INNOVATION insights

THE LATEST INNOVATIONS, COLLABORATIONS AND TECHNOLOGY TRANSFER
FROM THE UNIVERSITY OF OXFORD

ISSUE 19 July 2022

OXFORD STARTUPS: A CLUSTER BOOM!

A tsunami of talent, corporates and investors come to Oxford.

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INNOVATION insights

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Unstoppable innovation

Oxford Innovation Society members, partners, and others from the ecosystem joined our first in-person OIS meeting since 2019 in June, with a packed event that celebrated some of the tremendous successes of the last couple of years despite the disruption of the pandemic. The excitement and enthusiasm on display demonstrated how the innovation cluster has matured and developed, with an engaged population of entrepreneurs and partners keen to assist and participate in the next generation of innovation projects. Read more about the event, and the inspiring stories that were shared, in this issue.

Many readers will remember our former colleague Jamie Ferguson, who tragically died of Covid in 2019. Jamie was a pioneer in commercialising intellectual property from the University's Department of Chemistry, and in his memory we have jointly established the annual Jamie Ferguson Innovation Awards for the department.

In this inaugural year awards have been made to four entrepreneurial students who pitched projects with applications from materials science to combatting disease. Our wish is that these awards should provide a lasting legacy to Jamie, who embodied the passion for innovation that continues to grow in Oxford.

With best wishes from everyone here at OUI, we welcome your feedback.

News

Oxford University launch new #OxfordInnovates campaign

The campaign is focused on highlighting Oxford as a key collaborator and leader in innovation, improving the overall visibility of the University's activities and achievements both internally and externally.

FULL ARTICLE ▶

MoA Technology announces Series B funding

MoA Technology, a spinout developing an innovative approach for safer herbicides, has secured $44m in Series B funding. Investment will advance MoA's pipeline of new crop protection products designed to increase the resilience and security of the world's food production system.

FULL ARTICLE ▶

AstraZeneca boosts COVID portfolio with RQ Bio deal

RQ Bio has signed a $157 million exclusive licensing agreement with AstraZeneca to develop, manufacture and commercialise RQ Bio's existing early-stage monoclonal antibodies.

FULL ARTICLE ▶

Edtech platform secures Series B funding

BibliU, provider of a Learning Enablement platform, have raised $15 million in Series B funding. The funds are targeted for expansion in the U.S. market.

FULL ARTICLE ▶

PepGen announces $108m IPO

PepGen, the Oxford University spinout company developing the next generation of oligonucleotide therapies for chronic inflammatory respiratory diseases, has raised $108m in its Initial Public Offering (IPO).

FULL ARTICLE ▶

Oxford's ecosystem: past, present and future

With over half of the companies Oxford has created in its 800-plus year history formed in the past seven years, it doesn't take an Oxford prof to tell you that our cluster has been on something of a roll lately.

Here at OUI, we've been calling that explosion of activity the "Oxford Boom". If we take the formation of Oxford Science Enterprises in 2015 as the start of the boom, we've seen 157 new companies formed, with our total 288 companies raising over $4.7bn during that period. Alongside the numbers, we've seen a tsunami of talent, corporates and investors come to Oxford to help those companies grow and deliver on our goal of transforming Oxford research into tangible outputs that improve society, save lives and have economic impact.

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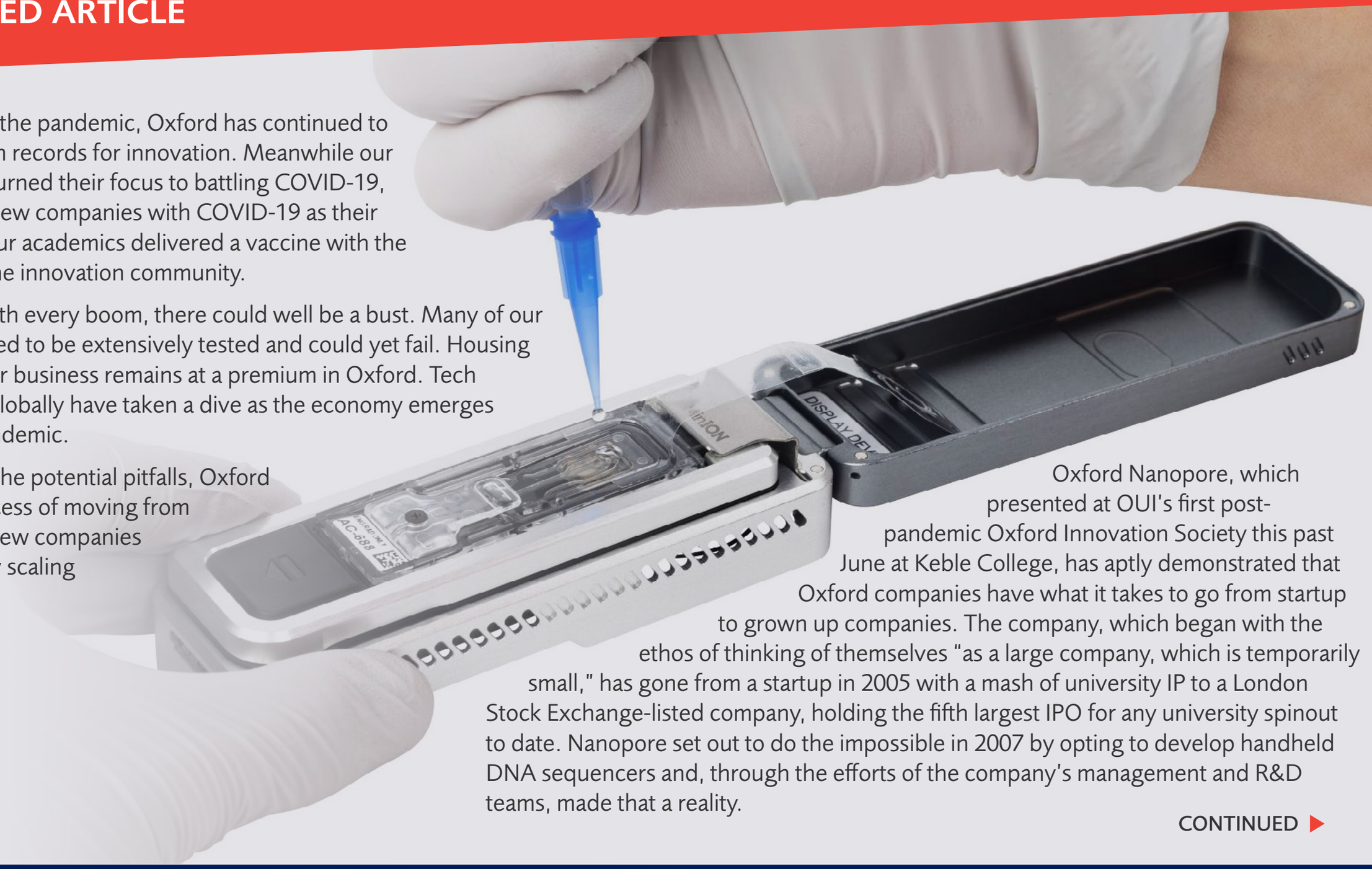
INNOVATION insights

FEATURED ARTICLE



Even during the pandemic, Oxford has continued to break its own records for innovation. Meanwhile our companies turned their focus to battling COVID-19, we formed new companies with COVID-19 as their focus, and our academics delivered a vaccine with the support of the innovation community.

However, with every boom, there could well be a bust. Many of our ideas still need to be extensively tested and could yet fail. Housing and space for business remains at a premium in Oxford. Tech companies globally have taken a dive as the economy emerges from the pandemic.

To navigate the potential pitfalls, Oxford is in the process of moving from the rush of new companies to effectively scaling them up.

Oxford Nanopore, which presented at OUI's first post-pandemic Oxford Innovation Society this past June at Keble College, has aptly demonstrated that Oxford companies have what it takes to go from startup to grown up companies. The company, which began with the ethos of thinking of themselves "as a large company, which is temporarily small," has gone from a startup in 2005 with a mash of university IP to a London Stock Exchange-listed company, holding the fifth largest IPO for any university spinout to date. Nanopore set out to do the impossible in 2007 by opting to develop handheld DNA sequencers and, through the efforts of the company's management and R&D teams, made that a reality.

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FEATURED ARTICLE

Another company achieving the impossible is First Light Fusion, which has now achieved fusion. Hot off the heels of a sizeable Series C, the company is now setting its sights on delivering gain from its fusion, with plans to build a pilot fusion plant within the next decade.

Our social ventures programme, started in 2018, has so far led to the creation of 15 social ventures. Those companies, often using bespoke and innovative business models to achieve their social objectives, are themselves maturing. Sophia Oxford, our first social venture, set out with the goal of alleviating poverty in the developing world. Initially, it planned to work with governments and NGOs to achieve this mission, but found in practice that these organisations weren't the right partner. Instead, Sophia has built partnerships with Citi Group and other banks which are stepping up to help Sophia of its goal of eradicating poverty.

Underlining these companies and spinouts like them is greater access to growth capital. In years past, large funding rounds for UK spinouts were practically unheard of. Now, our ecosystem is seeing substantial funding rounds appearing with regularity, such as OMass Therapeutics $100m raise in May, Osler Therapeutics emerging this year with $100m to start with, and MoA Technologies securing $44m last month.

To support this, the University is expanding and enhancing its Begbroke and Osney Mead sites to host more spinout companies. Oxford Science Enterprises is working with property investors to secure 2m ft^2 of space by 2025 and already has 1m of it in the pipeline. Meanwhile, OSE has also signed a deal to turn the Clarendon Centre, a retail centre in the heart of Oxford, into spinout and innovation space.

Our ecosystem has been on a rollercoaster since 2015. But with greater maturity, more sustained and well-resourced growth, and rapidly improving infrastructure, we may yet only be at the beginning of the ride.

Monitoring software provides battery health diagnosis

The UN Sustainable Development Goal 7 is to ensure universal access to affordable and clean energy. Yet despite progress in recent years, 770 million people still lack access to electricity according to the UN's most recent estimates.

Off-grid solar-battery systems play a vital role in addressing this global challenge; however, adoption is hindered by battery failure and rural locations that make preventative maintenance difficult. Monitoring battery health is also mission critical in disaster relief, as well as the automotive sector, with battery failure being the most common cause of car breakdown.

Researchers at Oxford University have developed software to predict and diagnose faults in battery systems.

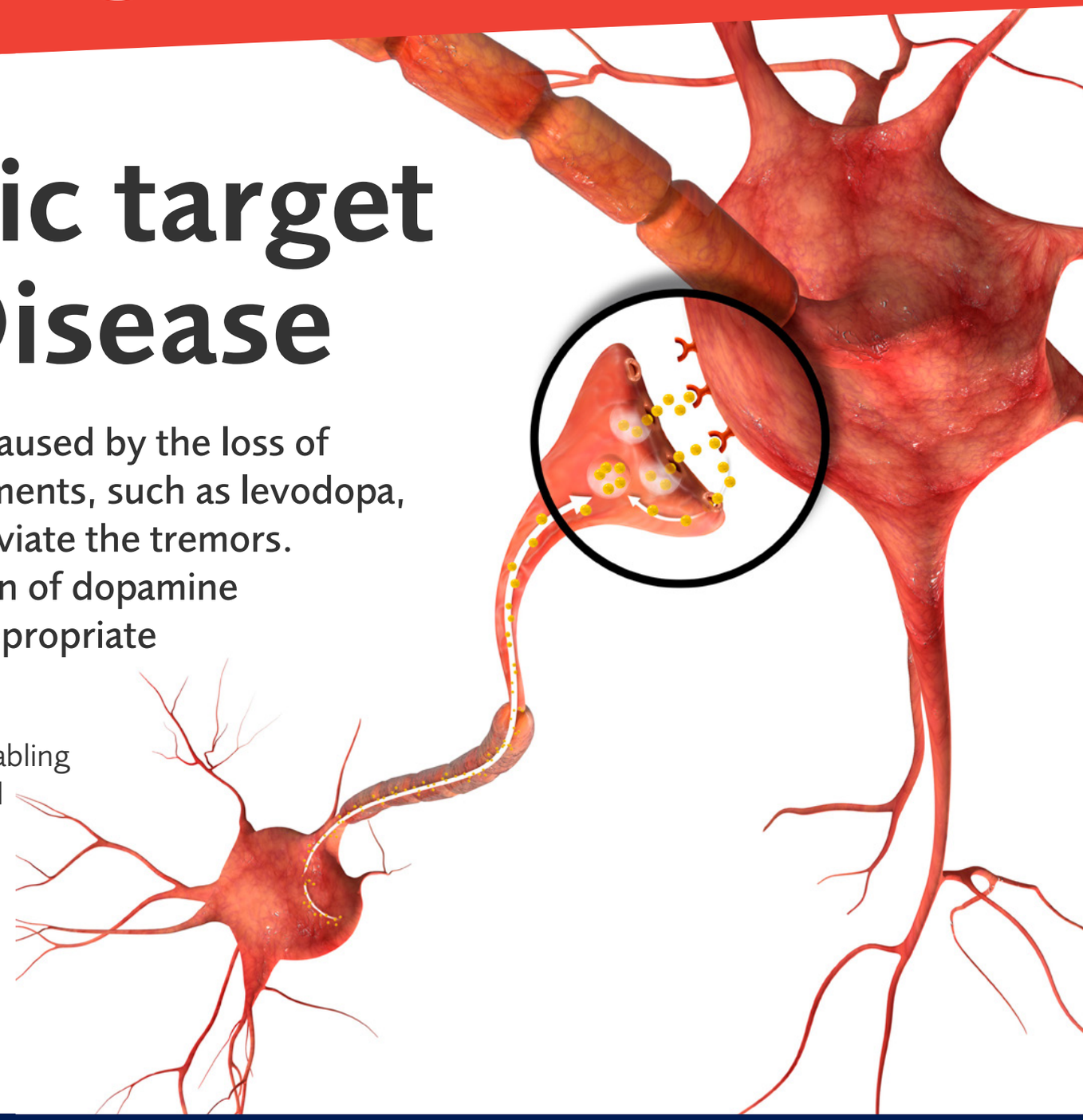
FULL WEB PROFILE ▶

A new therapeutic target for Parkinson's Disease

Parkinson's Disease is associated with ageing and is caused by the loss of dopaminergic neurons in the midbrain. Current treatments, such as levodopa, work by increasing dopamine levels in patients to alleviate the tremors. However, such treatments can cause general elevation of dopamine levels in the striatum, including via the release of inappropriate non-dopaminergic inputs.

Long-term administration of this drug will increase the incidence of disabling motor side effects, known as levodopa-induced dyskinesia, as reported in the journal Nature. Therefore, alternative therapeutic approaches are needed to reduce the side effects associated with levodopa.

Researchers at Oxford have found a new target in the nicotinic cholinergic systems for the treatment of Parkinson's Disease.



FULL WEB PROFILE ▶

Catalysts for capturing and utilising waste carbon dioxide

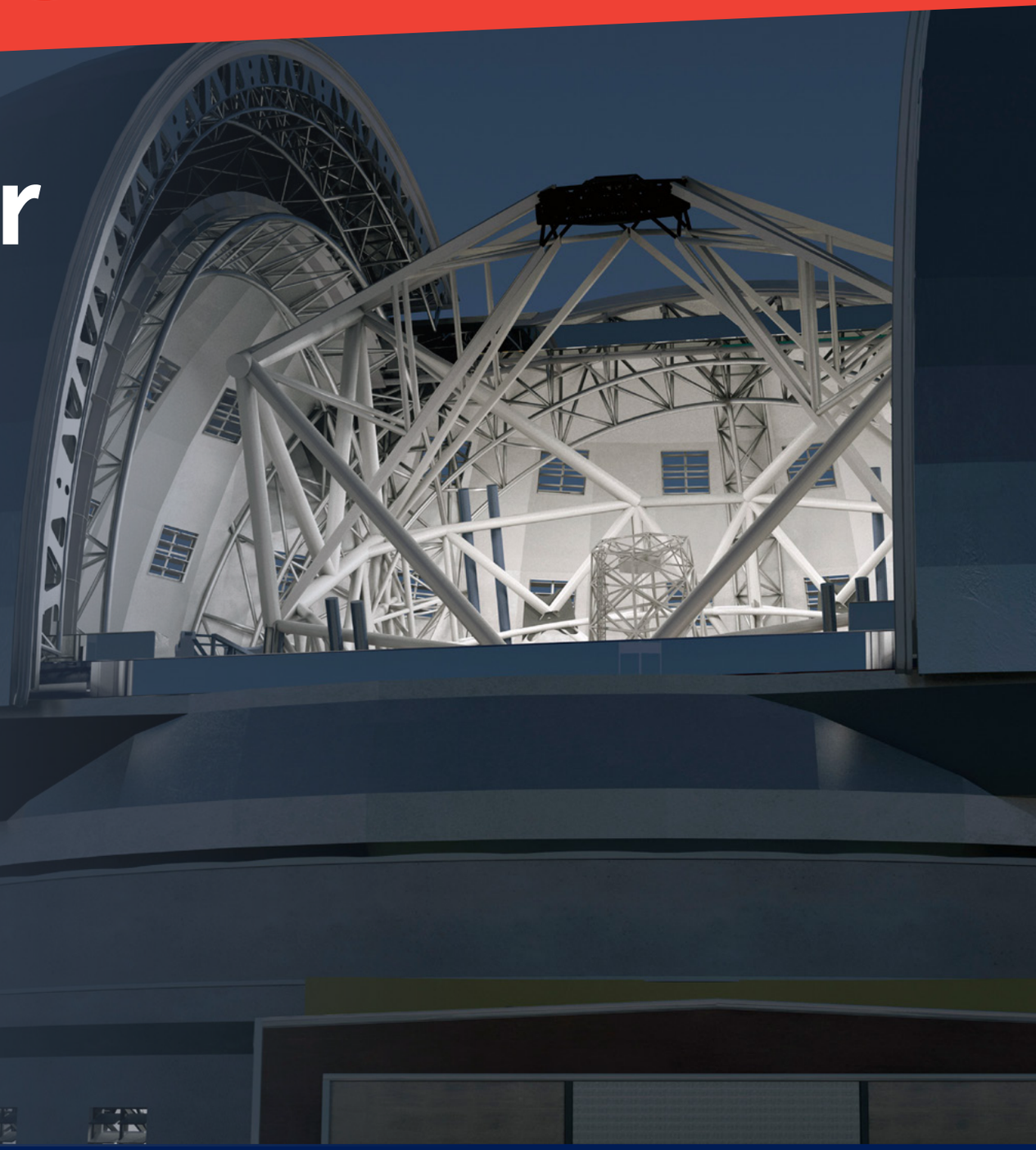
The climate crisis presents a pressing challenge for governments, industry, and scientists. CO_2 contributes to global warming by absorbing and re-emitting infrared radiation, and this is particularly problematic due to its long atmospheric lifespan.

The high stability of CO_2 makes it difficult to be used as a chemical feedstock and needs to be overcome before waste CO_2 processing can be industrially viable.

Oxford researchers have developed a cost-effective bimetallic catalysts to produce advanced polycarbonates from carbon dioxide or epoxides, allowing greater utilisation of waste CO_2 thus reducing raw material consumption.

FULL WEB PROFILE ▶

Adaptive optics for satellite imaging



The task of aligning telescope optics can be extremely burdensome. Typically, it is an involved, manual task using a heuristic process that can take many days. Whether this task falls to the manufacturers while still in the factory or to the end user after installation, it remains onerous.

It would be hugely beneficial to use a software-based procedure that can perform this alignment task autonomously – and this is exactly what researchers at the University of Oxford have achieved.

The current software contains an algorithm for automated alignment of telescope optics. The software can complete the alignment task in minutes within a factory setting.

FULL WEB PROFILE ▶

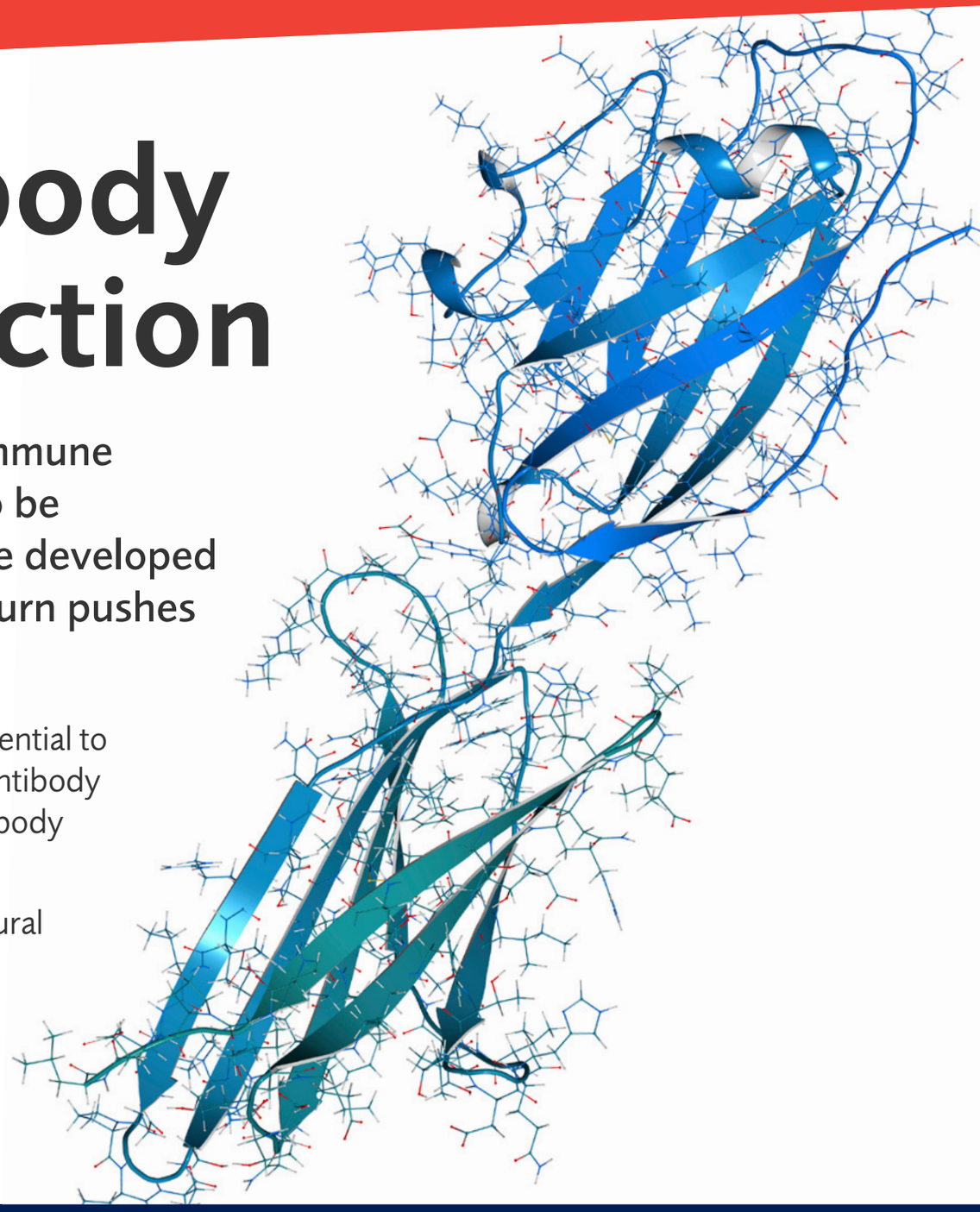
Power line communication solution for smart grid applications

Power line communication (PLC) is a method of transferring power and data for communication through existing power cables. It allows for data collection, control, and it enables advanced safety and fault-finding systems. However, traditional approaches to PLC require dedicated electronic hardware at every node in the network.

Oxford researchers have developed technology that allows PLC to be implemented 'for free' on any suitable power converter system – a software-only solution. This is achieved through careful exploitation of the built-in control properties and sensing capabilities that already exist in most types of power converter for their core power-conversion functionality. Robust information exchange between many converters becomes possible without requiring any changes to the underlying hardware.

FULL WEB PROFILE ▶

Computational antibody modelling and prediction



Antibodies are proteins that form the backbone of the human immune system. These molecules are highly designable allowing them to be harnessed as therapeutics. At present, antibody therapeutics are developed using experimental pipelines that are very expensive, which in turn pushes up the price of the resulting drug.

Facilitating this process by reducing the number of required experiments has the potential to accelerate and reduce the price of drug design. Recent advances in understanding antibody structure and function have allowed the development of software that facilitates antibody engineering in this manner.

Oxford researchers have improved the usability of SAbDab-SAbPred tools for structural antibody modelling and prediction into a singularity container for secure use on any Unix-based system.

FULL WEB PROFILE ▶

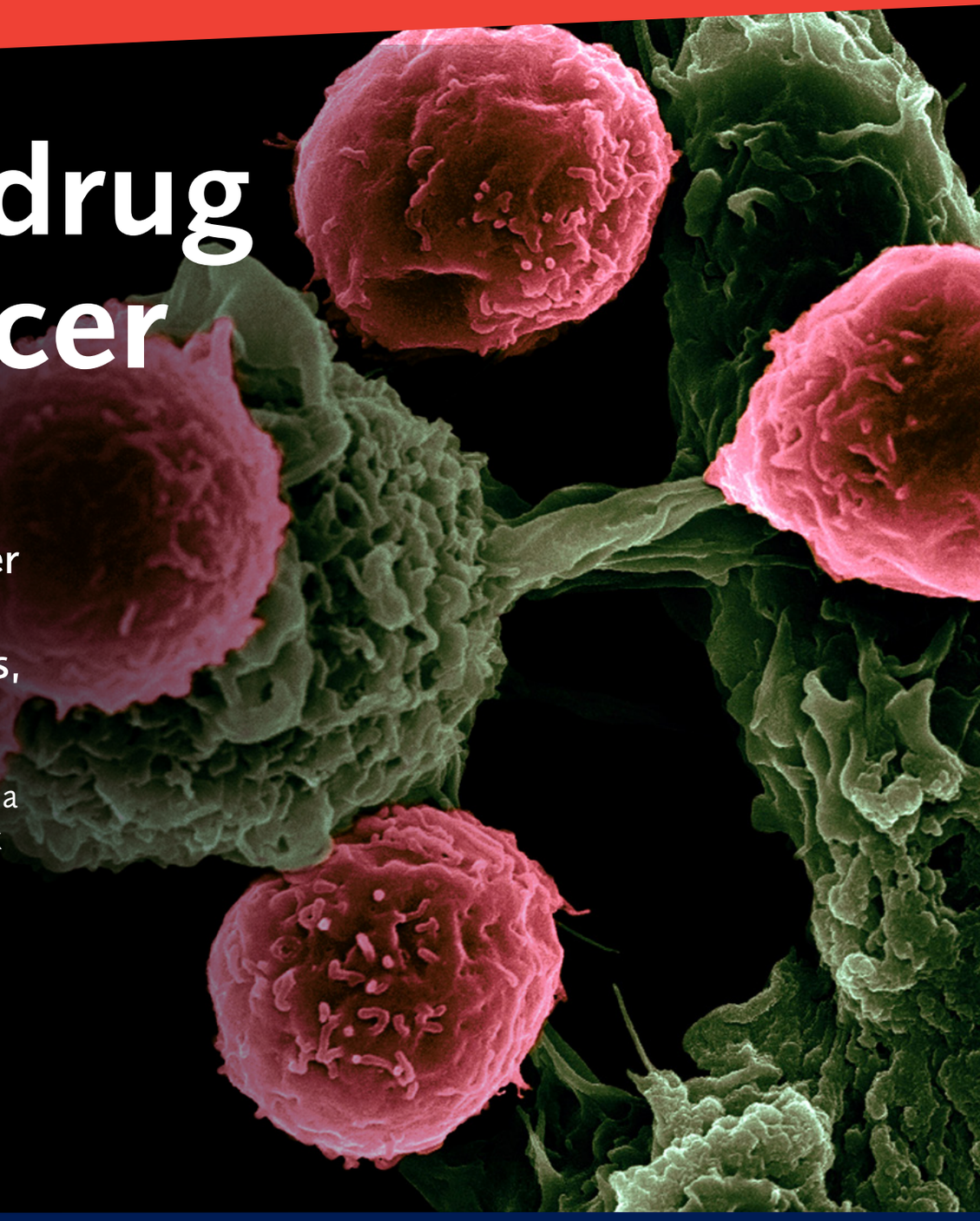
A method for upcycling waste plastics into energy

Polyethylene and polypropylene are found in half of all plastics produced. These two plastics are used in the packaging that keeps food fresh, sterilises materials used in medical applications, and lightweight parts that go into many of our affordable, durable goods. But, while these materials are valuable in use for their inertness, they are difficult to break down and very difficult to chemically recycle.

Researchers at Oxford have developed a method to chemically recycle common waste plastics in a practical and scalable way. The approach is a microwave-initiated catalytic method for recycling waste polyethylene and polypropylene into high-value light aromatic molecules.

FULL WEB PROFILE ▶

Nanoparticle-based drug delivery to treat cancer



Cancer is one of the leading causes of death in the world that affects all sections of the population and represents a significant economic burden on societies. Chemotherapy is a popular cancer treatment which, although often effective, suffers from lack of tissue specificity and can result in the destruction of healthy cells, causing a range of undesired side effects.

Scientists at the University of Oxford have tackled this important issue by developing a tissue-specific drug delivery system based on a novel polymer complex. The complex consists of iron-oxide nanoparticles bound to thermo-responsive polymers which enable drugs to be guided to the target site using a magnetic field.

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Instantaneous CO sensor operates at room temperature

Carbon monoxide (CO) is a harmful gas that is released into the atmosphere because of the incomplete burning of carbon-containing fuels. Sensors that can detect CO presence in the air are in high demand for homes and industrial settings, as well as for environmental air quality monitoring.

Most commercial CO sensors are based on electrochemical methods or metal-oxide semiconductors (MOS). An alternative to these methods is needed for solutions that are required to be portable, economic and fast.

Researchers at Oxford have developed a novel class of metal-free organic compounds that combine a Frustrated Lewis Pair (FLP), for sensing of CO in colourimetric sensing applications. Detectors are low-cost and non-toxic, and detection using these compounds is instantaneous.

FULL WEB PROFILE ▶

A digital method for tracking the phase of neural oscillations

Neural oscillations occur as a normal part of brain activity and mediate various biological functions. In some diseases, abnormal oscillations are associated with symptoms, such as motor deficits in Parkinson's disease. There is great potential in manipulating neural oscillations to rectify abnormalities. Particularly, evidence shows that stimulating brain tissue at a specific phase led to better rectifications.

To achieve this, researchers at Oxford have developed a system that can track phases of oscillations in real-time, and therefore deliver temporally precise stimulations. The technology is adapted to work in a closed-loop circuit, responding to changes in oscillations parameters. It can track oscillations over a large range of frequencies, including above 30Hz. The low-power system can perform on different methods of recording, including superficial EEG or deep-brain LFPs, and deliver different types of stimulation. These characteristics and versatility would make it easy to integrate to closed loop neurostimulation devices.

FULL WEB PROFILE ▶

The next-generation engineering centre

The Next Generation Tatara Co-Creation Centre was established through a collaboration between Shimane University and Shimane Prefecture as part of the Tatara Project, which aims to promote regional industrial creation through industry-government-academic collaboration. The Centre works with the region's speciality metal industry to develop new materials and provide young people with opportunities to study and work in the field.

Four academics from the University of Oxford provided advice and expertise to Shimane University in Japan in support of the establishment of the world-class engineering centre. All consultancies were arranged and managed by Oxford University Innovation's Consultancy Services team.

READ THE CASE STUDY ▶

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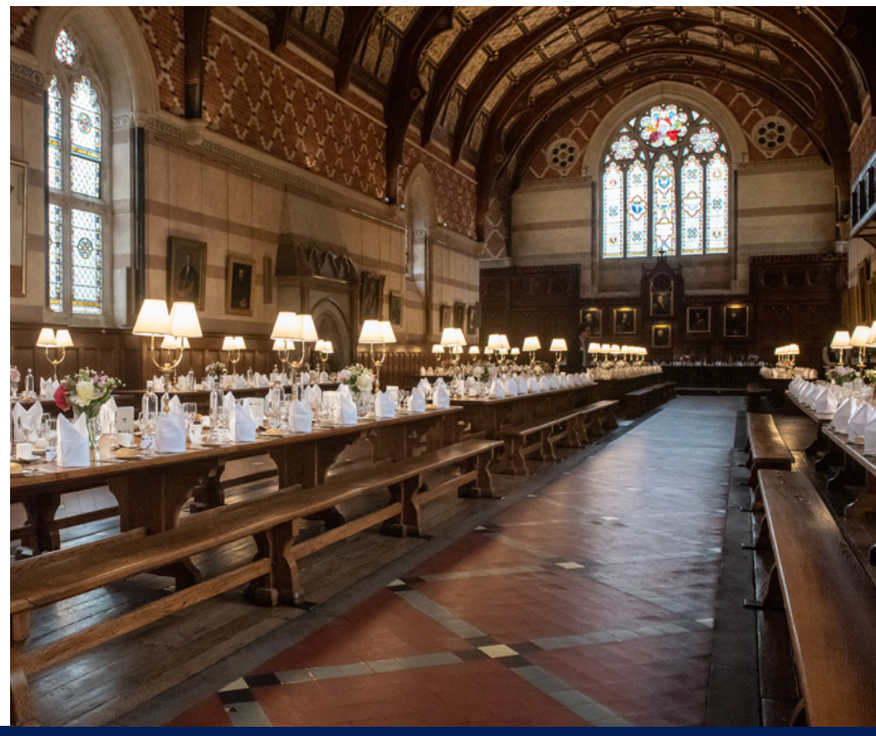
WE ARE BACK!

Oxford Innovation Society (OIS) meetings have resumed, following the suspension of in-person events throughout the worst of the pandemic.

OIS members will be invited to the attend our next event, at Pembroke College Oxford, in September 2022.



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