB provides independent and expert advice on the research and innovation needed if nuclear energy is to play a significant role in the UK's future low carbon and secure energy mix. NIRAB also advises on the creation of an environment that enables the nuclear industry to contribute significantly to the UK's economy.

The second external speaker was Mark Hartley, Engineering Director from EDF Energy Generation. The theme of Mark's talk was 'EDF Energy nuclear R&D and the importance of a national laboratory'. Mark described the importance of NNL's contribution to high end skills and supporting EDF Energy's current and future operations.

In the poster competition, an extensive gallery of entries was made available to view. Each was given three votes to nominate the best poster. The clear winner was judged to be 'Ultra-Fine Bubbles (Nano Bubbles)' by Jonathan Dodds.

Jonathan's poster described how a glass of water could be responsible for the chemical free clean-up of contamination. Recent developments in bubble technology

are enabling scientists and engineers to achieve great results and the winning poster described progress in very clear language and graphics.

The conference programme also included extensive networking opportunities and early post conference feedback has been very good with some learning points for next time. To view this year's posters and presentations along with everything you need to know about NNL, please visit nnl.co.uk.

If you did not attend, but would be interested in coming to next year's event, please contact Peter O'Brien at peter.o'brien@nnl.co.uk for more details.



Dame Sue Ion was among the external speakers that were invited to the conference.

Q A

with Suzy Morgan, Technical Team Leader, PIE and Materials, Windscale



What does your job involve?

I'm responsible for managing a team of people who perform Post Irradiation Examinations (PIE), specifically optical microscopy, on irradiated materials such as spent fuel, reactor graphite and steels.

My team works in the active handling facility at NNL's Windscale Laboratory, so the majority of the work is performed remotely within heavily shielded cells. The facility is featured in a new online tour on the NNL website (www.nnl.co.uk - see page 9). The team produces data for use in safety cases and we also work on internal strategic and signature research programmes. We're currently looking at ways to examine highly active glass based waste products fabricated from spent fuel.

In addition to managing the throughput of work within the cells, I'm also a technical lead for the metallography area, where my responsibilities may vary from advising on technical issues arising from PIE results, to equipment requirements and design for the hot cell. I also chair a technical advisory group looking at additional PIE techniques either for improvement or development and hold a visiting lecturer position at the University of Sheffield, which involves teaching materials engineering students some of the skills required for industry.

How long have you been in the nuclear industry (or with NNL)?

Nine years with NNL, although my PhD was sponsored by British Nuclear

Fuels plc (BNFL) and postdoctoral research was performed on behalf of the Nuclear Industry Radioactive Waste Executive (NIREX). BNFL was the fuel cycle services company and NIREX was looking at deep geological waste disposal. The NIREX role is now carried out by Radioactive Waste Management Ltd. To date I have a total of 14 years working in nuclear related fields.

How did you come to be doing the job you have now?

As I'd been sponsored by BNFL during my PhD, I was invited to apply for a job, which was great. I was offered a post and started working in the PIE materials team at Windscale, looking at corrosion of irradiated steels in simulated storage pond water conditions. Once that project was completed, I started working on Advanced Gas Cooled Reactor (AGR) PIE and performing optical microscopy characterisation. I began managing the materials PIE team around five years ago.

What do you hope to be doing in five years-time?

We're looking to develop the NNL PIE business and deliver a wide range of projects for customers. I hope I'll be managing a large and diverse team of materials and PIE specialists, who are able to deliver a range of characterisation techniques on a variety of materials.

I'm also looking to be part of a PIE team with increased research links with other international nuclear labs and

UK Universities. It's important to be able to continue to develop both the team and the work.

What aspects of your job do you like the most (and the least)?

I really enjoy the technical challenge of developing, and sometimes re-instating, techniques which require specialist active handling skills. I do miss being on the Windscale Laboratory cave face on a more frequent basis and using the Master Slave Manipulators (MSMs). The MSM is a mechanism that enables the operator to carry out work in a radioactive area from outside of the cell. It's quite a skill to operate the MSMs and enjoyable too.

Tell us something about yourself that people may not know ...

My favourite bands are (still!) Nirvana and Guns N' Roses... I'm probably still stuck somewhere in the rock and grunge era of the early 1990s!

Who or what has been a big influence on your career?

When I started my PhD and then my time with NNL, I worked with the late Ivan Owens, NNL's Head of Spent Fuel and Waste Technology. He always had time to spare for me if I had any problems, or just to have a chat even though he had a large team and portfolio of work to manage. It left a big impression on me and I remember thinking that the way Ivan helped me was something to aspire to in my own career.

What advice would you give to someone thinking of joining the nuclear industry?

I think now is a good time to be involved in nuclear. There are a lot of opportunities for building and developing a career and not just around the areas focused on new build.

For instance, we have a challenge to keep the current reactor fleet running

in the UK and to thoroughly assess fuel storage and disposal options for those reactors. I would also say that a nuclear related qualification isn't completely necessary to be successful within the industry. We're always on the look-out for talented and resourceful people.

What do you do to relax outside of work?

I enjoy getting away and doing some

fell walking and cycling in the Lake District National Park. It's brilliant to have such a fabulous landscape very close by in Cumbria.

What is the first thing you pack to take with you when you travel away from home?

A local guidebook!

NNL Leading the SMR Debate

NNL has made an influential contribution to the debate about the potential use of Small Modular Reactor (SMR) technology in the UK. The long awaited feasibility study was produced with Government by a consortium project managed by NNL and led by independent project director Gordon Waddington.

The consortium was made up of a formidable array of diverse contributors including NNL, AMEC, Atkins, KPMG, Lloyd's Register, the Nuclear Advanced Manufacturing Research Centre, Rolls-Royce and The University of Manchester.

The work considered four SMR designs in detail against challenging criteria based on technical, financial, market, innovation and commercial assessments. The designs under the microscope were the ACP100+ (designed by CNNC), mPower (Babcock & Wilcox and Bechtel), Westinghouse SMR (Westinghouse) and NuScale (Fluor).

The report concluded that there is an opportunity for the UK to regain technology leadership in the ownership and development of low-carbon generation and secure energy supplies through investments in SMRs. Also, there is a very significant

market for SMRs where they fulfil a market need that cannot be met by large nuclear plants. The size of the potential SMR market is calculated to be approximately 65-85 GW of new capacity by 2035, valued at between £250Bn and £400Bn, if economics prove competitive.

The report states that the UK market for SMRs could be around 7 GW of power on the same timescale and 'first-of-a-kind' SMRs could be cost comparable with conventional nuclear build. There is the potential for SMRs to become more cost competitive as more are built. However, the report concludes that further evidence is required to make a policy decision or to support business in considering an investment.

NNL Managing Director, Paul Howarth said: "SMR technology has the potential to play a substantial part in the UK's clean energy future and also to help boost UK wealth creation by virtue of the significant scope for UK companies to be part of the supply chain for SMR systems.

"This feasibility report is an important step on the way towards recognising the role which SMR designs can play and helping to capitalise on the opportunities offered."

The outcome of the NNL led study is helping to inform the next steps in the development of Government's policy approach to SMRs.



Raring to Go - NNL Technology Commercialisation

As a commercially-operated national laboratory, NNL chooses to invest a proportion of profit back into an innovative research and development programme.

While much of the programme is focused on fundamental research, part of its scope is directed towards entrepreneurial research. As a research intensive organisation with an enviable breadth and depth of research capability, NNL is looking for ways to maximise the application of research and deliver tangible benefits to the nuclear industry and wider afield if possible.

NNL has recently bolstered its Technology Commercialisation team with a couple of exciting new appointments. The team is based in Strategic Business Development and members are responsible for engaging with NNL scientists and engineers, encouraging new, innovative ideas and appraising them to find market-led applications.

They are geared up to find the next game-changing technology for the industry. By working in co-ordination with and responding to customers, NNL's aim is to deliver improved products and services to support the industry's end-users.

Paul Collings is Head of Technology Commercialisation and has recently returned to NNL from secondment at the Nuclear Decommissioning Authority (NDA). He said: "Innovation is at the forefront of the Government's growth agenda and has a key role in the Nuclear Industrial Strategy for the UK.

"Our customers also need technology innovations that deliver value



NNL's Technology Commercialisation team l-r: Paul Knight, Tim Whitworth and Paul Collings

and provide timely solutions to their technical risks. Hence, it's an exciting time to be involved in the development and validation of innovations to arise from the world class research base we have at NNL."

Paul is supported by **Paul Knight** and **Tim Whitworth**. Paul Collings and Paul Knight are based at NNL's Workington Laboratory while Tim is based at NNL Risley in Chadwick House.

Paul Knight has been working in Technology Commercialisation for a couple of years. He joined the team after several years managing NNL's waste management projects in support of Sellafield Ltd operations. Tim is NNL's very recent recruit and joins the team after working in the Commercialisation team at the University of Sheffield. Technology Commercialisation works closely with NNL Innovation Lead **Owen Horsfall**.

With the team at full strength, they will proactively seek opportunities for viable technologies and, where necessary, collaborate to improve the NNL offering.

Paul Collings added: "At present, we have a good mix of internally-developed ideas and projects in collaboration with Universities, SMEs and our customers.

"The challenge for us is to build on the good work to date by ensuring we are rigorous in commercialising outputs for NNL and seek opportunities for new innovations or new customers.

"It's quite a challenge but one that we're relishing."

For further information on NNL's Technology Commercialisation process, please contact **customers@nnl.co.uk**

Chief Scientist Making His Mark

Having joined NNL as Chief Scientist late last year, Andrew Sherry has been creating quite an impression inside and outside of NNL. He visited Japan recently alongside Geraldine (Gerry) Thomas, Professor of Molecular Pathology at Imperial College London.

The focus for the visit was public communication on nuclear energy. For the past couple of years, Andrew has been involved with the UK Nuclear Industry Council (NIC) and has led the Council work stream on Public Understanding of Nuclear Energy (PUNE). This work has resulted in a report 'In the Public Eye – Nuclear Energy and Society'.

The report outlined a high level strategy for the UK Government, the industry and other stakeholders to work together to ensure that public confidence in nuclear power is strengthened and the benefits to society in terms of electricity generation, jobs and the economy are recognised.

It was also recommended that a small Steering Group be set up consisting of communication professionals from the NIC membership. This group is developing a nuclear energy public engagement and communications programme with Andrew again leading.

This means his views are of prime interest to the Japanese in advising on nuclear energy communications. Public support for nuclear energy has quite understandably taken a hit in Japan following the damage sustained by the Fukushima Dai-ichi power station in 2011 after the country was hit by a devastating earthquake and tsunami.

Alongside Andrew, Gerry Thomas was also involved with the PUNE work in the UK and was a major media contributor



following the events in Japan four years ago. During their week in Japan, Andrew and Gerry gave briefings to the international press on the anniversary of the earthquake and tsunami and to the regional and national media in Osaka.

They also met with workers at three of the major energy utilities – KEPCO, TEPCO and Chubu – and discussed nuclear communication with a women's group in Fukui. This is the prefecture where one of the first Japanese nuclear power station restarts is due to take place at Takahama. Andrew and Gerry also presented at an energy education event in schools.

There was the opportunity for discussion with a considerable number of nuclear energy academics and experts and meetings were held with senior officials from Government departments. Although their schedule was very busy, they were able to reach out to the public and also to senior decision makers and influencers across the Japanese Government and nuclear sector.

There was real value in going out and talking to people in local communities. Feedback suggested that people in Japan are grateful for support and are

keen to learn from UK experiences. This highlighted the value of overseas input into the Japanese debate on nuclear energy.

Back in the UK, Andrew was also involved in a strong delegation that met with Patrick McLoughlin, Secretary of State for Transport.

Mr McLoughlin was visiting the Dalton Cumbrian Facility (DCF) to underline the Government's commitment to nuclear research and development. DCF is part of the University of Manchester's Dalton Nuclear Institute and prior to joining NNL Andrew was the Institute's Director.

DCF will feature pioneering academic access to NNL facilities at the Central and Workington Laboratories. NNL with DCF are core contributors to the new National Nuclear Users Facility (NNUF).

In his Autumn Statement, the Chancellor of the Exchequer George Osborne committed £60M to the growth of the NNUF, which was initially created via the Engineering and Physical Sciences Research Council (EPSRC). Alongside facilities provided by NNL and DCF, the NNUF also uses equipment based at the Culham Centre for Fusion Energy (CCFE).

In addition to meeting Andrew, Mr McLoughlin toured the DCF and was given demonstrations by students and postdoctoral researchers of new technology to highlight advances in research.

The Secretary of State reinforced the importance of training, innovation and technology transfer and the positive impact of research. He was particularly impressed by the Innovus programme, a joint initiative from NNL and The University of Manchester to create employment by moving research ideas forward from concept to commercialisation and then application.

NNL Prominent at UKTI Showcase

NNL sent a strong delegate team to the UK Trade and Investment (UKTI) Civil Nuclear Energy Showcase in London. The fourth event of its kind, the Showcase presented a unique opportunity to meet senior international decision makers from key overseas nuclear markets representing Governments, utilities, nuclear vendors and industry.

NNL participates in UKTI's nuclear high value opportunities programme that includes China, Japan and Vietnam and also supports trade missions in a group of countries prioritised by the Departments of Energy and Climate Change, Business Innovation and Skills and the Foreign and Commonwealth Office.

Over 20 countries were represented at the Showcase including China, Japan, Vietnam, Bulgaria, France, India, Poland, Romania, South Korea, Turkey and the USA. In the weeks leading up to the event, NNL hosted high ranking delegations from China, Vietnam and Poland.

Last year, NNL signed a Memorandum of Understanding agreement with the China National Nuclear Corporation (CNNC) and the visit to NNL and UKTI Showcase provided more valuable opportunities to meet face to face.

NNL and CNNC are exploring areas for mutually beneficial



NNL meets CNNC

collaboration in a variety of aspects of the nuclear fuel cycle.

The UKTI Showcase programme covered UK capability across the nuclear fuel cycle. Delegates learned about international nuclear projects and were able to develop new contacts through a series of market briefings and one to one networking.

NNL was prominent over the three days with MD Paul Howarth leading on key sessions. Adrian Davis-Johnston, Engagement and Programme Manager for the Innovus technology commercialisation initiative made a well-received presentation and NNL sponsored a number of networking opportunities.

Read All About Us - NNL Science

We are delighted with the excellent feedback received so far on NNL Science. The journal highlights and shares the exciting scientific and technical work being carried out by NNL.

Three issues have been published so far and are available via the NNL website. The latest edition in the series (Issue 3) features more excellent examples of technical work being undertaken by NNL for customers and via the internal research and development programme.

There is a strong collaborative theme throughout highlighting the value created by scientific partnerships when sharing complementary facilities and capabilities. The main article is focused on NNL's computer modelling expertise being used to build a predictive capability for a key industrial nuclear plant - the Sellafield Ion Exchange Plant (SIXEP).

Check out all three issues of NNL Science and a suite of other publications at www.nnl.co.uk/publications



Tim's the Space Seminar Star

A select audience at NASA's Jet Propulsion Laboratory (JPL) in Pasadena, USA witnessed a high level presentation from NNL Business Leader Tim Tinsley on the European 'space battery'.

JPL has extensive experience in the use of nuclear power for space applications and continues to manage the Voyager, Cassini, and Mars Science Laboratory (MSL) spacecraft. Each of the vehicles features nuclear power sources.

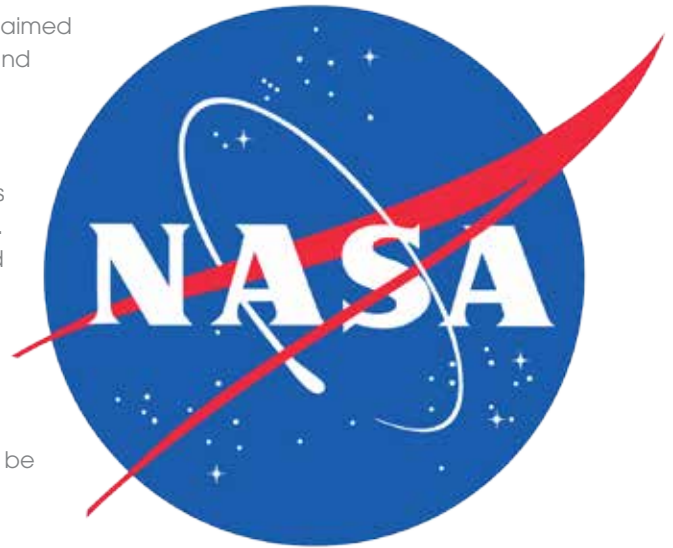
Tim was invited along with Richard Ambrosi, from the University of Leicester, to deliver a talk covering the European initiative to produce a new generation of space battery. Last year, NNL was awarded further work by the European Space Agency (ESA) to examine the

technical feasibility of using americium in a Radioactive Thermoelectric Generator (RTG) or space battery to power future generations of European led space missions.

The JPL seminar was aimed at mission planners and spacecraft system engineers who are developing plans for future space missions powered by nuclear. The event also raised awareness about the availability of a potential European device and the types of missions that it could be suitable for.

While at JPL, Tim and Richard were also treated to a tour of

facilities, including the mission control room for Voyager, Cassini and MSL and various models and displays of spacecraft.



Annual Review Published

NNL has published its 2014 Annual Review, giving details of performance in key areas in the past year. The editorial includes commentaries on progress and performance by NNL Chairman Richard Maudslay and MD Paul Howarth.

Also included are a full business review, strategic objectives, financial overview, sustainability report and update on NNL people.

Richard Maudslay commented: "Significant changes heralded at the end of the 2012/13 financial year came into effect during 2013/14 making this a transformational year for NNL.

"Despite some challenging times in the sector and the considerable changes we went through as a business, I am very pleased to report that once again we were able to record a significant profit."

Paul Howarth added: "This has been a very positive year for NNL and for all of the people associated with the business.

"The new Government-Owned, Government-Operated model is testament to Government's faith in NNL as the 'go to' organisation on nuclear fission."

See the Annual Review, other publications and a wealth of other information by checking out www.nnl.co.uk/publications



NNL Explores Advanced Reprocessing

While nuclear fission technology is generally considered to be at a mature stage of development, there are still advances being made across the fuel cycle.

These developments help meet the challenges of future energy demands and security of supply. They make improvements in the efficiency and safety of nuclear operations and clean-up. And they also support long term waste management solutions including disposal and other areas such as radiological-nuclear threat reduction.

NNL has many years of experience in the nuclear fuel cycle and associated science and technology. This puts NNL in an ideal position to advise decision makers on key topics, making an important contribution and supporting the UK's ability to meet nuclear challenges.

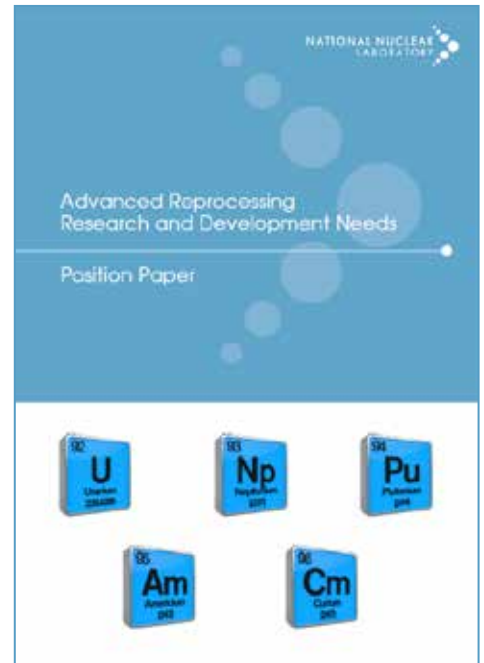
NNL is expressing views on a range of key topics in a series of Position Papers.

The papers reflect NNL's independent and authoritative view and are supported by underpinning studies.

The latest paper '**Advanced Reprocessing – Research and Development Needs**', covers the options to 'close' the fuel cycle in the 21st century. The anticipated growth of nuclear energy will result in substantial quantities of used nuclear fuel being held in storage.

Disposal of used fuel in a Geological Disposal Facility (GDF) towards the end of the 21st century, or later, is a feasible route and is described as the so-called 'open' (once-through) nuclear fuel cycle.

'Closed' nuclear fuel cycles use advanced reactor and fuel recycling technologies to offer an alternative solution to deal with used fuel. They also improve the sustainability of nuclear energy and minimise the volume and impacts of heat generating high activity wastes to be disposed of in the GDF.



The latest NNL position paper discusses the issues with specific reference to the potential pathways for nuclear energy in the UK and considers the implications for UK R&D in advanced reprocessing. The paper is available via the NNL website at www.nnl.co.uk/positionpapers

NNL Website - Windscale Takes Centre Stage

Recently introduced on the NNL website, a new tour of the Windscale Laboratory features 360o photography and process animations. The new tour complements the already featured tour of the Central Laboratory.

The website is designed to work on a range of mobile devices and contains a wealth of material about NNL, our work and our people.

Why not take a look at <http://windscale.nnl.co.uk>



Setting the Standard at Windscale

At the Sellafield site, the Pile Fuel Storage Pond is one of the four Legacy Pond and Silo facilities.

Site operator Sellafield Ltd is focused on the safe decommissioning of the PFSP as part of the site hazard and risk reduction programme.

NNL is supporting Sellafield Ltd to safely decommission the facility.

In 2012 the retrieval of canned fuel from the PFSP was accelerated. The operation was undertaken to prove retrieval techniques and underpin the treatment route.

The legacy fuel was transferred to NNL's Windscale Laboratory to enable the cans to be opened, fuel removed and then repackaged into modern containers.



Pile Fuel Storage Pond



Extended view of the PFSP

The Windscale Laboratory is a high-active facility, offering a range of services including post irradiation examination of nuclear fuel, radioactive waste processing and management as well as materials analysis and mechanical testing.

The PFSP work was scheduled to allow NNL to conduct a refurbishment programme in the Windscale Laboratory.

The refurbishment programme has seen a major import/export section of the plant thoroughly modernised to ensure it can safely manage historic fuel.

In addition, a new crane has been commissioned to enable efficient operations for the remaining operational life of the facility.

Following the successful refurbishment, carried out over two years, the PFSP work has resumed successfully at Windscale.

Since operations restarted, the NNL team at Windscale has played a key role in delivering an excellent service to the customer receiving over 100 fuel cans so far.

In challenging circumstances, the team worked incredibly hard. Their success is a great example of commitment and teamwork and earned them a very well-deserved internal IMPACT Award as joint Team of the Year.

Workington Hosts Robot Technology Trials

NNL has been leading a collaboration to successfully evaluate robot technology and its potential to be used in a new plant at Sellafield. The Box Encapsulation Plant (BEP) is due to be commissioned in 2017.

The Remote Engineering Team based at the NNL Workington Laboratory has been examining the suitability of robots to handle nuclear waste feeds to the new BEP plant. The robots are already available on the market and are most commonly used in foundries and on car production lines.

They have proved so successful in the trials at Workington that customer Sellafield Ltd has endorsed the use of robots in BEP and further development and proving is underway.



Robot evaluation at NNL's Workington Laboratory

The NNL Workington Laboratory is a dedicated facility for non-radioactive test rig activities carried out on behalf of customers. NNL led the robotics collaboration working with Sellafield Ltd and robot suppliers KUKA Systems (UK) Ltd, Nuclear Sciences Group and Nuclear Technologies. The trials are designed to prove that the robots meet the necessary operational functionality.

The work is helping to determine that the robots can pick up, move and place simulated nuclear waste in a test environment. The way the robots can be operated, their reliability and maintainability can also be assessed.

Engineering work associated with recovering failed robots and removing them from a typical Sellafield plant environment before replacing them with a functioning robot has also been undertaken and further work is planned.

The 'off the shelf' robots are readily available and proven units are in use all over the world and in a variety of different environments. Robots of this type have been demonstrated to be robust, reliable and easy to operate. The trials have covered the critical areas necessary to demonstrate that the use of the units is a viable option for BEP.

The BEP project is being delivered as an integral part of the Magnox Swarf Storage Silo (MSSS) programme, which is tackling the clean-up of a key legacy facility on the Sellafield site. When complete, BEP will deliver the capability to treat nuclear waste recovered from MSSS, immobilise it and prepare it for long term storage.

In addition, the BEP plant may also process waste recovered during the decommissioning of other significant Sellafield facilities including the First Generation Magnox Storage Pond and the Pile Fuel Storage Pond.

The trials have been a high profile development project showcasing the capability available at the NNL Workington Laboratory and the people working there across a series of disciplines. High quality results provided by NNL Workington, safely and to a very challenging timescale, made the decision very clear-cut to continue with further development on robotics.

For their hard work, dedication and achievement of excellent results, the team celebrated a great year by winning an internal IMPACT Award for joint Team of the Year. They picked up their award at the IMPACT Awards dinner and ceremony in Manchester in front of an audience including customers from Sellafield Ltd.



Proving to be a viable nuclear option

NNL Scores at WM 2015

Regarded as the premier international conference for the management of radioactive material and related topics, WM 2015 took place in Phoenix, Arizona in March.

As a silver sponsor, NNL was prominent at the five day event and fielded a strong team of delegates. The NNL team participated in three separate panel sessions and co-chaired six others. In addition, NNL presented three posters and a number of joint papers.

A dinner with the Pacific Northwest National Laboratory (PNNL) was hosted by NNL and there was also participation in a joint dinner with the US Department of Energy (DOE) and the UK's Nuclear Decommissioning Authority (NDA).

While in Phoenix, NNL attended the DOE standing committee meeting alongside NDA. The standing committee is chaired by Dr Monica Regalbuto, a recent visitor to NNL in

the UK (see page 26). The meeting in Phoenix reflected the excellent progress made by NNL over the past three years with respect to collaboration in the USA.

NNL also took part in a number of 'sidebar' meetings at WM 2015, particularly with the Australian Nuclear Science and Technology Organisation (ANSTO), CEA, Kurion, UKTI, Eckhart and Zeigler, KUKA, Arvia Technology and others.

A number of orders for services were secured by NNL at the event from Bechtel and the Idaho National Laboratory (INL). This is in addition to recent work related to the vitrification of high level waste management processes for DOE. NNL is also using its own internal research and

development funding to work with DOE on the development of a fabrication process for accident tolerant fuels.

NNL's Head of Marketing Keith Miller was heavily involved in the planning of WM 2015 as a co-chair on the Programme Advisory Committee (PAC). Chief Technologist Anthony Banford also sat on the PAC. Keith acted as co-ordinator for the NNL delegate team throughout WM 2015.

WM 2016 will see the UK as the featured country (at WM 2015 it was France). Keith and Anthony will again represent NNL on the PAC. They will produce a full report on WM 2015 and a forward strategy to maximise NNL's involvement at WM 2016.

BEST Man Mike

Celebrating the Best External Scientific or Technical paper published by NNL, the presentation of the annual NNL BEST Award took place recently at the NNL Technical Conference.

Many Congratulations to Mike Carrott who won for his paper covering the 'EURO-GANEX' process. Mike presented his paper to the Technical Conference and also received The Lawrence Medal from Chief Scientist Andrew Sherry. This is the third time the medal has been presented and is named in honour of former NNL Managing Director Mike Lawrence.

Mike Carrott's award winning paper passed through a rigorous selection process based on technical and scientific content, coherency of argument, innovation and impact of the science. The paper highlighted the consideration of minor actinides recycling as a potential scenario in the development of advanced fuel cycles. The EURO-GANEX flowsheet is being developed under the European Union Framework Programme VII ACSEPT project.



Mike (centre) with NNL MD Paul Howarth and Chief Scientist Andrew Sherry

James is Top Apprentice

Retention and growth of capability, skills and expertise is a key part of NNL's nationally strategic role. This is reflected in a commitment to attracting the brightest and best people in to the business. The recruitment of younger people to join NNL's established apprenticeship programme forms a key part of our recruitment strategy.

NNL provides close support and opportunities to young people as they begin their careers and progress through apprenticeships. The achievements of apprentices are formally recognised via the annual Apprentice of the Year Awards. Over the years, the apprentice awards have consistently grown in competitiveness and value.

Apprentice numbers in NNL have steadily increased and nine high performing apprentices were nominated for this year's awards. Three winners were chosen in the business, scientific and engineering categories:

Business Apprenticeship

Charlotte Fee - Procurement

Charlotte demonstrated professionalism and tenacity through her support to the management of the NNL car hire account and has consistently performed at a high level.

Scientific Apprenticeship

Luisa McGregor - Facilities and Operations

Luisa's scientific experimental work has earned her a secondment into the NNL Highly Active Liquor Evaporation and Storage (HALES) team.

Engineering Apprenticeship

James Rothwell - Facilities

James has embraced all of the challenges placed on him and always aims to deliver beyond what is required. He has represented NNL among customers, the community and the media.

Overall Winner

James Rothwell was named NNL's overall Apprentice of the Year. Being among such formidable competition

makes his achievement even more special. Many congratulations to James on his well-deserved award and he becomes the latest proud owner of the coveted trophy.

The judges highlighted his excellent early career achievements and acknowledged his progression towards becoming an all-round contributor. He has undertaken work placements with NNL customers receiving excellent feedback and has achieved the highest possible college grades. He is currently leading his fellow facility apprentices in organising a sports challenge cup tournament to encourage skills development and team work.

James and the other nominees enjoyed the ceremony and dinner as he collected his award on crutches having sustained an unfortunate knee injury. In addition to his trophy and cash prize, James and his proud mum Claire attended the recent NNL IMPACT Awards Dinner and Ceremony in Manchester (see page 22).

Other Nominees

The other nominees also attending the awards ceremony were Mark Laird (Asset Care), Aimee Bawden (Environmental Services), Jamie Talbot (Electrical and Instrumentation), Lucy Kavanagh (Waste Behaviour and Materials), Scott Harrison (Environmental Services) and Ryan Clubley (Procurement).

Congratulations to all of the nominated apprentices and especially the winners.



Apprentice of the Year James Rothwell (right) with fellow nominees

NNL People:

Mark Edmiston - Head of Environment, Health, Safety, Security and Quality



Being NNL's Head of EHSS&Q sounds like quite a responsibility and it is! As the job title suggests it's a very wide remit for Mark Edmiston.

Mark leads on protecting the environment at work and beyond and making sure NNL has an excellent health and safety performance and culture. He also looks after security on behalf of the business and promotes NNL's quality strategy.

While Mark relishes his role and is pleased with progress so far in each key area, he's far from complacent. "There's no doubt we're improving," he said. "Our progress reflects the commitment and determination of NNL people to get better. And we can and will get better."

"Our vision for NNL is to deliver the best nuclear science and technology solutions in the world, which means we must also have industry leading EHSS&Q standards implemented right across our business."

"We're working hard in the EHSS&Q team to be a positive and supportive influence on people in an engaging and compelling way. If our people across NNL get it wrong, there is the potential for very serious consequences for the business."

Elements that Lead to Excellence

"There are moral, legal and financial reasons for having the right level of environment, health and safety," said Mark. "We have a fundamental duty of care and safety remains at the pinnacle of our priorities and is absolutely central to how NNL operates."

How is NNL Looking to Make Improvements?

"Delivering our operational and financial targets is meaningless if people are hurt or the business is compromised in the process," said Mark. "We're already doing well but are looking to get even better."

"In the last year we have changed many of our approaches, focusing on a range of what we call leading and support indicators. These are designed to help us all – and I mean business groups, facilities and functions – to be alert to things going in the wrong direction before someone is hurt or we have some kind of significant event. Ideally, these indicators need to flag well before any of that becomes a possibility."

Mark added: "What hasn't changed and what is central to our approach are the principles of Behavioural Observation which cut across everything and don't just focus narrowly on 'safety'. If we can habitually challenge any potentially negative behaviour and, even more importantly, encourage and praise people for their good or outstanding contribution then there's no limit to what we can achieve. Preaching down to people seldom works."

Pause for Thought

Mark also recognises the commitment coming from the top in NNL. "Earlier this year, we introduced a mandatory 'safety pause' for everyone in the business," he said. "We saw some signs

that safety awareness was slipping and took decisive action."

This resulted in over 40 sessions involving everyone in NNL. "The safety pause was led by members of the Executive team and proved to be a great opportunity to get people engaged and talking about safety," said Mark.

Feedback included many positive aspects of NNL's safety culture and also generated constructive comments and good ideas to help maintain focus. "The discussions were extremely healthy," he said. "We'll continue with the application of Human Performance and Behavioural Observation along with taking a little extra time to apply Stop, Think, Act and Review (STAR) principles. It's about people taking responsibility for their own safety and the safety of others."

External Recognition

It's been very pleasing that NNL has received external recognition for its commitment to safety. Since 2004, NNL has been an eight time winner of the prestigious research and development sector category in the annual Royal Society for the Prevention of Accidents (RoSPA) Awards.

"Sector Awards are all the more important in our industry, where safety is always of paramount importance," said Mark. "The awards are the pinnacle of RoSPA's recognition of truly excellent companies. To win, we must provide evidence of good safety practice across a range of measures." However, the awards are not just about

having good statistics. Judging takes place across a series of criteria that includes continuous improvement, managing risk, occupational health, sickness absence and training. "RoSPA are always looking for evidence of what you have done well and what you have done differently," said Mark. "They're keen to find out what you're particularly proud of as a company."

It's possible to win the award even in challenging circumstances if evidence is provided that an issue has been dealt with in a professional manner while learning from the experience. Nuclear safety, in particular, demands a particular type of robust discipline during operations.

"We do a lot of quite intensive work that challenges our processes and procedures," said Mark. "For instance, the refurbishment work at the NNL Windscale Laboratory has seen us carrying out extremely complex activities in very challenging environments.

"All of this work is undertaken with the utmost attention paid to health, safety and protection of the environment. We're proud of the way we carry out work of this nature and there are many examples of excellence across all of our Labs. We probably need to celebrate our success even more than we currently do."

Security Awareness and Culture

Given the nature of NNL's business and the regulation applied to it, there is no doubt that security is a key area of focus. "We take our security responsibilities very seriously and we're always looking to improve," said Mark. "In recent times, we've upgraded internal reporting and raised awareness of the importance of security and reduction of risks.

"It's about building awareness and developing a culture that takes security into account in whatever we do and also thinking through the consequences of our actions. This includes physical security arrangements at our facilities and the information we use.

"The increasing threat of cyber-attacks has been in the news recently and we're aware of the potential to negatively affect our business and also the wider industry. Cyber security can affect people in their private lives. We're taking action to raise awareness and prevent people falling into error traps."

Mark is pleased to report that the Office for Nuclear Regulation (ONR) has been supportive of the actions NNL has been taking to improve security performance. "There's a determination to constantly improve our security culture in NNL and feedback from ONR has been very encouraging," he said.

Quality Matters

NNL trades on reputation with customers and a quality approach must flow right through the business. Mark sees the improvement of quality culture and processes as essential.

"We must be constantly passionate about quality," he said. "We've developed a long term quality strategy to help us identify areas for development and to achieve higher standards. Quality is everyone's responsibility in NNL and its importance can't be stressed enough."

The NNL Quality Forum operates at a strategic level and it is supported by a team of Quality Improvement Leaders (QILs) who look to address 'on the ground' issues. "The QILs are able to respond quickly to the changing needs of the business and help everyone increase their focus and deliver the right quality levels," said Mark. "We have a Quality Champion at Executive level to reinforce our commitment to providing the best possible products and services to customers and other stakeholders."

Family Affair

Mark hails from Barrhead, near Glasgow. He gained a BSc and PhD in Chemistry from the University of Glasgow and joined British Nuclear Fuels plc (BNFL) at Sellafield in 1991. Within a year he met future wife Lindsay and they are

parents to Robert (15) and Lauren (13).

Lindsay is also part of the NNL senior team. "We're both based at the Workington Laboratory," said Mark. "Professionally, our paths cross occasionally, although we're certainly not in each other's pockets."

Family life is always busy. "Dad's taxi service is becoming more prominent," he said. Mark is also involved in his local church, St James C of E in Whitehaven and he has been a governor at the local primary school for nearly 12 years.

"I try to bring a level of independence when helping to make decisions for the benefit of the school, the pupils and the parents," he said. One of his other main hobbies is Freemasonry. "It's a much misunderstood organisation but, for me, it represents pure enjoyment and a strong moral and charitable focus".

Mark's colleagues are well aware of occasional obscure references and analogies that he makes. This stems from his love of certain cult TV series and films, principally Dr Who!

Staying Focused

With NNL, continuous improvement in EHSS&Q performance and culture is Mark's ongoing objective. "We must ensure we stay focused on safety, security and quality," he said. "The industry is under scrutiny like never before and any reduction in focus will set us back. It's my job to make sure we keep driving in the right direction and redouble our efforts. Every day brings a new challenge and I'm looking forward to NNL being seen as industry-leading."



In the Media

NNL has again attracted considerable interest from the media. We like to think this a sign that we are doing things right and presenting opinions that people find interesting. Selected highlights from our media coverage are....

• BBC Breakfast News

NNL and St Benedict's School, located in Whitehaven close to the Sellafield site, featured in a television report by BBC Breakfast News business presenter Steph McGovern. This was the first in a series of three short films that examined specific skills challenges in the UK and looked at what local businesses, schools and colleges are doing to rise to the challenge.

At St Benedict's, the BBC filmed students who have been working on the Engineering Education Scheme (EES). NNL has participated in the EES for a number of years. The scheme links teams of Year 12 students and their teachers with local companies. They work on real scientific, engineering and technological challenges.

Graduates Andrew Ballantyne and Jonathan Peters, who are both based at the NNL Workington Laboratory test rig facility, have been supporting the scheme at St Benedict's. They took part in filming alongside Angela Homer, the Key Stage 4 Science Co-ordinator at the school. The film also included contributions from Diageo and Warwick University.

News and Star

NNL's Olivia Thompson featured in an interview in the News and Star, a regional newspaper in Cumbria. Olivia is Business Manager in the NNL Environmental Assessments team and covers technical support on decontamination and waste assessment.

In the interview, she discussed her background and education and presented some examples of projects she's been involved in with NNL. A particular highlight during her career so far has been the provision of support during the training of scientists involved in nuclear decommissioning activities taking place in Iraq. A group of scientists and engineers from Iraq visited NNL facilities during the final part of a two-year programme covering the dismantling, decommissioning and decontamination of nuclear facilities. Olivia led on the NNL based elements of the training.

She is also involved in the UK chapter of Women in Nuclear (WiN). The establishment of WiN and the work of local Science, Technology, Engineering and Maths (STEM) initiatives are contributing to a gradual change in the gender landscape in UK nuclear.

• World Nuclear News (WNN)

Supported by the World Nuclear Association, WNN covers a wide range of stories from the industry. Earlier this year, WNN reported on a project to develop new robotic techniques for use in the autonomous handling of radioactive wastes. The three-year 'Robotic Manipulation for Nuclear Sort and Segregation' (RoMaNs) project is among those recently selected for funding by the European Commission.

NNL is prominent in the RoMaNs collaboration alongside the UK's University of Birmingham and France's CEA and the National Centre for Scientific Research, together with the Technische Universität Darmstadt in Germany.

The European Commission announced the first robotics projects to receive funding under the Horizon 2020 programme. The list of 17 includes medical, rescue, industrial and service robotics as well as cognitive interaction and precision agricultural techniques.

RoMaNs will develop new technology for 'mixed autonomy for tele-manipulation' for use in the sorting and segregation of a wide variety of objects making up legacy radioactive waste. The project will receive a total of €6.4 million through Horizon 2020. This is another example of NNL's involvement in the development of robotics and their application in the nuclear sector.

Hosts with the Most - ESARDA 2015

Acknowledged as a great success by delegates, this year's European SAFeguards Research and Development Association (ESARDA) Symposium was hosted by NNL in Manchester UK.

Billed as the major international conference on nuclear safeguards research and development, the event takes place every two years at a different venue across Europe. NNL took up the hosting baton to coincide with the 2015 Presidency of ESARDA being held by Jim Tushingham.

Jim is based at NNL Harwell has been active within ESARDA for a number of years and chairs the Destructive Analysis Working Group in addition to doing work for the association's editorial committee. At NNL, he administers the nuclear safeguards programme on behalf of the UK Department of Energy and Climate Change. He also has a co-ordination role for UK safeguards support.

ESARDA is an association of European stakeholders formed to advance and harmonise safeguards related R&D. The organisation also provides a forum for the exchange of information and ideas between nuclear facility operators, safeguards authorities and others engaged in R&D.

A key element of ESARDA's activities is the encouragement of frequent interaction between R&D personnel, plant operators and safeguards authorities. The ESARDA Symposium is a tremendous opportunity for delegates to exchange information on new aspects of international safeguards and non-proliferation as well as discussing recent developments in related research activities and their implications for the safeguards community.

The event attracted over 200 delegates from all over the world. Although ESARDA has a mainly European focus, the Symposium welcomed a number of delegates from the USA and many others from the nuclear safeguards community outside of Europe.

The opening plenary session featured speakers from the European Commission, the European Union Joint Research Centre, the Institute of Nuclear Materials Management and the UK's Office for Nuclear Regulation (ONR). A comprehensive programme of parallel technical sessions also featured, each with a specific focus on an aspect of safeguards technology or policy.

Prior to the main conference, a pre-event took place dedicated to 'Building Capability in Safeguards R&D' and there was also a post-event technical tour to enjoy with a



NNL's Jim Tushingham opening the ESARDA conference

visit to the URENCO facility at Capenhurst. There was also a series of working group meetings and a chance to relax at the conference dinner at the impressive and historic Tatton Hall in Cheshire.

There was even an opportunity to visit the 'Secret Nuclear Bunker' at Hack Green also in Cheshire. Before becoming a must see tourist attraction, Hack Green played a central role in the defence of Britain for almost sixty years. During World War II, the UK Air Ministry identified the site to locate innovative Radio Detection and Direction Finding (RDF) equipment or radar as it came to be known. Hack Green was one of 21 fixed radar stations in the country and one of only 12 to be fully equipped with searchlights and fighter aircraft control.

The attendance at the ESARDA Symposium was among the largest for a number of years and the event was hailed as a great success by all involved.

NNL External Relations Director Adrian Bull said: "This was the first time that NNL has taken the financial risk of hosting a major international conference of this scale, but it is exactly the sort of thing which a National Lab should be doing.

"Thanks to a tremendous amount of effort from the organisers - in particular Jim Tushingham - the event was a great success, raising NNL's standing and profile with the UK Government, the European Commission and the international safeguards community, many of whom are potential customers of ours.

"We're very pleased about the impressive numbers of delegates which we were able to attract to the event. Thanks are due to all those who helped to make the Symposium such a success."

Congratulations to Keith Franklin MBE

Everyone in NNL was delighted to hear the news that Keith Franklin, currently on secondment to the British Embassy in Tokyo, has been awarded the MBE in the Queen's Birthday Honours list. The honour means that Keith is now a very proud Member of the Order of the British Empire.

Since he was seconded from NNL to Japan in 2011 after the Fukushima Dai-ichi accident, Keith has held the position of First Secretary (Nuclear) at the Embassy. His award is for "Services to UK/Japan relations in the field of nuclear energy".

Prior his move to Japan, Keith was NNL's Business Leader in the Reactor Chemistry and Materials area, based at NNL Stonehouse in Gloucestershire. He had previously spent time in Japan between 1999 and 2001, while working for British Nuclear Fuels plc (BNFL), when he was posted to the then Japan Atomic Research Institute (now JAEA) in the Ibaraki prefecture, carrying out research on the properties of molten salts.

Keith said: "I was astonished to hear that I was to receive this award – but obviously I was also delighted and honoured too. If the links between the nuclear industries in the two countries, particularly in nuclear decommissioning, are working successfully, then it's down to the help and support of countless colleagues in both nations, not just me.

"I'm also grateful to my employer, NNL, for the chance to take up this unique and tremendously varied posting at a

very challenging time for the nuclear industry in Japan."

Adding his congratulations, NNL's MD, Paul Howarth said: "This honour for Keith is tremendously well-deserved. He responded very quickly and positively after the events in Fukushima to help provide support to the UK presence in Tokyo and throughout his secondment to the Embassy he has provided a vital link between Japan and the whole UK nuclear sector, not just NNL.

"He's played a pivotal part in the success of many visits to the country – right up to Prime Ministerial level – and the insights and help he has provided have been very valuable to the nuclear industries in both countries."

Keith is a native of Fife in Scotland and attended Inverkeithing High School. He eventually graduated with a PhD in Chemistry from Edinburgh University. He joined BNFL in 1996 after completing a two-year post-doctoral position at the Worcester Polytechnic Institute in Massachusetts USA. He is a former Chairman of the British Zeolite Association.

Keith has a passion for sport and is a fanatical Dunfermline Athletic supporter and shareholder. Much to the 'delight' of his Japanese wife Rie, he watches as many games as possible in Japan live via the internet in the early hours of Sunday mornings.

He is also a keen cricketer and has captained the British Embassy Cricket Team in Japan's National



Keith Franklin, MBE

Competition (the 'Japan Cup'). He used his interest in cricket to support and draw attention to the recovery of the area around the Fukushima-Dai-ichi site by organising a cricket match against a local team in Minamisoma, Fukushima Prefecture, which gained international media coverage and secured a mention in the 2014 edition of the cricket almanac Wisden.

Keith also has a keen interest in theatre and comedy and has twice appeared at the Edinburgh Fringe. Congratulations to Keith from everyone in NNL on his tremendous achievement.



Keith bowling at the cricket match in Minamisoma

Here's to you Mr Robinson

Nick's Epic Bike Challenge

Incredible, astonishing, extraordinary, remarkable – how many superlatives do you need to describe Nick Robinson's latest cycle challenge? NNL Project Engineer Nick, who works in the Windscale Laboratory, and fellow rider Joe Robson are planning to cycle down the east side of the country from Edinburgh Castle to London Bridge.

Both are already very experienced cyclists and operate at a high level of pedalling as members of the Honister 92 Cycling Club. When they arrive at London Bridge, they will turn around, although not straight away, and ride all the way back to Edinburgh Castle.

That's means they will clock up a 'mere' 1,400km or 870 miles across the three days. This equates to cycling an almost incredible 300 miles each day. That's 20 hours in the saddle during each 24 hour period. Again, incredible, astonishing, extraordinary and truly remarkable!!



Indoor training for Joe and Nick

Nick and Joe, who works for Sellafield Ltd, are being supported by their friend Chris Morfoot and his partner. Chris works for NNL in the Vitrification Test Rig team. He will drive the specially prepared support van.

The epic challenge begins on 17th July and all of the cash raised is being donated to support the Special Care Baby Unit at West Cumberland Hospital. In particular, Joe holds the work of the unit close to his

heart as his twin daughters Isabella and Olivia received specialist care shortly after they were born.

Clearly, this was a very challenging time for Joe and his wife. But, with the support of the Special Care Baby Unit, the Maternity department and the dedicated team of midwives, nurses, doctors and so many more other people, the girls did well and are now thriving.

Both Nick and Joe are keen to repay the dedication and support of the team at West Cumberland Hospital, savers of so many lives, by putting themselves through the physical and mental pain barrier.

Much needed medical advice has been supplied by Sellafield Site Doctor Russell Newlove. Russell has supported the pair with training plans, nutritional and medical advice throughout the build up to the challenge.

Find out more about Nick and Joe's epic adventure in Innovate Issue 8.



Lycra Lads, ready for the challenge

Supporting STEM and our Communities

A strengthened focus on Corporate Social Responsibility (CSR) has been a key recent feature in NNL.

A more structured way of assessing and responding to requests for support has been introduced with a continued strong focus on Science, Technology, Engineering and Mathematics (STEM) activities and on helping the communities where NNL and its people are based.

An increasing public profile means NNL continues to receive more requests for support than ever before. Great care is taken to ensure that a balance is maintained in the way contributions are made across a range of activities and locations.

In 2013/14 NNL funded over 2,000 hours of employee time for CSR work and this was similar in 2014/15. Not surprisingly,



this was also exceeded substantially by the contributions made by employees using their own time.

NNL has continued to work with the well-respected Smallpeice Trust. NNL and Smallpeice run 3-5 day residential courses aimed at pupils in Years 9 and 10. The courses are held at Universities around the country and present students with the opportunity



to find out about specific areas of engineering and to get a taste of what life after the classroom would look like. In 2015 courses are covering Physics in Engineering (x2), Nuclear Engineering (x2) and Girls into Engineering.

Having been involved for a number of years, NNL also actively participates in the Engineering Education Scheme (EES). The EES is an Engineering Development Trust (EDT) programme linking teams of four Year 12 or S5/S6 students and their teachers with local companies to work on real, scientific, engineering and technological problems. NNL's involvement has recently been

reported in the media (see page 16)

In addition, NNL takes part in the 'Dream Placement' competition scheme. The initiative presents an opportunity for two West Cumbrian based students to spend a week with major businesses located in the region. Both student participants in 2014 decided to take up apprenticeships with NNL. The Dream Placement competition is organised

by Cumbria's Centre for Leadership Performance and NNL is involved again in 2015.

Schools local to NNL sites are supported via visits and events and around a dozen summer student placements and 35 work experience places were offered and taken up during 2013/14. The initiatives gave young people an insight into what it is like to work in the nuclear industry and to demonstrate the range of opportunities offered by the sector. A similar placement scheme is operating this year.

In 2013/14 80 new recruits joined NNL including 18 graduates and eight apprentices. At the end of 2013/14 there were a total of 28 apprentices in the business.



Graham Departs

NNL recently said a fond farewell to our Chief Science and Technology Officer Graham Fairhall. Graham retired at the end of March following a distinguished career in the nuclear industry that spanned over 25 years. His departure was marked by a celebration with colleagues and friends in Whitehaven near the Sellafield site.



Graham (centre) with NNL MD Paul Howarth (left) and former BNFL Chief Executive Mike Parker (right)

Graham first joined the former British Nuclear Fuels plc (BNFL) in 1979 and spent the vast majority of his career working in nuclear research and development. In the 1990s he was appointed to the Chief Technologist role for Waste Immobilisation. This represented a breakthrough at the time as it was the first senior level appointment in BNFL based on technical contribution. During the past few years as CSTO he has led NNL's team of scientists and engineers supporting reprocessing and waste management activities including advanced fuel cycle studies.

He was accountable across NNL for technical approach and strategy contributing to programmes covering the breadth of the nuclear fuel cycle. Graham also had responsibility for the company's links with Universities, research councils and other external collaborators. He has established a network of Senior and Laboratory Fellows to work collectively in developing and promoting technical capability in specialist areas. The Fellows are focused on leadership and the strengthening of technical capability and act as ambassadors to showcase NNL in the external scientific community. Graham also linked the technical community with NNL's commercial sector via a network of Chief Technologists. The Chief Technologists represent the main NNL businesses and drive the internal research and development programme.



Graham with Neil Baldwin, former Magnox Ltd Managing Director

Graham was also instrumental in building NNL's contribution, profile and influence with Government and other key stakeholders. He built an immense reputation in the scientific community and became the first point of contact for high quality technical knowledge and advice. During his career, Graham was a real asset to the nuclear industry, NNL and the UK.

He is succeeded by Andrew Sherry.



NNL Chairman Richard Maudslay speaking at Graham's leaving event

IMPACT Awards Recognising

Each year, the NNL IMPACT Awards present an opportunity to step back and recognise people who have gone the extra mile to help the business in all sorts of ways. The nominations for the majority of the awards are made by NNL people for NNL people.

In 2015, voting was up on previous years. A tremendous 489 nominations were received compared to 327 in 2014. This represented a very impressive rise of 50%. The record voting was a testament to how much the awards are valued across the NNL business by people at all levels.

The IMPACT Awards dinner and ceremony took place in April at the Museum of Science and Industry in Manchester. Winners were spread right across the NNL sites and each of the winners pulled all the stops out to help take the business forward.

The ceremony was introduced by Chairman Richard Maudslay and



The IMPACT Awards dinner

hosted by MD Paul Howarth supported by members of the senior team. The speaker was Fraser Doherty, the founder of 'SuperJam'.

Fraser supplies jam to thousands of supermarkets in the UK and from Russia to Australia. Although still in his mid-twenties, he's already been named 'Global Student Entrepreneur of The Year', written a best-selling book 'Super Business' and had a re-enactment

of his life story made in Japan! Fraser has also won over 20 business and innovation awards.

The main event of the evening was the presentation of the IMPACT Awards and many congratulations to the 2015 winners:

Joint Teams of the Year:

BEP Robotics (Workington Laboratory)
PFSP Oxide Processing (Windscale Laboratory)

Exceptional Leader of the Year

Wayne Muckley

Delivery to Internal Customers

Melissa Ratcliffe

Delivery to External Customers

Ray Foster

Commitment to Quality

Glyn Rossiter

Newcomer of the Year

Jon A Hyde



Chairman Richard Maudslay introducing the ceremony

Excellence



Clockwise from top-left: Paul Howarth introduced the awards; Kat Lennox with Talent and Development Director, Liane White; Glynn Rossiter with Fuel Cycle Solutions Director, Fiona Rayment; Jon Hyde with Facilities and Safety Director, Keith Johnson; Melissa Ratcliffe with Strategy Director, Chris Moore.



Corporate Responsibility

Jo Fagan

Bob Grieve Safety Champion

Alex Gregory

Norman Brewer Personal Development

Kat Lennox

Internal Research and Development

Ingenuity

Alice Laferrere and Oliver Payton (High Speed Atomic Force Microscopy)

Most Promising New Innovation

Jeffrey Kuo (Brokk Simulator)

Nick the Dino Hunter

Going for a stroll on the beach is usually a relaxing rather than dramatic and exciting affair. NNL Waste Management and Decommissioning Director Nick Hanigan and his brother Rob were indulging in a spot of fossil hunting on Lavernock beach near Penarth in the Vale of Glamorgan in Spring last year when they made the 'discovery of a lifetime' - the fossilised skeleton of a theropod dinosaur.

Nick and Rob had in fact found the first Jurassic meat-eating dinosaur ever to be discovered in Wales. This 'new'



Nick and Rob interviewed on BBC2

Welsh dinosaur is a distant cousin of the Tyrannosaurus Rex and lived at the very earliest part of the Jurassic Period, some 201 million years ago. There's a possibility that Nick and Rob have discovered the oldest Jurassic dinosaur

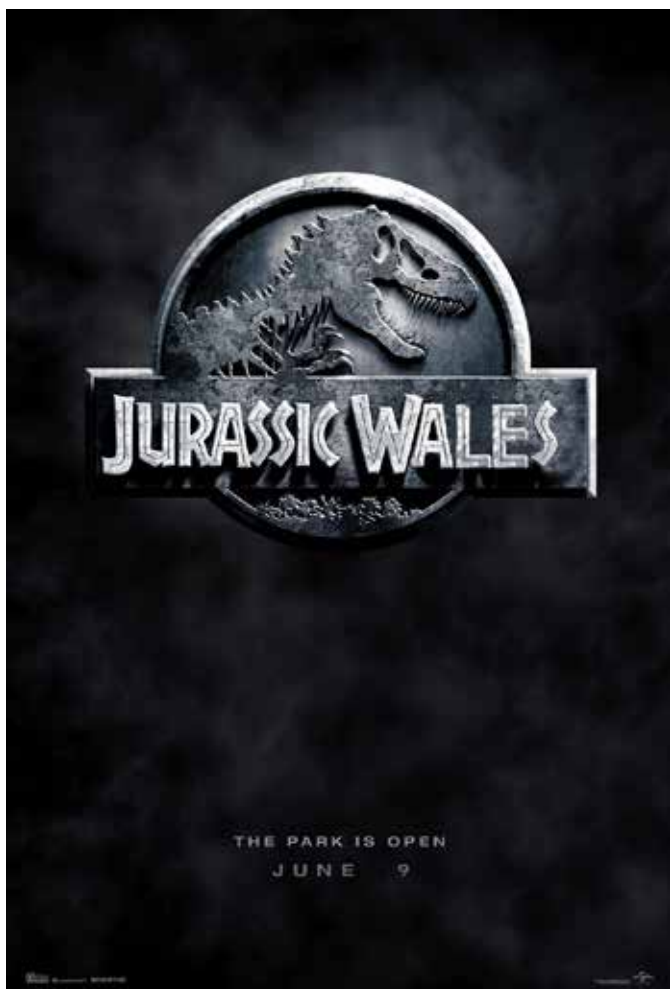
in the world! And you can go and see it. The fossil is on display in the main hall at the National Museum of Wales in Cardiff until 6th September.

Nick and Rob made their discovery after storms in spring 2014. There had been a cliff fall on the beach and Rob spotted several loose blocks containing part of the skeleton of a small dinosaur and collected the specimen, including its razor sharp teeth, and claws. Nick managed to find

the remains of the skull which was incredibly lucky as the bones are paper thin and get destroyed very quickly by the sea.

The fossilised bones were found spread across a number of slabs of rock and although some were preserved together in the correct position, others were scattered and separated by the actions of scavenging fish and sea-urchins. The specimen was preserved with the fossilised remains of the sea-urchins. Nick and Rob took their time to carefully conserve and prepare the specimen, which included arranging for the dinosaur to be CT scanned and X-Rayed at Manchester Royal Infirmary and having the mudstone removed from the bones using micro-blasters. When Nick and Rob were certain that they had found a theropod dinosaur, they contacted Cindy Howells, the Palaeontology Curator at the National Museum of Wales and dinosaur experts from the Universities of Portsmouth and Manchester.

The team confirmed that this particular dinosaur was meat-eating and from the theropod group. It's also been suggested that it was a juvenile animal as some of the bones are not fully



formed. Research is still ongoing, with a scientific paper in progress which will reveal the name of the new species. It was small, slim and agile, probably only about 20in (50cm) high and about 6.5ft (2m) in length with a long tail to help it balance. It lived at a time when South Wales was a coastal region with a warm climate. Having lots of small, blade-like, sharp, serrated teeth suggests that it would have eaten insects, small mammals and other reptiles.

The rocks that contain the dinosaur fossil date back to a time immediately after the start of the Jurassic period, some 201.3 million years ago. At that time, the dinosaurs were just starting to diversify and Nick and Rob's specimen is one of the earliest Jurassic examples in the UK.

Nick, who made an appearance with his brother on the Victoria Derbyshire daily news and current affairs show on BBC2 said: "This is a once in a lifetime find - preparing the skull and seeing the teeth of a theropod for the first time in 200 million years was absolutely fantastic - you just can't beat that sort of thing!"

Rob added: "It's always been our intention to donate our dinosaur to the museum for the public and scientists to see and research."

Commenting on the discovery, David Anderson, Director General of the National Museum Wales said: "This is a very special discovery, and Nick and Rob Hanigan are incredibly generous in donating this wonderful specimen to the collection to preserve it for future generations."

The media interest on the day was phenomenal with the story being the sixth most popular on the BBC Website, as well as trending on twitter and appearing in all news bulletins throughout the day. The next day, the story appeared in all of the UK newspapers, it was also shown in the US on CNN and CBS News and in newspapers from as far afield as Vietnam and South America.

Innovation Delivered

NATIONAL NUCLEAR
LABORATORY



NNL Hosts USDOE VIP

Dr Monica Regalbuto, senior technical advisors and the Chief Science Officer from the President's office visited NNL at Sellafield recently. Monica is the Associate Principal Deputy Assistant Secretary for the US Department of Energy (DOE) Office of Environmental Management (EM).

In her role, she leads EM's mission units and applies technical expertise to advance the clean-up mission across the DOE portfolio. While at Sellafield, the group visited NNL's flagship facility the Central Laboratory, the Vitrification Test Rig and Workington Laboratory.

NNL's Keith Miller co-ordinated the visit and accompanied the party throughout. Keith with Dr Anthony Banford led on the visit's engagement programme.

While in the UK, the VIP visitors also met with representatives from Sellafield Ltd and the Nuclear Decommissioning Authority (NDA).

Monica chairs the high ranking standing committee meeting attended by DOE, NNL and NDA. The latest meeting took place at during the WM 2015 Conference in Arizona (see page 12).

She is particularly interested in the key technologies deployed by NNL at Sellafield. DOE is facing similar issues at



the Hanford site in Washington State (Pulse Jet Mixers) and at Savannah River in South Carolina (Vitrification).

During her visit to the UK, Monica also took the opportunity to address a 'Women in Nuclear' (WiN) event held at the Energus Centre close to the Sellafield site. She captivated her audience with details of her distinguished and challenging career so far.

NNL Welcomes Lan Anh

NNL recently hosted Lan Anh, Senior Commercial officer at UKTI during an extended visit to the UK from Vietnam. Lan Anh is located at the British Embassy in Hanoi and spent just over a week with NNL on a short term secondment.

The aim was for her to learn about NNL, the business and priorities. Her busy schedule was tailored by the Strategic Business Development (SBD) team to meet the objective of understanding NNL's products and services that

have the potential to be of interest to Vietnam and over what timeframe.

Lan Anh had individual sessions with NNL Business Leaders and also with the SBD team. At the end of her time with NNL she gave an excellent presentation to SBD on her findings.

She was also given a tour of the Preston Laboratory, which she thoroughly enjoyed and found very informative. The Preston Laboratory is located on the Springfields site and is a purpose built facility designed to service customers requiring uranium active research and development.



Lan Anh also visited the Nuclear Advanced Manufacturing Research Centre (NAMRC) in Sheffield. Her visit to NAMRC built on the concept that NNL can act as a portal to the UK market.

NNL maintains close links with UKTI via the SBD team and participates in the UKTI nuclear high value opportunities programme (see page 7).

innovate

NATIONAL NUCLEAR LABORATORY



NNL is proud to be a member or partner in the following organisations:



NNL operates at six locations in the UK:

Sellafield, Cumbria • Workington, Cumbria • Preston, Lancashire • Warrington, Cheshire • Harwell, Oxfordshire • Stonehouse, Gloucestershire