
The research commercialisation office of the University of Oxford, previously called **Isis Innovation**, has been renamed **Oxford University Innovation**

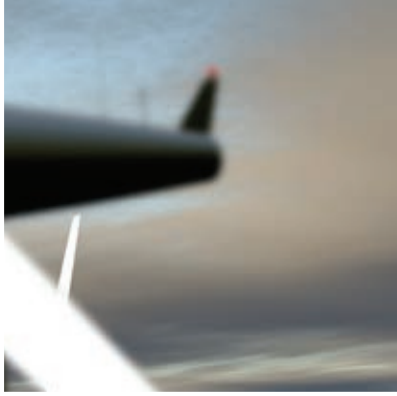
All documents and other materials will be updated accordingly. In the meantime the remaining content of this Isis Innovation document is still valid.

URLs beginning www.isis-innovation.com/... are automatically redirected to our new domain, www.innovation.ox.ac.uk/...

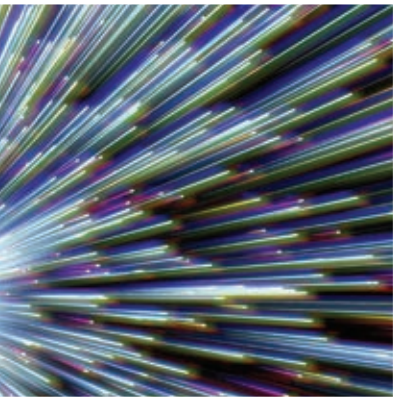
Phone numbers and email addresses for individual members of staff are unchanged

Email : enquiries@innovation.ox.ac.uk





# Channelling expertise



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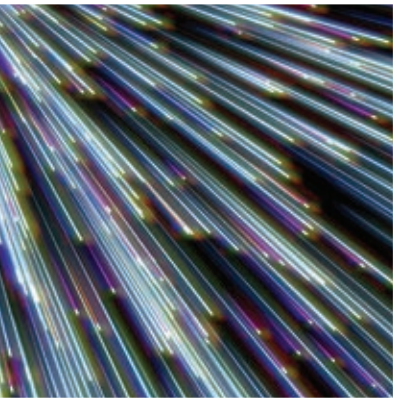
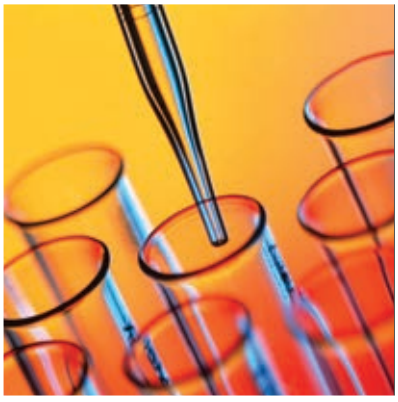
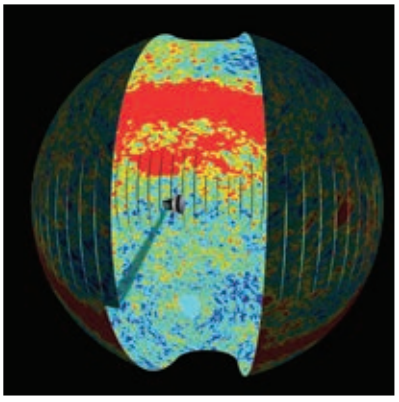
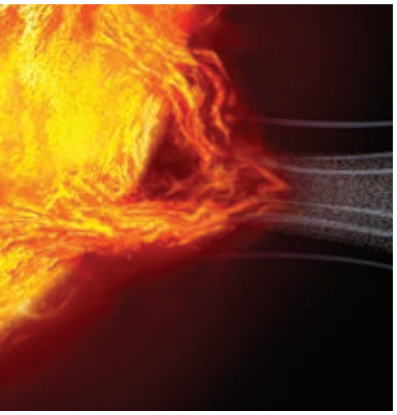
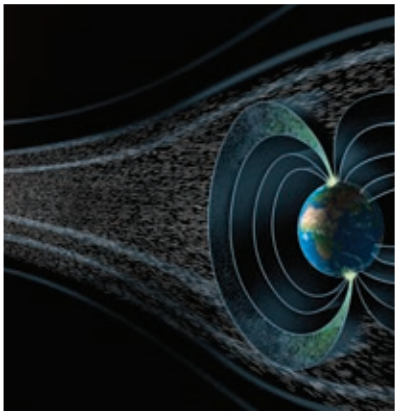


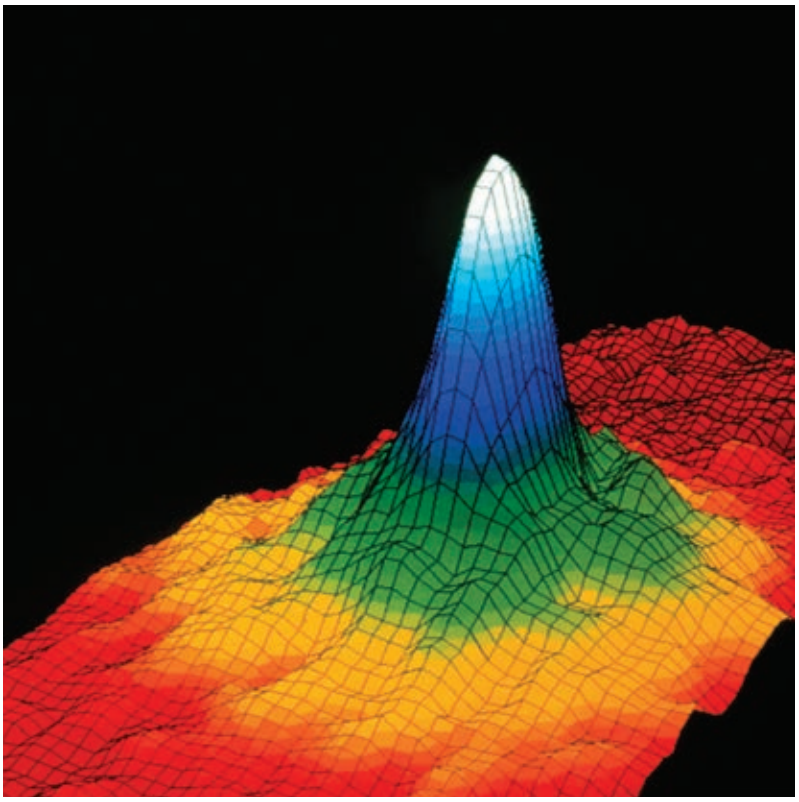
The University of Oxford's Consulting and Services arm

Consultancy and Services in the Mathematics, Physical & Life Sciences Division

UNIVERSITY OF OXFORD

OXFORD UNIVERSITY CONSULTING



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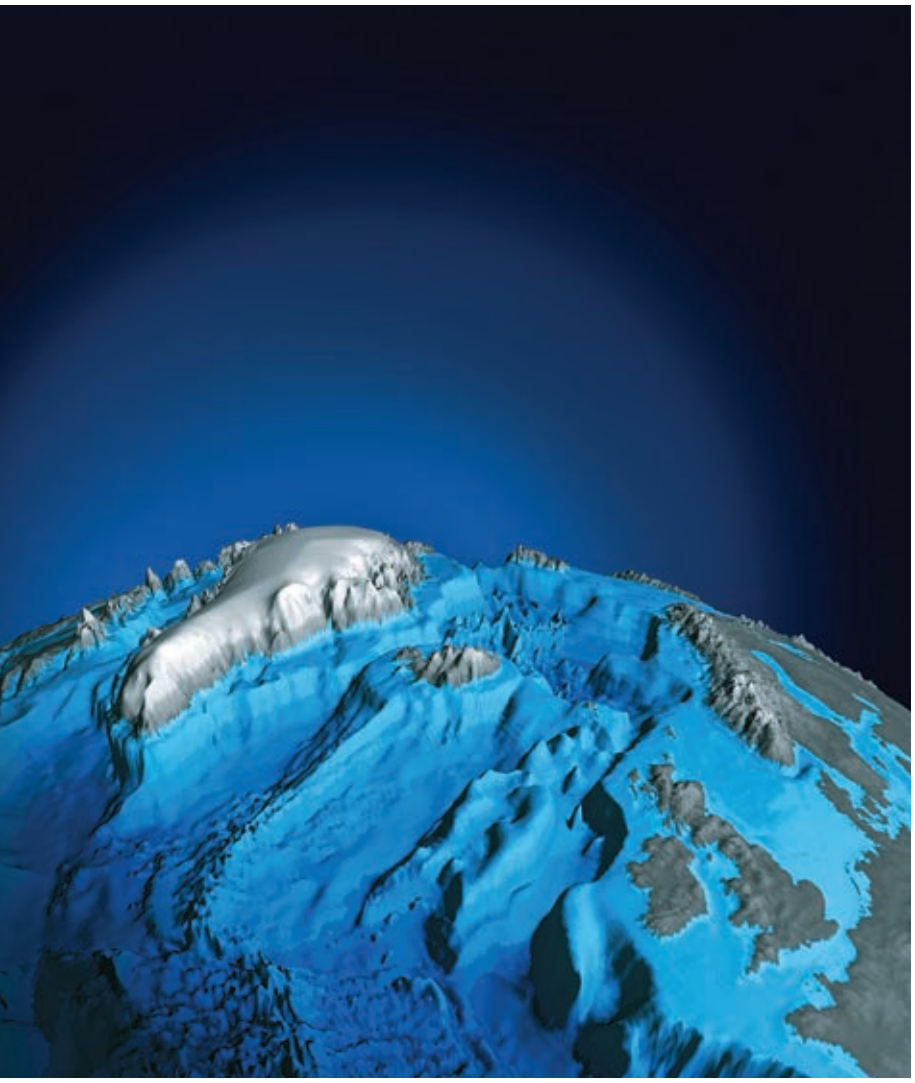
# Contents



UNIVERSITY OF OXFORD

OXFORD UNIVERSITY CONSULTING



# Introduction

A key part of the University's mission is to achieve wider engagement with society and to demonstrate the positive impact (both economic and societal) of research undertaken in Oxford. In 2000, the University established Oxford University Consulting (OUC), now a division of Isis Innovation Ltd, to support staff that wish to undertake consultancy and departments who wish to make their facilities and expertise available to external organisations.

Consulting activity is one of the important means by which staff in the Mathematics, Physical & Life Sciences (MPLS) Division can make available their knowledge and expertise to benefit a wide range of organisations including those in the private and public sectors. Such interactions in turn benefit the University, as staff bring back to their teaching and research the insights, experiences and contacts they have gained as consultants. The relationships developed through the provision of consultancy and services complement the activities of the Division's Business Development team and are a recognised part of a broad spectrum of activities that support the research and impact agendas.

***"We have a strong tradition of innovation in the MPLS Division and collaborate widely with an impressive range of external organisations who seek the benefit of working with Oxford. Consultancy activity can help to develop contacts, increase our understanding of research applications, and be an important precursor to developing new research collaborations.***

***OUC has a long history of working successfully with staff from the Division, providing a robust and professional contracting service to support consultancy activity with a broad range of organisations, from local SMEs to global corporations. As we seek to build bridges with industry, the personal relationships that arise through consultancy help strengthen these connections and reinforce the benefits to be gained from working together."***

**Professor Alex Halliday,**
**Head of the MPLS Division**

***Over the past three years, OUC has seen an overall increase in the number and diversity of projects that call upon the advice and expertise of colleagues based in the MPLS Division. In this period, OUC managed 265 consultancy or service projects across the Division, successfully contracting work for over 150 academic consultants and departmental service providers.***

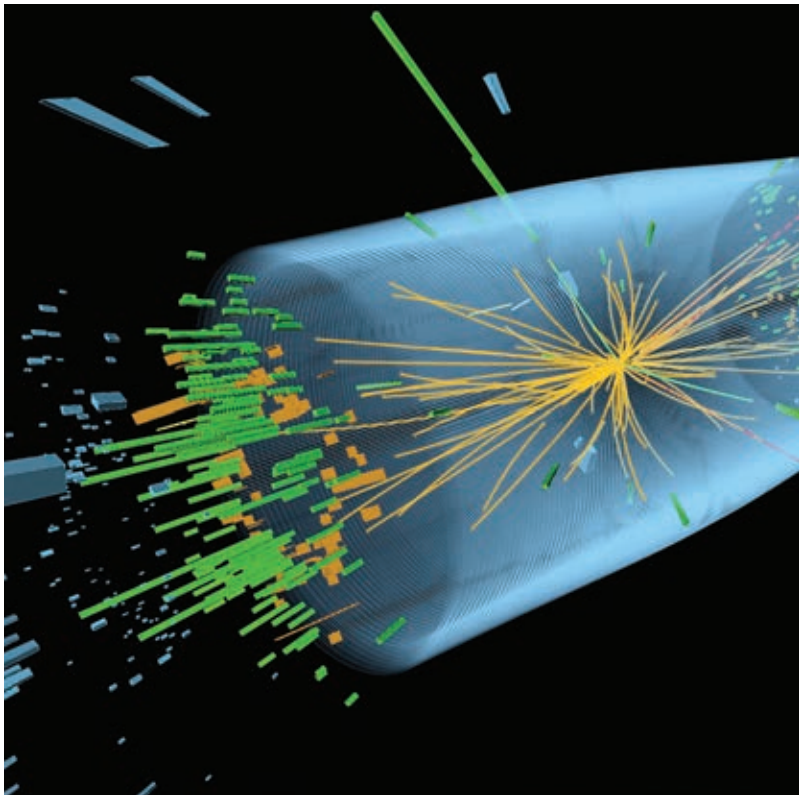
***We recognise that researchers from the MPLS Division are motivated to undertake consultancy or provide other commercial services for a variety of reasons ranging from the desire to see their expertise applied to new challenges outside the spheres of teaching and research, through to financial benefits and the opportunity to build relationships that may lead to downstream research funding. Whatever the circumstances, we aim to work in partnership with staff in the Division and strive to offer you an efficient and effective service that reduces the administrative burden and maximises the time you are able to devote to the technical element of projects.***

***We are excited about the potential for consultancy and services to contribute to the Divisional strategy as part of the drive to engage with external organisations and to foster productive relationships. We warmly invite you to contact us to discuss how OUC can support you to do consultancy and services work.***

**Andrew Goff, Head of OUC**

**About this brochure**

The purpose of this brochure is to highlight a small but representative number of academic consulting and service projects that have been undertaken in the Division through OUC and to provide an overview of how we can support both individual researchers and their departments to engage in this type of activity.



# Working across the Division

The MPLS Division consists of 13 different and diverse departments, each with its own unique approach to consulting and offering services to businesses. OUC helps the academics and researchers throughout MPLS to become better acquainted with the skills needed to be an active consultant and to recognise when an opportunity manifests itself. There are a number of ways we do this.

Academic Consulting Workshops, titled "Academic Consulting – Increasing Impact and Incomes" are held at regular intervals through the Oxford Learning Institute and can be booked online. We can also arrange workshops to suit the needs of specific departments, as has been the case with Physics, Mathematics and Engineering Science. Catering for a small group of around 15, we try and show you what's involved in undertaking consultancy during your time at Oxford, the benefits that it can bring you and how we are there to support you at every step of the process. The workshops are run over a working lunch and require no prior knowledge or training in consultancy.

Alternatively we can provide short introductions to consultancy, lasting from 15-30 minutes. These can be easily accommodated during departmental staff or committee meetings.

OUC also introduces you to the concept of consultancy as a part of the workshops given by our colleagues in the MPLS Business Development team. This is similar in detail to the short introductions given at departmental or committee meetings.

In some departments we have been requested to sit on their industrial liaison committee and help them with their interactions with businesses in a wider context, attending their research forums industry days, and the like.

You can of, course, just give us a call to come and discuss anything that you think might be a consulting opportunity.

***"The work of Oxford University Consulting and the MPLS Business Development team is highly complementary. The access that companies can gain to academics' knowhow and expertise through focussed consultancy projects often provides an excellent foundation upon which to build more substantial research collaborations, or can enhance an existing collaboration. By working closely together, the MPLS and OUC teams provide an efficient and effective interface for matching Oxford's research and consulting capabilities with companies' needs, and then helping such relationships to develop and flourish."***

**Dr Stuart Wright**
**Head of Impact & Innovation**
**Mathematical, Physical and Life Sciences Division**

### Consultancy

Generally speaking, academic consulting can be described as the provision of advice and expertise to a client organisation external to the University in return for financial compensation; it is governed by a legal contract. This advice and expertise may take many forms, as this brochure highlights, and while the central tenets always remain the same, academic consulting falls into two broad categories:

**Personal Consultancy** involves one or more individuals acting as academic consultants to provide expertise to a client in return for which the academic consultants receive income personally. This work is carried out independently from University activities, with the academic consultants acting in their personal capacity.

**Departmental Consultancy** consists of one or more individuals providing expertise to a client with the consulting fees being paid to the academic consultant's department. Such fees can be used at the discretion of the department, for example as travel stipends for DPhil students. This work is carried out as part of an individual's University activities with the academic consultant acting on behalf of their department.

### Services

Services work typically involves providing external client organisations with access to facilities or techniques that are already being provided to other internal users, for example, Small Research Facilities. Services are provided to external clients on a purely commercial basis with the fees being paid through OUC directly to the department. This type of project is covered by a service agreement that is negotiated and contracted by OUC, as distinct from a research or collaboration agreement that would typically be handled by Research Services. (For more on Services, see pp20-21)

$$G_{\mu\nu} + g_{\mu\nu}\,\Lambda = \frac{8\pi G}{c^4} T_{\mu\nu}$$

## The benefits of using OUC

**MAXIMISING TIME**

- Managing projects
- Handling administration
- Securing payments

**REDUCING RISK**

- Negotiating contracts
- Providing insurance
- Protecting interests

**SUPPORTING IMPACT**

- Finding opportunities
- Preparing proposals
- Offering advice



“Arranging a contract with a major electronics manufacturer would have been difficult or even impossible for me as an individual. Doing it via OUC was safe and easy, and left me free to focus on the technical work; they even negotiated much better consultancy rates than I would have expected.”

Professor Ian Horrocks,
Department of Computer Science

“Managing my consultancy contracts through OUC greatly simplified the legal aspects – something that I have no experience in – and it allowed me to be sure that I am not violating University's guidelines regarding consultancy. It was also reassuring to know that OUC would provide legal help, should such matters arise.”

Dr Boris Motik, Department of Computer Science

# Communications and Media

## Global end-game

University of Oxford climate change expert Professor Myles Allen provided consultancy for “Fate of the World”, a nail-biting PC and Apple game developed by Oxfordshire-based Red Redemption in 2010.

Gamers navigate through global warming scenarios over the next two centuries, grappling with geo-engineering, fusion power, wildlife adaptation and more, managing the earth's resources and climate while meeting the needs of an ever-growing population.

OUC was approached by Professor Allen after he and a former colleague, now working for Red Redemption, discussed how they could provide realistic climate change calculations for the game’s outcomes.

Professor Allen is project leader on ClimatePrediction.net, a programme that lets interested people from around the world take part in climate modelling. “Providing science for games is a new field for me,” he said in 2010, “but public engagement with the issues surrounding climate change is vital and games are a great way of reaching millions of people."

## Smart phone potential ‘in context’

When Professor Ian Horrocks was approached by a major electronics OEM to help them with certain aspects of software development that would make their next generation of mobile telephony devices even smarter he asked OUC to assist with the contractual matters. The objective of the project was to develop a "Delta-Reasoner", a new reasoning system that would meet the functionality needed by the client’s platform for context-aware applications.

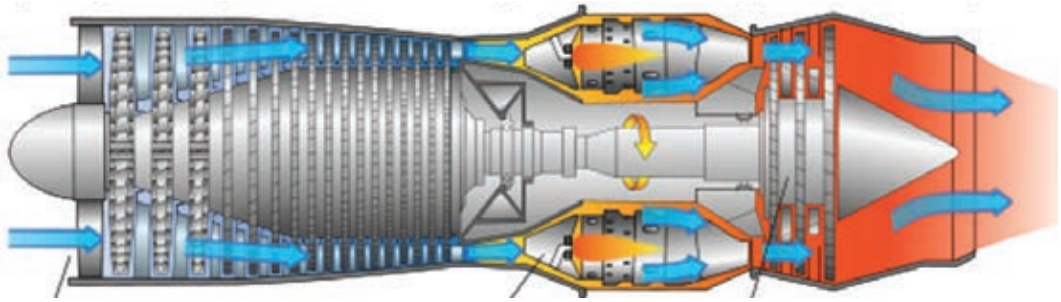
The goal of context-aware applications is to exploit the context information in an intelligent way for the purpose of helping the device owner organise his daily life, for example, a reminder to buy some milk when the context indicates that the user is located close to a grocery store.

Reflecting on the prediction that the number of mobile phones in circulation is forecast to surpass the number of humans on the planet in 2014, the significance of mobile phones in all our lives requires little further elaboration.

A detailed specification was sent to Professor Horrocks and his colleague Dr Boris Motik by the client. From this, OUC broke the project down into key milestones: Stage one would be design and core module development, stage two would be optimisation and functional development and stage three testing and training. Deliverables and budget were identified for each phase and the project was delivered in accordance with the timeline set out in the original project plan.

**“My experience of working with OUC is that they are very responsive and through with contractual and administrative matters throughout the duration of the consultancy, allowing me to concentrate on the technical matters.”**

**Kam Chana, Commercial & Technical Director of OTRF, Department of Engineering Science**



**“I have been very impressed with the prompt and professional way in which Isis handles consultancy work. OUC have been great at handling existing work, introducing new contacts, and in handling all the essential paperwork.”**

**Professor Peter Ireland – Head of Thermofluid and Turbo Machinery Group, Department of Engineering Science**

# Thermo-Fluids


## Tip clearance for turbine efficiency

The Osney Thermo-Fluids Laboratory, to the west of Oxford, houses some of the most sophisticated turbine and high speed flow facilities in the UK. The Commercial and Technical Director of the facility, Kam Chana, has not only been involved in bringing research collaborations to the Department of Engineering Science but has also used his extensive industrial experience to engage in personal consultancy work through OUC. Much of his consultancy work is bound by commercial confidentiality, but one particular project can be freely discussed.

Since the introduction of the gas turbine engine, manufacturers have known that the efficiency of their turbines or jet engines can be improved through tighter clearance between the tip of the rotating blade and the casing. Designing a sensor to measure how the tip clearance varied under diverse operating conditions formed the basis of a consultancy project that Kam undertook through OUC. The consultancy focused on the joint design and development with QinetiQ of an eddy current sensor system capable of operating at temperatures in the order of 1500-1600K.

Kam approached OUC with the outlines. Working closely with both legal and purchasing teams within QinetiQ, OUC set up the consultancy and obtained all the appropriate internal and external signatures to allow Kam to start the work.

## Rolls-Royce experience

After four years as Rolls-Royce's Corporate Specialist in Heat Transfer Technology, Professor Peter Ireland moved back to Oxford in 2011 to take up the role of Director of the Rolls-Royce University Technology Centre in Heat Transfer and Aerodynamics. His research group pioneered the use of liquid crystals in heat transfer experiments and he has published more than 120 papers in heat transfer, turbine cooling and heat transfer measurement methods.

Professor Ireland contacted OUC to discuss the possibility of undertaking future consultancy work. It was demonstrated at the outset that OUC could assist by attending initial meetings with potential consultancy clients, ensuring that the scope of work was properly formulated and deliverables from the consultancy clearly understood by all parties. With his considerable experience in industry, Peter wanted to ensure that he did not take on projects with unrealistic timescales which might have adverse commercial implications for the client. OUC was able to show that they are well versed with managing the expectations of potential clients so that their commercial requirements were satisfied whilst Peter's academic responsibilities were not compromised. OUC also demonstrated that they could add value by eliminating virtually all the hassle of dealing with pre-contractual negotiations and managing all post-contract administration and paperwork.

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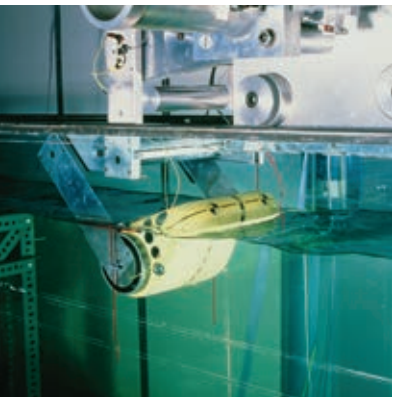
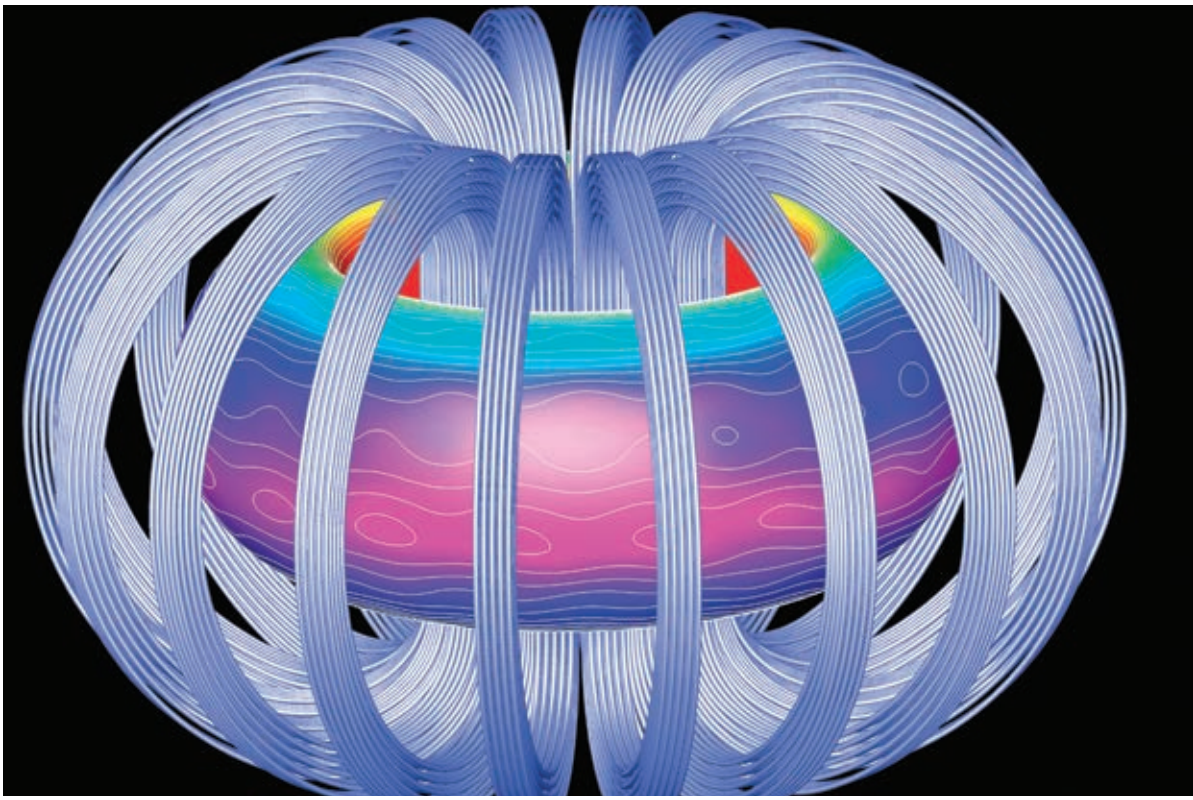


$$\frac{dx}{dt} = \sigma(y - x)$$

$$\frac{dy}{dt} = x(\rho - z) - y$$

$$\frac{dz}{dt} = xy - \beta z$$



"Acting as a paid consultant is a big responsibility. People take key decisions based on what you tell them. Such decisions may be safety-critical. They may affect the profitability or even the survival of a business. They may even affect whether an individual is sent to prison or not. Whatever the situation, the consultant needs the best possible support and advice, a good legal contract, and comprehensive insurance protection. In my experience, OUC provides all of these things in abundance, for a relatively modest percentage fee. Don't do any work of this kind without them!"

Emeritus Professor George Smith, Department of Materials

"OUC is great at sorting out the arduous activity of administering the paperwork of a consultancy, which would otherwise consume valuable time. Not only do they bring clients, they also negotiate good rates!"

Dr Malcolm McCulloch, Head of Energy and Power Group,
Department of Engineering Science

"OUC looks after the paperwork and negotiates the fee, and I am very pleased not to have to spend time on this. And they do it promptly, which makes a good impression on clients. It means that I can quickly focus on the problem or issues that are the substance of the consultancy."

Professor Richard Darton, Co-Director, Oxford Geoengineering Programme,
Department of Engineering Science

# Energy, climate and sustainability

## Brick by brick sustainability

There is an ever-pressing need to find sustainable solutions for the construction industry. One involves the development of a carbon negative masonry product which incorporates a recovered aggregate with a renewable binder – using low energy processes – to greatly reduce the environmental impact of the traditional build. The proprietary carbon negative bio-polymer technology EncoSol™ was initially developed by Drs John Forth and Salah Zoorob from the Universities of Leeds and Nottingham respectively. Encos was formed in 2008 to complete the development and extensive testing of a sustainable masonry product using the EncoSol™ technology. The resulting products: EncoBrick™ and EncoSlip™ have a fraction of the embodied energy of their traditional fired clay alternatives.

Professor Richard Darton was instrumental in evaluating the chemistry behind the development of EncoSol™, advising on the use of admixtures and how their interaction with both the binder and aggregates could improve the physical properties of bricks, brick slips and blocks. The Department of Engineering Science Professor also advised on the important role porosity plays in the curing reaction of the products, and on the development of catalysts, admixtures and binder blends. His consultancy work was all arranged through OUC.

## Quest for fusion

Einstein demonstrated that energy could be released from the process of fission with his famous equation E=mc2 but it wasn't until after the Second World War that any serious attempts were made to harness energy from the process of fusion. UKAEA filed the first patent relating to a fusion reactor in 1946 with Sir George Paget Thomson and Moses Black being listed as the inventors. Some 60 years and a lot of atomic reactions later, fusion still isn't a viable commercial option. However, that hasn't deterred scientist from exploring all manner of ideas. One of the most enduringly appealing has been the tokamak (magnetic) device first raised in a 1950-1951 theoretical work from Russian scientists Tamm and Sakharov – later a dissident and human rights activist – and based on the inspirational work of Lavrentiev. Imagine a hollow doughnut (toroid to be precise) with positively and negatively charged ions and charged electrons in a plasma state at temperatures in the region of 100 million K. The landscape has been complicated by the tokamak fusion community segmenting into those seeking a large scale solution and those pursuing a small scale answer that might be faster and cheaper if proven. Either way, in order to maintain the fusion process, particles from the hot plasma must be confined in the central region of the doughnut otherwise the plasma will cool rapidly; this makes control over the plasma beam and the materials used for the toroid critical factors.

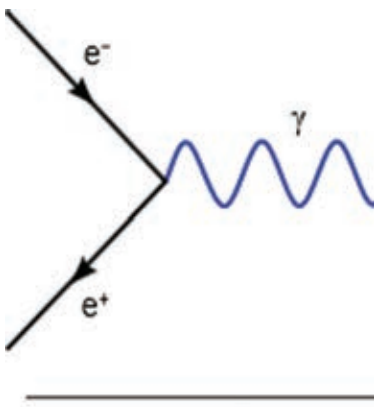
Professor George Smith, now emeritus, from the Department of Materials was approached by a company seeking to develop small-scale fusion energy technology to address the issue of material choice and design for such a tokamak fusion reactor. In a two part consultancy he was initially commissioned to carry out a study on material design and development issues facing certain aspects of a miniature reactor technology, before looking at new materials development over the next 5-10 years that could have an influence on future design. The initial consultancy culminated in a report of the findings. The second part of the consultancy built on these findings and saw Professor Smith pull together a team of specialists to produce interim reports on the main materials for the small scale reactor, mapping out the roles for each team member. While the dream of nuclear fusion power remains a work in progress, it is nice to know that two consulting projects undertaken through OUC are contributing in some small way to this endeavour.

"Oxford University Consulting has been working with the Department of Physics to highlight opportunities that lend themselves to personal consultancy, departmental services work and other areas of knowledge exchange with businesses. This is now beginning to bear fruit by way of interesting and intellectually stimulating consultancy work for individual academics in the Department as well as additional work relevant to the Design Office and Mechanical and Electronics workshops. Some of these interactions are also leading to interesting opportunities for collaborative research with businesses."

Professor John Wheater, Head of the Department of Physics

"Thermal mechanical simulation is vital to understand how machines and precision equipment behave in a physics environment. Machine design in physics is about more than just good engineering knowledge, but also the ability to relate what physics R&D requires. Applying our expertise and skills in these areas to the needs of industry has been very useful to the Department in helping to establish stronger relationships with specific companies. OUC has been very useful in handling the contractual and administrative matters."

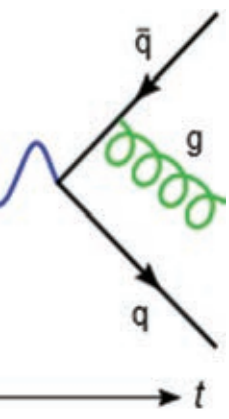
Dr Wing Lau, Head of Mechanical Workshop & Design Office, Department of Physics



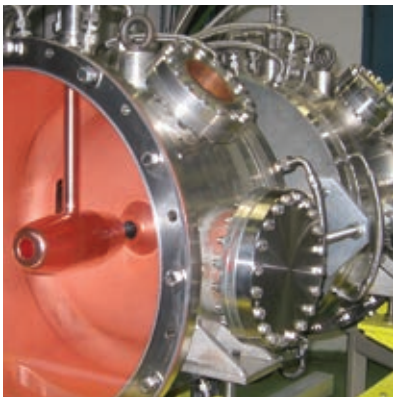
# Healthcare

## Eye of a needle

A method for allowing people with diabetes to measure their blood glucose level via an image of their eye has been developed by Reading-based Lein Applied Diagnostics following consultancy work arranged by OUC. Lein approached Dr Gari Clifford, University Lecturer in Biomedical Engineering at Oxford, to explore how his work in neural networks and machine learning could be applied to some of Lein's complex datasets in order to evaluate the relationship between the data collected from the patient's eye and their blood glucose level. Measuring blood glucose levels is critical in the clinical management of diabetes. It helps patients and clinicians tailor the correct dosage of medication and avoid hypoglycaemic events. Monitoring is currently performed by taking a small blood sample but Lein are developing their proprietary confocal optical technologies into a non-invasive monitoring system that patients will use by simply holding a mobile-phone sized device in front of their eye and taking a "snap-shot" of their blood glucose levels. For a number of companies seeking to gain an edge in the development of new medical technologies, the range and depth of expertise at the University has provided invaluable support and insight.




## Particle accelerators, everywhere…

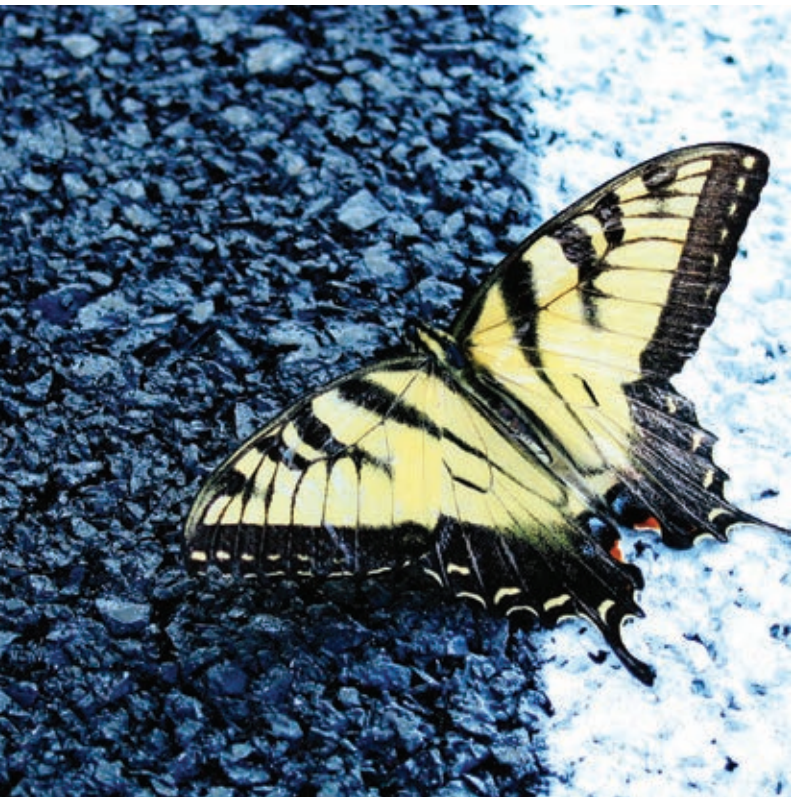


Oxford's Department of Physics is one of the largest physics departments in the world, employing about 475 people. The John Adams Institute for Accelerator Science (JAI), a division of the Department of Physics, is a centre of excellence for advanced and novel accelerator technology used in a host of areas including the LHC in CERN and hospitals around the world.

Towards the end of 2011, OUC was asked to assist the JAI to establish a closer working relationship with Elekta, a Swedish company that provides radiation therapy, radiosurgery related equipment and clinical management for the treatment of cancer and brain disorders.

Elekta is the world leader in image guided and stereotactic clinical solutions for radiosurgery and radiation therapy, giving radiation oncologists and neurosurgeons an unmatched capability to aggressively treat tumours and functional targets with ultra-high precision while sparing healthy tissue. Working with Elekta's teams in Crawley, OUC's involvement was to negotiate a contractual framework that would allow the Department of Physics to engage with Elekta's scientists on discrete projects in an open-ended arrangement. OUC would then manage the subsequent administrative project activity arising from each statement of work, arrange regular review meetings to discuss progress on existing projects and discuss new ones that could be developed, invoice Elekta upon completion of the work and ensure that the Department of Physics received the fees.

The relationship that has now been established between Elekta, the Department of Physics and OUC demonstrates the demand that there is from the industrial sector to work with the departments of the University and that Oxford skills and expertise in design, manufacturing and test facilities, can add real value to the activities of industry. The JAI, via its Accelerator Technology Exploitation Centre (ATEC), seeks to develop collaborations with a wide range of research and industrial partners that have interests in different aspects of accelerator technology. OUC offers such organisations a convenient means of accessing Oxford's accelerator expertise via consultancy agreements.



**“The Oxford Animal Flight Group has had a very successful relationship with Isis. Their commercial and legal advice and support during commercial negotiations over consultancy, IP, patents and licensing has been extremely valuable. They have also been very easy to work with, and I thoroughly recommend them.”**

**Professor Adrian Thomas, Department of Zoology**

# Flight

$$F = m\frac{dv}{dt}$$

## Oxford Animal Flight Group

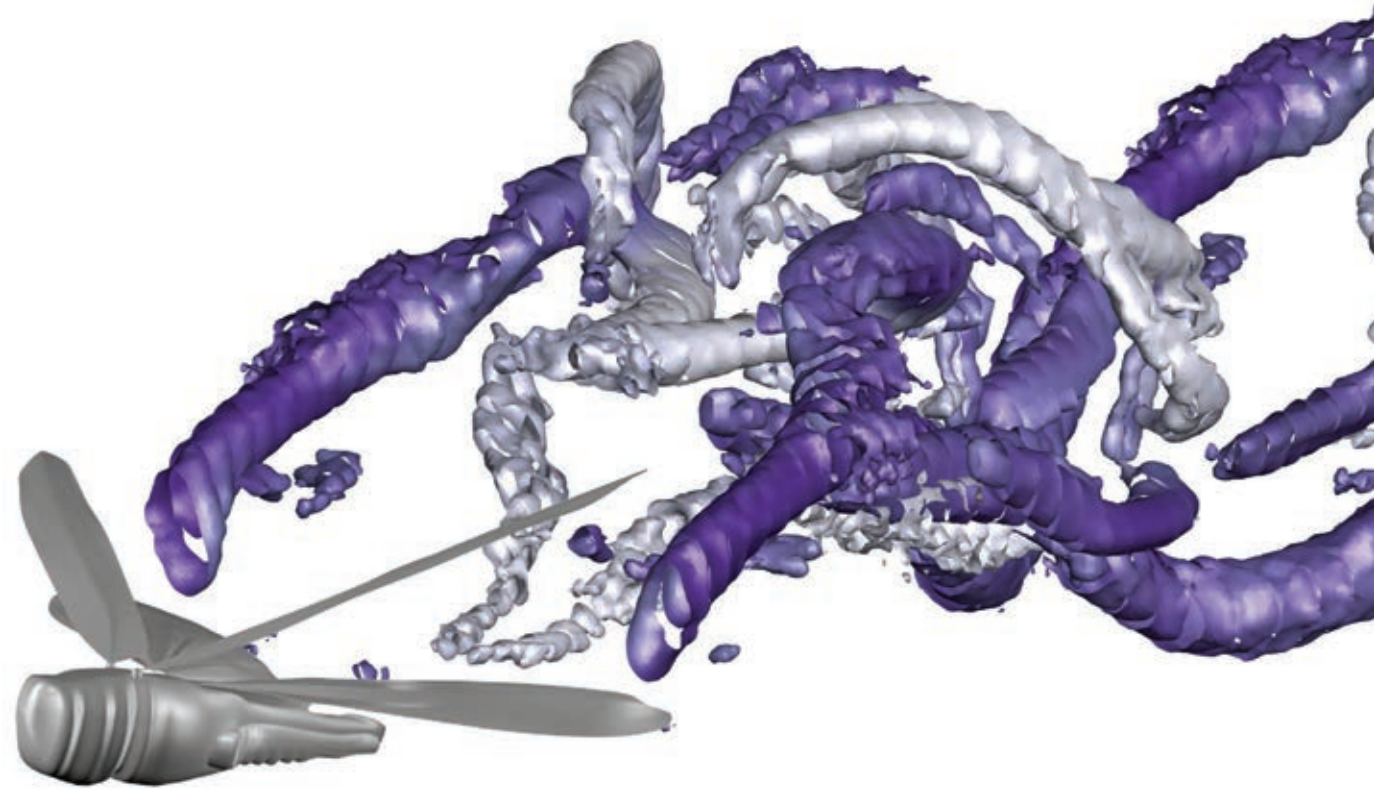
OUC provides consultancy support to the Oxford Animal Flight Group, based in the Department of Zoology.

The Oxford Animal Flight Group was founded by Professor Adrian Thomas in 1996, although the history of animal flight research in Oxford extends back much further to the seminal work of Professor J.W.S. Pringle. The group's current research deals with biological problems related to Fluid Dynamics and Flight Dynamics, with these two wings of the group led by Professor Thomas and Dr Graham Taylor, respectively.

The group is especially interested in understanding how evolution hones complex dynamical systems for high efficiency and efficacy of operation – from the firing of individual neurons to the emergence of complex flight behaviours. While the group tackles problems in animal flight from a biological perspective, the approaches they take share much in common with engineering, and the group is known for the strong interdisciplinarity of its outlook.

"Animals have been swimming and flying for several hundred million years, and through this time have been exquisitely tuned by natural selection to optimise performance," says Professor Thomas. "These animals demonstrate systems optimised for speed, efficiency, sensitivity, endurance, agility, manoeuvrability, stability and robustness and our understanding of this can help us find novel solutions to corresponding engineering problems. In addition to our basic research, we are interested in targeted technology and knowledge transfer to relevant industries and welcome enquiries from interested parties."

The group's specific areas of expertise include: biological sensors and actuators, low-speed aerodynamics, flapping flight, passive flow control and acoustic noise reduction, and OUC has worked with the group to provide their advice and expertise to a number of clients. These range from a film production company needing studio support to better handle insects being filmed for a 3D documentary on insect flight, through to projects for aerospace companies seeking to learn lessons from nature in the area of flight dynamics.



$$ds^2 = R^2\left((d\phi)^2 + cos^2\phi(d\theta)^2\right)$$



"OUC continues to provide first class support for my consulting activities. Having a team of professionals to manage my portfolio, do the worrying paper work and contracts, chase and then put the money in my account is helpful and reassuring beyond words. It gives me the time to do the consulting bit. It's a no brainer."

**Professor Paul Newman,**
**Oxford Mobile Robotics Group**
**Department of Engineering Science**

"I have found professional backup to be invaluable in dealing with contracts, confidentiality and billing – OUC just makes these go away. A service I'd recommend to anyone who is lucky enough to have access to it."

**Dr Ingmar Posner,**
**Oxford Mobile Robotics Group**
**Department of Engineering Science**

# Robotics

## Oxford Mobile Robotics Group

Researchers in the Mobile Robotics Group (MRG) are helping to build a future where autonomous vehicles will play an important part in all our lives and OUC is helping support the application of this research expertise by managing the consultancy of Professor Paul Newman and several of his colleagues in the MRG.

"Robots will come in a variety of shapes and sizes and undertake a diverse set of tasks on our behalf," says Professor Newman. "We will want them to carry things and transport us, labour for us and defend us. We shall want them to be flexible, reliable and safe. And they will need to work in a range of environments, sometimes hostile, and sometimes dynamically changing." Robots today already carry goods around factories, move stock around warehouses and manage our ports, but these are constrained, controlled and highly managed workspaces. In such environments the navigation task is made simple by installing reflective beacons or guide wires. However, Professor Newman and his co-workers are extending the reach of robot navigation to truly vast scales without the need for such expensive, awkward and inconvenient modifications of the environment. Their approach does not rely on GPS which, if available, does not offer the accuracy required for robots to make decisions about how and when to move safely. Even if it did, it would say nothing about what is situated around the robot, and that has a massive impact on autonomous decision-making. Instead, the Oxford approach is to use the mathematics of probability and estimation to allow computers in robots to interpret data from sensors like cameras, radars and lasers, aerial photos and on-the-fly internet queries.

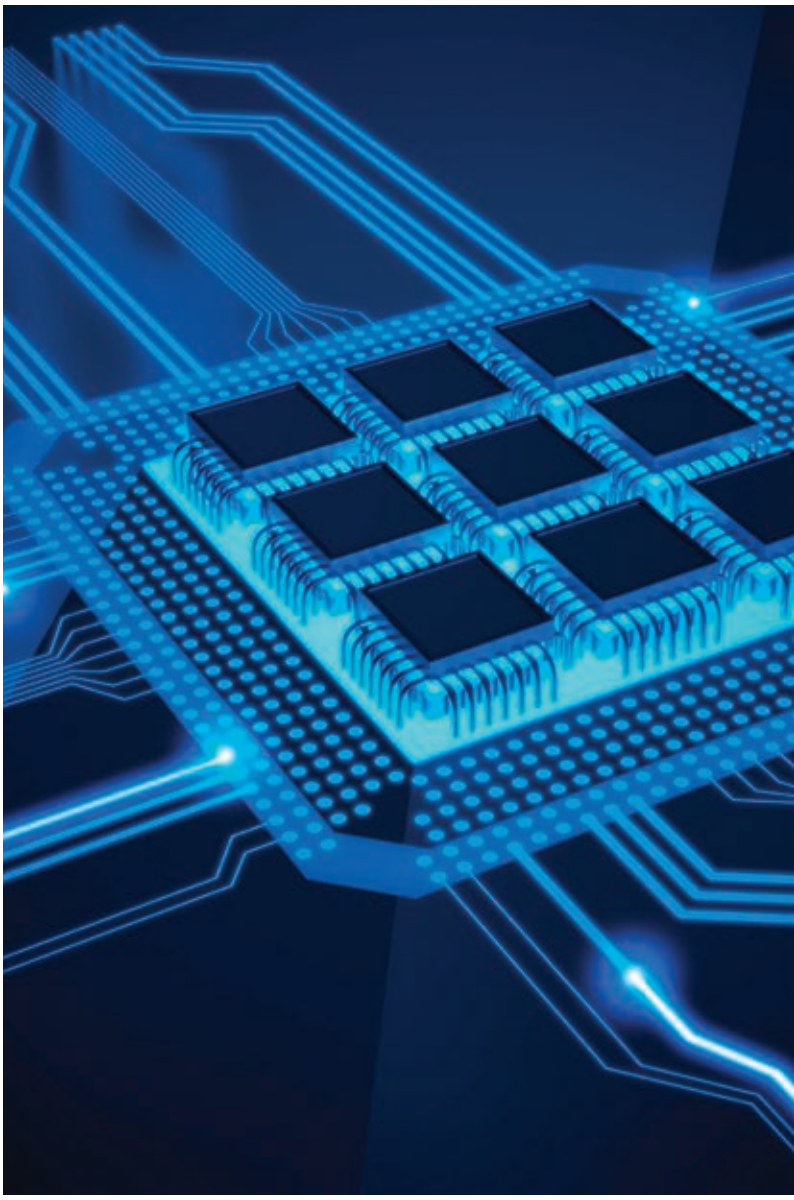
Underpinning much of the MRG's work is the MOOS ("Mission Oriented Operating Suite") software project – free, open source, light-weight middleware, originally conceived by Professor Newman when he was at MIT. While MOOS continues to be developed in Oxford today, it is also used by a wide range of external organisations in the development of their own autonomous robots. Through OUC, Professor Newman supports many of them to get the best out of MOOS with his consultancy advice and expertise.

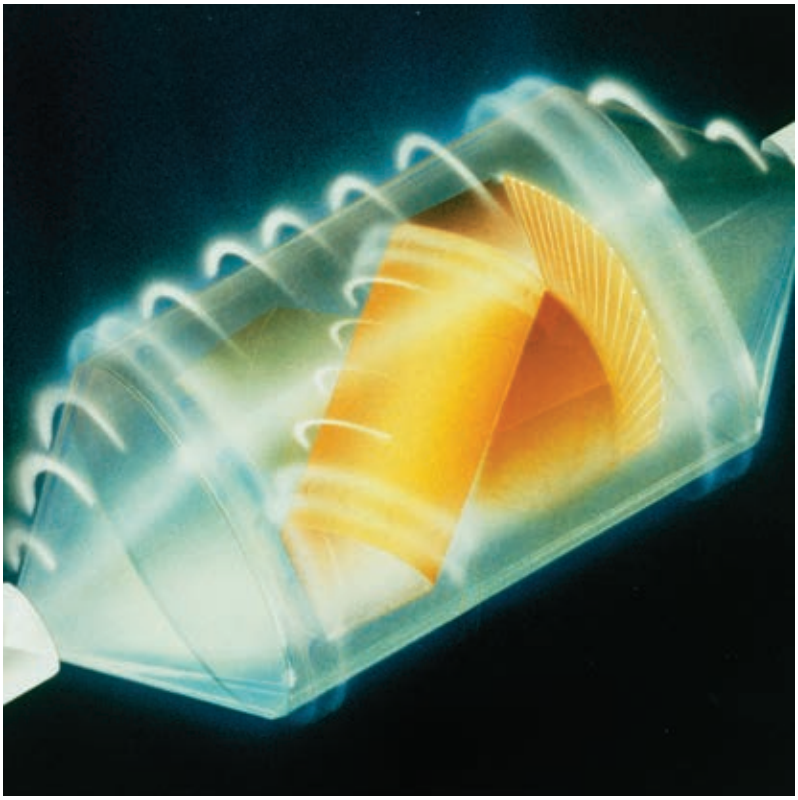
One of Professor Newman's most high profile projects to date is the Robotcar project (www.robotcar.org.uk), an autonomous Nissan LEAF road vehicle. With research supported by the Engineering and Physical Sciences Research Council (EPSRC) and in collaboration with Nissan, MIRA, Guidance Navigation Ltd (GNL) and the EU, it is among the first projects in the world to tackle the big challenges of creating long term, any-weather mobile autonomy. The technology installed in the vehicle removes dependence on GPS, improves navigation precision and is set to lower emissions, interpret local traffic conditions, track risks, and above all offer a hands-free experience to the driver.

The application of Oxford mobile robotics expertise is not only confined to terrestrial environments. GNL, a leading developer and supplier of sophisticated navigation and position measurement technologies, is also working with Professor Newman, both through sponsored research and through consultancy managed by OUC, to develop better dynamic positioning systems for offshore marine applications. GNL's aim is to increase the flexibility of marine vessel operation, helping to widen the weather operation window and improve safety.

**“Doing consultancy work has given me new ideas and a new perspective helping me to better support the requirements of my Department.”**

**Johan Fopma, Head of Cost Recovery, Department of Physics**





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# Facilities and Services

The Mathematics, Physical & Life Science Division boasts an outstanding array of services and facilities across its departments, spanning a huge range of technology areas and potential applications. Such services and facilities primarily support research and teaching activities within the Division and across the University.

Further impact and benefits for the Department, Division and University can be extracted from these resources by providing services to external companies through commercial service contracts. In addition to the range of services and specialist equipment within the Division that may not be available from other sources, external organisations reap additional benefits from the expertise of the teams that run the equipment, facility or service – frequently active researchers working at the cutting edge of their fields.

OUC arranges service contracts with external organisations ranging from independent research organisations in southern Europe, through universities in Africa, to biopharmaceutical companies in the UK. The Departments benefit from an additional income stream and contribute to the wider impact agenda by maximising the use of the equipment and facilities.

## NMR Services

Dr Tim Claridge manages and runs the Nuclear Magnetic Resonance (NMR) facility from the Chemistry Research Laboratory (CRL) at the Department of Chemistry, which is one of the largest magnetic resonance facilities in the UK, supporting chemical research and undergraduate practical work, as well as commercial services. Operating twelve solution-state and two solid-state FT NMR instruments with proton operating frequencies ranging between 200 and 700 MHz, they are capable of running most experiments of interest to the research chemist.

OUC has supported the NMR facility to arrange some commercial service contracts, including the analysis of compounds for an independent forensics expert. In addition to the income that the group receives, using spare capacity on equipment by providing services to commercial organisations fits perfectly with Research Council objectives to generate maximum impact from Small Research Facilities (SRFs).

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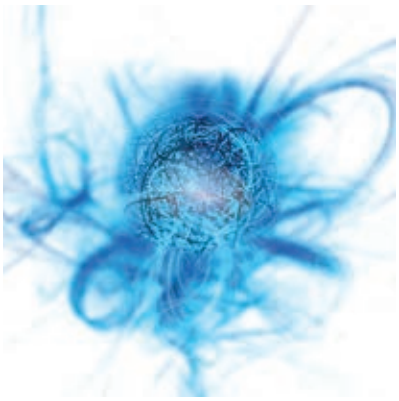
**“OUC have assisted us in the negotiation and administration of commercial contracts, allowing us to focus our time on providing scientific expertise to our external clients.”**

**Dr Tim Claridge,**
**Department of Chemistry**



“OUC have managed the financial side of a consultancy project with a German company called ETALON AG for two researchers in my group and myself. The project was contractually very complex as it was intertwined with an on-going license deal negotiation as well as a research contract and a material sales agreement. OUC collaborated well with their Technology Transfer colleagues who dealt with the rest of the project, and handled all the contract and payment parts for us. Given how much time I had to spend on all this already I would split 10% of the consulting proceeds any time again to have OUC handle the administrative side of things.”

Dr Armin Reichold,
Department of Physics

“Working with OUC has been a source of very interesting consultancy projects for me. In each case, the process has been efficient, the work has been exciting and the team have been highly supportive and pleasant to work with. I feel they provide a straightforward system and secure platform for academics undertaking consultancy.”

Dr Orlaith Burke,
Department of Statistics

# Supporting Technology Transfer

The Technology Transfer group within Isis works closely with researchers at the University to identify, evaluate and commercialise intellectual property that is generated through research activities.

There are a number of routes for commercialising new ideas including licensing to development partners, spinning-out a company around the intellectual property or, for some software-based ideas, starting-up a new company through the Isis Software Incubator.

With any new venture, integrating or developing new technologies presents its own set of special challenges and Isis, the University and its researchers have a vested interest in seeing its partners succeed so that the technology can have the maximum impact beyond the boundaries of the University. OUC therefore works very closely with colleagues in the Isis Technology Transfer team to arrange consultancies to advise technology licensees and to support new spin-outs and software start-up companies.

## Consulting to an Isis spin-out company

The intellectual property (IP) landscape surrounding a spin-out company can be complex with the company licensing-in IP from Isis, developing new IP themselves, potentially funding research in the University that generates additional IP, or buying-in consultancy or services that may generate new IP, or improve existing IP. When a consultant is also a founding academic of the company and the inventor of IP developed in the University and licensed-into the company through Isis, it is important that IP rights clauses in each of the spin-out, research, consultancy and services agreements are properly aligned and potential conflicts of interest avoided.

## Oxford Imaging Detectors (OID)

OID was set up to exploit imaging detector technology developed by Professor Angus Kirkland's group in the Department of Materials. Initially focussed for use in electron microscopy, the technology provides significant advantages over the current state of the art in terms of speed, contrast, efficiency and resolution. OID was organised as a small high-tech manufacturing business, where components and sub-systems manufacture would be out-sourced, and final assembly and testing carried out in-house. The spin-out was managed through the Technology Transfer Group within Isis. Working closely with Professor Kirkland and the Technology Transfer Group, OUC put in place all the necessary internal paperwork and contracts required for him to undertake the consultancy work without compromising his on-going research or other duties within the University.

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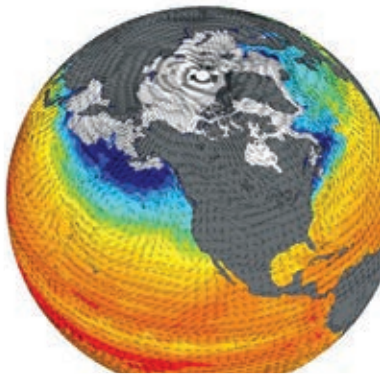

**To register as a consultant with OUC please go to**
www.isis-innovation.com/consulting/university/register


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