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PULSE offers an insight into Culham Science Centre (CSC)'s valued businesses, from harnessing the power of fusion, to finding a cure for cancer, it's all here for you to discover.

Top Facility

A topping-out ceremony recently took place to mark the completion of the main structure for UKAEA's new H3AT (Hydrogen-3 Advanced Technology) and Fusion Technology facility.

H3AT will provide the UK with unique capabilities for developing fusion as a sustainable source of energy and will promote opportunities for industry collaboration.

Steve Wheeler, Director of UKAEA's Fusion Technology Business Unit, said: "It's fantastic to see the completion of the main structure of the new home for our H3AT and Fusion Technology facilities…This centre will play a key role in both national and international fusion programmes,

in addition to supporting ground-breaking UK science."

The H3AT facility will be a world-first tritium research centre. Developing techniques for managing the complete tritium fuel cycle is an essential step in the path to making fusion a commercial energy source. Research will help inform projects including the ITER international fusion experiment and the prototype power plants DEMO and STEP.

The building will also include fusion technology testing facilities to help UK engineering companies contribute to the STEP programme, secure contracts on ITER, and trial technologies for the wider nuclear industry.

The new building is expected to open in June 2022 and construction is well advanced. The traditional topping-out ceremony marked the placing of the last beam on the structure, with a tree planted to mark this milestone in the construction project.

ccfe.ukaea.uk

Fusion Community

We were pleased to welcome the executive team from General Fusion for a tour of the site to discuss the prospective development of their Fusion Demonstration Plant at Culham.

UKAEA presented the team with a key to their new site office where they will be based to support the project. To find out more about General Fusion, visit:

generalfusion.com

Inside PULSE…

Growing Community

Global leader in sustainable technologies, Johnson Matthey (JM) has joined our Culham community occupying just over 3,000 sqm to support its new Hydrogen Technologies business unit.

JM acquired the assets and intellectual property of lithium-sulfur battery developer OXIS Energy, based at Culham Science Centre, earlier this year to accelerate the scale-up of its growing green hydrogen business and future battery materials technology.

Demand for green hydrogen is projected to grow from a very small market today to meeting – along with blue hydrogen – the almost ten-fold increase in hydrogen demand between now and 2050, and the hydrogen fuel cell market is forecast to grow more than three-fold through to 2027.

Eugene McKenna, Managing Director of Green Hydrogen at Johnson Matthey, said:

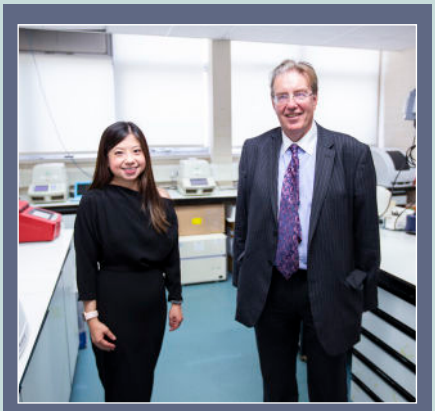
"Hydrogen has an enormous potential role in the decarbonisation of society. Johnson Matthey's hydrogen technologies enable the production of hydrogen and its use in fuel cells, and the move to Culham demonstrates JM's continued commitment to building the hydrogen economy and progressing towards net-zero. We look forward to utilising the assets we have acquired at Culham Science Centre, which have a key role to play in the scale-up of our Hydrogen Technologies business unit."

Johnson Matthey will undertake a review of the building and upgrade of key equipment acquired; JM will officially open the building in early 2022.

Culham Science Centre is owned by UKAEA and is home to approximately 40 science and engineering businesses, collectively employing over 2,500 people.

Dawn Russell, Commercial Property Manager, Culham Science Centre, said: "We are delighted to welcome Johnson Matthey to our growing community of businesses that are committed to harnessing science and technology to develop clean energy."

matthey.com/en



Happy 10th Anniversary

GeneFirst recently welcomed local MP, John Howell, to meet with their team at Culham Innovation Centre, which coincides with the company's 10th anniversary year.

Winnie Wu, Chief Operating Officer, GeneFirst, commented: "We had some fantastic discussions about the GeneFirst journey, the unique challenges for us and the wider diagnostics industry and alignment of interest with this Government's vision for creating a sustainable environment for businesses."

Founded in 2011, GeneFirst has most recently been heralded for its proactive work throughout the pandemic to develop and provide COVID-19 PCR test kits.

The company was born out of a passion for scientific discoveries and recognition for the importance of providing accurate diagnosis to improve patient care.

genefirst.com

Life Changing Technology

Unsuccessful biopsy, due to inaccurate needle placement, is all too common with repeat procedures inflicting further pain and tissue trauma on patients, not to mention the additional cost and burden placed on healthcare systems.

More than 200 million patients undergo needle-based procedures every year. One in ten sustain nerve damage while two in ten are re-called to hospitals for a repeat procedure as a direct result of needle misplacement due to poor visibility and deflection of needle tip.

ANT, based at Culham Innovation Centre, is about to revolutionise how biopsies are conducted, having recently gained a CE Mark for its first medical product – an award winning high visibility biopsy needle.

The company is preparing to scale-up following a soft launch of its product early next year.

Active Needle's Founder and CEO, Ian Quirk, said: "Much has been reported about the huge backlog in the NHS, particularly for patients who are waiting for a cancer diagnosis or treatment. Our device will really make a difference to healthcare professionals and patients by helping to prevent unnecessary pain experienced as a result of prolonged or repeated biopsies. Importantly, it will also save the NHS millions."

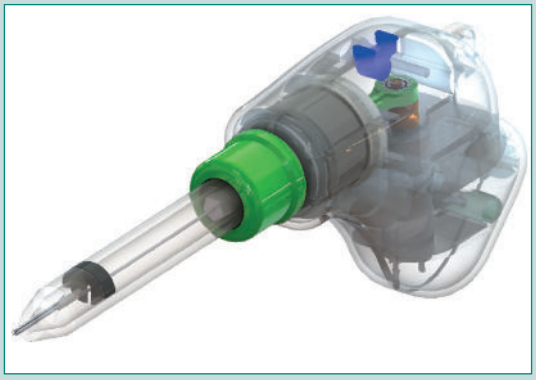
How does it work?

Active Needle's patented technology is a hand-held piezoelectric that interfaces with single-use medical needles to induce minute longitudinal ultrasonic vibration.

The device, which has been developed in conjunction with clinicians, consists of a durable driver unit that vibrates the disposable needle at ultrasonic frequencies. This leads to enhanced visibility and reduced deflection of standard needles under laboratory conditions.

Talking about the launch, Ian Quirk said: "COVID has slowed us down by about a year as our clinical trials were stopped, but we are now on track to launch at centres across the UK and Italy early next year. We are opting for a soft launch in Q1 to ensure we have exactly the right offering and will close funding at the end of this year as we build-up stock."

Precision needle targetting



TranQuill tattoo device

Tattoos

The latest Active Needle development could see the company rub shoulders with the David Beckhams and Lewis Hamiltons of this world, who have an undeniable passion for body art.

The company has scored the highest marks it has witnessed from Innovate UK and has been awarded £250,000 to further develop a product that will provide camouflage tattoos for burns victims. Active Needle has been working with Stoke Manderville's Burns Unit, among others in Oxfordshire, Berkshire and Bucks.

Ian Quirk said: "Our tattooing device is far less painful when penetrating the skin and causes extremely low swelling. It will play an important role in helping burns victims regain confidence, but there is clearly a huge growth market outside of its medical need. One in three millennial have a tattoo and the body art market is worth £2.5billion worldwide - we have no competitor! We are currently working on commercialising the product and are preparing to launch in 2023."

Active Needle has been supported by Culham Innovation Centre and has benefitted from being part of the wider Oxford Innovation network.

activeneedle.com
tranquill.co.uk

Hydrogen Power

We are pleased to announce that Reaction Engines has joined the Project Fresson consortium which is aiming to accelerate the journey to zero-emissions passenger-carrying aircraft through using hydrogen fuel cell technology.

The consortium is led by Cranfield Aerospace (CAeS) and Reaction Engines has been selected for the company's expertise in developing revolutionary thermal management technology on the SABRE programme, also used for applications in the motorsport, energy, and aerospace industries.

Rob Marsh, Project Fresson Chief Engineer, said: "Reaction Engines bring to Fresson their world-leading thermal management technology, which is critical to our hydrogen propulsion development; in return, Cranfield Aerospace Solutions and Project Fresson provide a credible and quick route to flight demonstration and certification of this exciting technology."

Reaction Engines joins a host of prestigious British companies on the consortium, including Ricardo, Britten-Norman and Innovatus Technologies who will work together to accelerate hydrogen fuel cell technology and prove its operational and commercial viability.

Project Fresson marks the latest initiative in a series of sustainable technology projects that Reaction Engines is involved in. Last year it launched HXLIFE Foils, an isothermal battery cooling system for electric vehicles that extends range and battery life as well as significantly reducing charging times. The company has also developed a waste heat recovery heat exchanger for Brunel University using Supercritical CO2 as the working fluid to significantly reduce carbon emissions in industrial processes.

Mark Thomas, CEO of Reaction Engines concluded: "Reaction Engines is committed to developing sustainable technologies that underpin UK and global net-zero targets. Through our ground-breaking work in batteries for electric vehicles, waste heat recovery and hydrogen fuel cell cooling, we are using our experience, technology and intellectual property to drive real change."

reactionengines.co.uk

SABRE Update

In partnership with S&C Thermofluids, Reaction Engines has tested SABRE's advanced hydrogen preburner at energy delivery levels in excess of two megawatts and proved output temperature uniformity under pressurised conditions. The preburner will now be combined with the HX3 heat exchanger to provide heat to the SABRE cycle at take-off and early flight.

The completion of this test campaign marks an important step on the road to a full engine demonstrator. The next phase of development will take place imminently and will involve testing the preburner and HX3 together to establish a full early flight heat control system for the engine core.

Fusion Cluster

The rapid growth of fusion research in the UK can be seen in the increasing number of private companies and start-ups attempting to fuse atoms together for energy production and the technology supply chain that support it.

Commercial fusion is a challenge that demands collaboration – and is the reason behind a newly created Fusion Technology Cluster here at Culham.

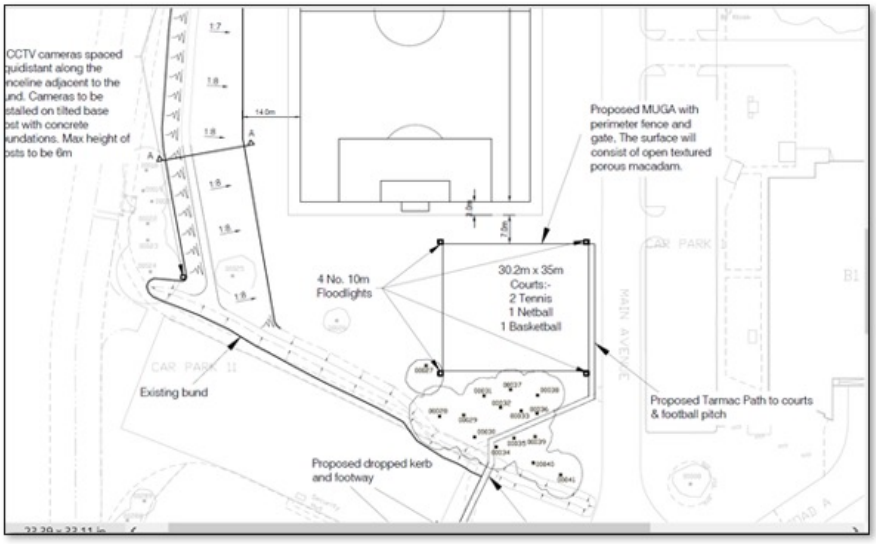
In the next edition of Pulse, we look forward to finding out more about Valerie Jamieson, UKAEA's Fusion Technology Cluster Development Manager and the benefits that a cluster will offer our Culham community and the local economy.

New Beginnings

With the growth of staff numbers at Culham Science Centre and the construction of more buildings on site, we are introducing a new sports site or Multi-Use Games Area, which should be opened for use next year.

We are also undertaking a consultation on a new exercise route and nature walk, which will cover 1.8 miles around site. The proposed route was outlined at two recent events hosted in E3.

For more information please contact enquiries@campusdevelopment.ukaea.uk



Coffee Time

E3 continues to undergo extensive works with a new and larger Costa Coffee bar, new conference centre facilities, a redesigned shop and an extremely popular outdoor seating area already completed.

The next phase of refurbishment works are due to start in January 2022, when a new look coffee lounge seating area will be introduced.

Meanwhile, the oldest temporary buildings on site were recently demolished to make space for new opportunities. C1 and C2 were built in 1962 as part of the first phase of, the then called, Culham Laboratory. During their 59 years on site, the buildings have been used for a wide range of purposes including a canteen, bank and shop.

To keep up-to-date with site developments, visit our website.

culham.org.uk

Summer Fun

The sun was shining for the hotly anticipated return of Culhambury Festival and it was great to see so many of our community back on-site. The event gave UKAEA staff and their families the opportunity to relax, have fun and enjoy a host of entertainment. We are already looking forward to next year's event!

Who's Who

Name: Ruth Lloyd

Job: Catering General Manager

Length of service: 3 years

What does your role entail?

Supported by a team of nine fantastic people, I'm responsible for ensuring the smooth running of all catering facilities at Culham Science Centre. This includes managing all hospitality for the conference centre alongside the restaurant, three cafés, our shop and mobile food van.

What's your background?

I began my career in the catering industry when I left school and joined Thames Valley Police as a kitchen porter. I attended college and worked my way up to head chef before later returning as operations support manager.

My husband and I also ran a pub for a couple of years in Goring-on-Thames. As foodies, this was always something we wanted to do, but we decided the work-life balance wasn't for us as we like having an occasional holiday!

How has COVID impacted your role?

I'm pleased to say that after a very challenging year, we are starting to see customer numbers increase again and the site is generally busier. My team has been absolutely marvellous and we couldn't have got through it without the support of each other.

Customers have been very happy with the changes we've made to our catering facilities, which are unrecognisable if you haven't been to site for a while. This includes new décor, furniture and an improved layout, particularly to Costa, which means we can now offer an increased menu.

Importantly, we are now in the position to grow my team again and are actively recruiting for a number of roles to ensure the smooth reopening of all of our catering services. If you know of anyone looking for a new challenge, we have vacancies in the kitchen, front of house, conference centre and are also looking for a mobile food van driver. Please get in touch!

Tell us about any funny or unusual experiences?

During my time here and Thames Valley Police, I have catered for a number of VIPs. When working for the police, a government minister asked to see me. I didn't think it sounded too good and wondered what he was going to say. It turned out the football team he supported were playing during the event and he asked if I could keep him updated with the score!

What do you like doing outside of work?

In recent times, I've become a keen gardener. I'm not too good at it, but I've enjoyed being outdoors. I love to travel and would say that Thailand has been the most interesting country I've visited and the food was also great!

Events

Show & Tell

A schedule of events created to promote the sharing of knowledge and to further connect with our Culham community is currently being organised. If you are interested in showcasing your work, please email: **sarah.lewis@ukaea.org**

Venturefest Oxford

Thursday 25 November 2021

A platform to support the innovation eco system in Oxfordshire, offering new and growing businesses support services and networking opportunities. Venturefest 2021 will be an in person live audience event, while also providing a live stream of online content.

venturefestoxford.com

Santa Run 2021

Wednesday 8 December (tbc)

It will soon be time to don your red suit and white beard to run-off some of those delicious mince pies that will soon be available from the Costa Coffee bar! Look out for an email with route and registration details soon.

BaxterStorey has a number of roles currently available and are looking for people with passion, creativity and flair and who can make every customer feel welcome.

Would you like to recommend a friend or relative to Baxterstorey? Please contact ruth.lloyd@ukaea.uk or speak to one of the catering team.

Join the conversation

Culham Science Centre is now live on Twitter, Facebook and LinkedIn. Stay up to date with us - follow us, tag us into your posts, check us in and add us to your LinkedIn profile. We love to stay in touch.

Do you have a story to share?
Email: sarah.lewis@ukaea.uk