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EXECUTIVE SUMMARY

I am privileged to write the executive summary for the fifth annual report of the University of Plymouth’s Institute of Translational and Stratified Medicine (ITSMed). The focus of ITSMed remains our three areas of strength: cancer; clinical neuroscience; and infection, immunity and inflammation, with cross-cutting expertise in diagnostics, clinical trials and public health. We continue to provide a permissive environment with core infrastructure platforms for effective transdisciplinary research. While after four years of growth, 2018 was mainly a year of consolidation, we are pleased to welcome Dr Konstantin Glebov who joined us from the University of Bonn and strengthens our Clinical Neuroscience team.

Certainly a highlight in 2018 was the Royal opening of our new Derriford Research Facility (DRF) by Her Royal Highness The Princess Royal, which was followed by a well-attended, one-day scientific symposium.

As an indication of another successful year, we increased the number of publications in the top 10% journal by cite score even further. This includes five papers in Lancet, additional ones in Lancet sister journals, three Nature Communications papers, as well as papers in Cell and Nature Medicine.

In 2018 we had two examples of where our basic science research has been successfully translated into the clinic. These were the publication of a clinical trial based on earlier research in our Brain Tumour Research laboratory, and the Dementia – Person Aligned Care Team (D-PACT Dementia Support Study). D-PACT is a five-year £2.74 million programme funded by the NIHR, aimed at driving dementia clinical trials into the community with the community.

Funded by Innovate UK, researchers of the infection, immunity and inflammation theme received a grant as part of a bilateral research competition between the Department of Health and Social Care’s Global Antimicrobial Resistance (AMR) Innovation Fund and the Chinese Ministry of Science and Technology.

We aim to further develop these collaborations and our other existing relationships and Memorandums of Understanding with Chinese universities across all themes. As part of this we staged a symposium of Chinese researchers with ITSMed, and plan to participate in the Jiangsu–UK 20+20 World-Class University Consortium.

2018 also saw the creation of another University spinout company, Amprologix, working on the development of a new class of antibiotics to help tackle the global problem of drug resistant infections.

I hope this annual report will show that in our fifth year we have continued to consolidate and develop our strong research position, and that we are on a trajectory to become a leading institute for translational medicine.

Again, I want to thank all of the Institute members for their hard work and commitment that has enabled us to continue this successful progress. Special thanks to Dr Tom Nicholson and Francesca Niedzielski for their support in producing this annual report.

Professor C Oliver Hanemann
ITSMed Director, Plymouth, 2018
Headquartered in the University of Plymouth’s prestigious new £17 million Derriford Research Facility, the Institute of Translational and Stratified Medicine (ITSMed) brings together scientists, clinicians and expertise from across the spectrum of scientific discovery, medical research and health technology, to conduct world-class laboratory, clinical/applied health research.

The Institute’s dynamic, collaborative, interdisciplinary research environment and integrative ‘bench-to-bedside and back’ approach enables development of new therapeutics, diagnostics, interventions and approaches to prevent, detect and treat devastating diseases, enhance patient outcomes, and improve global healthcare.

The Institute hosts two major research groups, the Biomedical Research Group, and Clinical Trials and Population Studies Group, with combined facilities and resources that cluster researchers with recognised expertise from across the University’s Faculty of Medicine and Dentistry, and beyond.

ITSMed is home to the University’s internationally renowned Brain Tumour Research Centre of Excellence.

Our focus is on three core research themes: cancer; clinical science; and infection, immunity and inflammation, facilitated by cross-cutting expertise in diagnostics, clinical trials and public health research.

This translational research is facilitated by the University’s UK Clinical Research Collaboration (UKCRC) registered Peninsula Clinical Trials Unit (PenCTU), Medical Statistics and Systems Biology Centre teams.

Our research strengths were confirmed by the excellent results from our submission to the Research Excellence Framework (REF) 2014, which ranked us as the UK’s top higher education institution for quality of research outputs in clinical medicine, above medical schools at Oxford and Cambridge.

In 2018, ITSMed’s management board comprised the Director, Professor Oliver Hanemann, supported by the Research Group Leads Professor Bob Fern and Professor Mathew Upton (Biomedical Research) and Professor Adrian Taylor (Clinical Trials and Population Studies), the Faculty’s Research and Innovation Business Partner, Dr Tom Nicholson, the Faculty’s Research Co-ordinator, Sue Varley, and an external scientific advisory board.

Derriford Research Facility
ROYAL OPENING OF THE DERRIFORD RESEARCH FACILITY

The Derriford Research Facility (DRF) was officially opened by Her Royal Highness The Princess Royal on 15 May 2018, a visit that underlined the importance of the University’s investment in the translation of medical and dental research into patient care.

Patients, fundraisers and members of the community joined staff members to help celebrate the occasion. Her Royal Highness was officially welcomed by Vice-Chancellor Professor Judith Petts CBE, who accompanied her on a tour of the facilities. During the tour The Princess Royal was introduced to a number of our research projects from across the three themes, including those of Professors Oliver Hanemann, Simon Jackson, Matthew Cramp, Mathew Upton, Edgar Kramer and Simon Rule, and Drs Michael Jarvis, Claudia Barros and Shouqing Luo.

The visit also included meeting invited members of the community who fundraise and benefit from the life-changing research taking place, including Parkinson’s disease patient John Whipps, who is participating in Dr Camille Carroll’s work.

The Royal visit concluded with The Princess Royal unveiling a plaque to commemorate the building in front of an invited audience.

The Royal visit was followed by a successful one-day scientific symposium, with guest speakers Professor Dame Pamela Shaw (University of Sheffield) and Dr Mark Fidock (AstraZeneca). Over 100 scientists attended, including representatives from funding organisations and biomedical research companies.

The close proximity to both the Faculty of Medicine and Dentistry, and the University Hospitals Plymouth NHS Trust at Derriford Hospital, places DRF in a prime location to advance the biomedical and clinical research capabilities of the city. This relationship between the three entities encourages cross-organisation collaboration, reflecting our role as a research-led university and reinforcing the Institute’s ‘bench-to-bedside and back’ approach.

We are certain that the DRF will build on the existing strengths of quality health research at the University, with the potential to attract more of the greatest minds in medicine to Plymouth, and put the city and region on the international map in addressing global health issues.

“My congratulations on the achievement of this facility, focused as it is on research, but with very close clinical associations. I suspect that it is also a huge encouragement to patients, who will feel more involved with research in the future, and their families. I hope you feel that this investment, what you see going on and the teams here are truly fulfilling the ambitions you all have for this facility, and the link with the hospital. I am sure there will be much more to come.”

HRH The Princess Royal
INSTITUTE FACILITIES

ITSMed’s laboratory, clinical and applied health research, and work with external partners is enabled by a range of world-class facilities, services and expertise that:

- underpin and cut across our areas of research activity;
- facilitate interdisciplinary collaboration;
- enhance our research and innovation capability, and
- allow provision of dedicated services and support to other organisations.

DERRIFORD RESEARCH FACILITY (DRF)

Opened in October 2017, ITSmed’s new, state-of-the-art DRF headquarters represents a landmark investment by the University into its biomedical and clinical research infrastructure.

Located at Plymouth Science Park, adjacent to the University’s Faculty of Medicine and Dentistry and neighbouring University Hospitals Plymouth NHS Trust, the DRF incorporates high-tech laboratories with a range of cutting-edge technical capabilities, including the University of Plymouth Systems Biology Centre and Plymouth Light Microscopy Service. The DRF provides a rich, collaborative, interdisciplinary environment for University researchers, clinical colleagues and our partners.

MEDICAL STATISTICS

Our dedicated medical statistics team provides quantitative statistical/data analysis, database management and support – including study design, screening, biomarker discovery and risk assessment – across biomedical, clinical and health research, trials and services for academic, NHS and commercial partners.

PENINSULA CLINICAL TRIALS UNIT (PenCTU)

PenCTU is a fully registered clinical trials unit in the UK Clinical Research Collaboration (UKCRC), and receives NIHR support funding. It has clinical, methodical with clinical, methodological, trial and data management expertise. It is intended to design, set up, conduct, analyse and publish high-quality single and multi-centre clinical trials and other well-designed studies, from early human drug trials (CTIMPs) to public health and health services complex interventions.

PenCTU works across the University’s health and medical research and with academic, NHS and business partners.

UNIVERSITY OF PLYMOUTH SYSTEMS BIOLOGY CENTRE

The centre has a track record for high-quality proteomic analysis facilities and expertise. It provides a comprehensive, dedicated service to support delivery of research, from experimental design to data analysis, for academic and commercial partners. This is complemented by our bioinformatics team.
PLYMOUTH LIGHT MICROSCOPY SERVICE (PLiMS)

PLiMS offers a light/confocal microscopy and image analysis service for bioimaging applications for academic and commercial partners. The comprehensive service includes advice, instruction, image acquisition, processing and analysis of samples, fast documentation of live cell cultures and tissues, in situ conventional and fluorescent stains, and quantitative image analysis.

NIHR COLLABORATION FOR LEADERSHIP IN APPLIED HEALTH RESEARCH AND CARE SOUTH WEST PENINSULA (PenCLARHC)

A NIHR-funded partnership between the University of Plymouth, the University of Exeter and NHS organisations across Devon, Cornwall and Somerset.

The partnership supports and funds research with direct impact on patients’ health and the way in which NHS care is delivered, conducting research based on questions from those directly affected: doctors, nurses, therapists and patients.

For further information about ITSMed’s facilities and services please visit: www.plymouth.ac.uk/itsmed
CANCER RESEARCH HIGHLIGHTS

BIOMEDICAL RESEARCH

Our success in this area is highlighted by the £1.3 million funding for our internationally renowned Brain Tumour Research Centre of Excellence, led by Professor Oliver Hanemann.

Professor David Parkinson and Professor Hanemann started an exciting collaboration with Vivace Therapeutics to test a first-in-class drug in two different brain tumour models, while Dr Sylwia Ammoun and Professor Hanemann were awarded a grant by the Great Ormond Street Hospital Children’s Charity and SPARKS Investigation, towards targeting cellular prion protein PrPC in neurofibromatosis type II related tumours schwannomas, meningiomas and spinal ependymomas.

An ‘omics’ analysis of the most common intracranial brain tumour meningioma, undertaken using genomics and proteomics and in collaboration with colleagues from Cambridge University, has been published in Scientific Reports and EBioMedicine.

In April 2018, Dr Claudia Barros was awarded £163,000 sponsorship from Brain Research UK for her team to commence a three-year research project, focusing on brain tumour initiation and growth.

Dr Bing Hu’s team has been focusing on the molecular mechanisms of stem cell activation and maintenance. Dr Hu’s recent article ‘Prominin-1 controls stem cell activation by orchestrating ciliary dynamics’ in The EMBO Journal has shown that proper cilia functions in stem cells require prominin-1/CD133 for recruiting different key intracellular effectors. The report ‘Transit Amplifying Cells Coordinate Mouse Incisor Mesenchymal Stem Cell Activation’ has been revised and described as being “of considerable interest” by the editor of Nature Communications.

The Hematopoiesis and Immune Cell Cancer Group, headed by Dr Amiya Patra, has recently reported impaired T- and B-lymphocyte development due to defects in the interleukin-7 (IL-7) signalling pathway. The team suggests this could lead to either immunodeficiency or leukaemia (T-acute lymphoblastic leukaemia; T-ALL), which are both serious pathological conditions. They have identified a key signalling molecule (NFATc1), which plays a critical role in executing IL-7 signals during the early stages of T- and B-lymphocyte differentiation. Through their current project, funded by the José Carreras Leukaemia Foundation, they aim to understand how altered NFATc1 activity leads to T-ALL pathogenesis.

Will web-based support for undertaking physical activity result in significant health gains for patients with chronic conditions?

A multi-centred randomised controlled trial to investigate the effects of adding web-based coaching (e-coachER) to an exercise referral scheme, as a way to increase uptake and sustained health enhancing physical activity for patients with chronic physical and mental health conditions.

Physical inactivity has been widely linked to increased risk of various cancers, but the challenge is to find ways to support the adoption and maintenance of behaviour change. The £900,000 NIHR-funded e-coachER study, led by Professor Adrian Taylor in ITSmed and the Peninsula Clinical Trials Unit (PenCTU), involved a total of 450 inactive primary care patients from Plymouth, Birmingham and Glasgow.

The patients were referred to an exercise referral scheme (ERS) to randomly receive either the usual ERS or the usual ERS plus a bespoke seven-step behavioural support programme, delivered via an interactive website. The sample patients had an average body mass index of 33 and were 50 years of age. Participants with access to online e-coachER support were not significantly more active at 12 months (based on accelerometer worn devices) compared to those who didn’t, despite reasonable engagement with the online support. But, given the low cost of the e-coachER support package, the small improvement in activity levels could be worthwhile if offered more widely. The full results are expected to be published in high profile publications in 2019.

This study was managed by PenCTU and supported by the NIHR Collaboration for Leadership in Applied Health Research and Care South West Peninsula (PenCLAHRC).
Smoking remains the main cause of preventable morbidity and premature death in England. Professional support for smoking reduction may increase the number of smokers who quit, and increasing physical activity may help such an approach.

The £1.8 million NIHR-funded Trial of physical Activity and Reduction of Smoking (TARS) study led by Professor Adrian Taylor has recruited the required 900 smokers (who didn’t want to quit but did want to reduce) from Plymouth, Oxford, London and Nottingham. Participants have been randomised to receive either usual brief advice about the benefits of quitting or one-to-one health trainer support. Engagement has been excellent with an average of over five support sessions having been provided so far. The final nine month follow-up assessment with self-report and expired carbon monoxide confirmed continuous abstinence will be completed in February 2020.

This study is managed by the PenCTU and supported by the NIHR Collaboration for Leadership in Applied Health Research and Care South West Peninsula (PenCLAHRC).

Could physical activity encourage smokers to reduce their consumption?

A collaborative national study to test the effectiveness of new support to help smokers who want to reduce but not quit.
Brain Tumour Research Centre of Excellence

Internationally renowned for research into low-grade brain tumours.

The Centre of Excellence for low-grade brain tumours, funded by the charity Brain Tumour Research, is led by Professor Oliver Hanemann and has four Principal Investigators.

Recently the team intensified their work on meningiomas, the most frequent primary brain tumour.

One of the aims, which runs through all groups, is to identify new therapeutic targets for brain tumours. They then validate these and test (repurposed) drugs in a variety of model systems for brain tumours, in addition to exploring combination therapies. The research team has a track record of translating these new treatment approaches into clinical trials.

In parallel, they stratify brain tumours into molecular defined subclasses, with the overall long-term aim of personalised therapy.

This is in line with the second aim to identify biomarker candidates, which differentiate lower and higher grade tumours or indicate progression to higher grade, using a variety of complementary approaches. They aim to have simple biomarkers to stain tissue and, if possible, biomarkers in the blood. Efforts to identify biomarkers are supported by the €3.6 million EU Marie Skłodowska-Curie Innovation Training Network AiPBAND.

This team has a significant number of stable and productive collaborations within the brain tumour research community in the UK and beyond.
PUBLICATION HIGHLIGHTS

Hanemann CO, et al.
An integrated genomic analysis of anaplastic meningioma identifies prognostic molecular signatures. Scientific Reports 2018-09, 10.1038/s41598-018-31659-0

Proteomic analysis discovers the differential expression of novel proteins and phosphoproteins in meningioma including NEK9, HK2 and SET and deregulation of RNA metabolism. EBioMedicine 2018-12, 10.1016/j.ebiom.2018.12.048

Hussain SA, et al.
Atezolizumab versus chemotherapy in patients with platinum-treated locally advanced or metastatic urothelial carcinoma (IMvigor211): a phase 3, open-label, multicentre randomised controlled trial. The Lancet 2018-02, 10.1016/S0140-6736(17)33297-X

Poetsch A, Danckwardt S
Transcriptome 3’end organisation by PCF11 links alternative polyadenylation to formation and neuronal differentiation of neuroblastoma Nature Communications 2018-12 (online), 10.1038/s41467-018-07580-5

Rule SAJ
Bortezomib-based chemotherapy in mantle cell lymphoma The Lancet Oncology 2018-11, 10.1016/S1470-2045 (18)30743-5

Rule SAJ, et al.
Acalabrutinib in relapsed or refractory mantle cell lymphoma (ACE-LY-004): a single-arm, multicentre, phase 2 trial. The Lancet 2018-02, 10.1016/S0140-6736(17)33108-2

CANCER RESEARCH IN THE NEWS

Researcher secures funding to further investigate treatment for neuro-tumours (Dr Sylwia Ammoun) www.plymouth.ac.uk/news/researcher-secures-funding-to-further-investigate-treatment-for-neuro-tumours

Professor co-authors paper on landmark bladder cancer trial (Professor Syed Hussain) www.plymouth.ac.uk/news/professor-co-authors-paper-on-landmark-bladder-cancer-trial

Student honours dad by fundraising for vital research www.plymouth.ac.uk/news/student-honours-dads-passing-by-fundraising-for-vital-research

3D bioprinter revolutionises skin research (Dr Bing Hu) www.plymouth.ac.uk/news/3d-bioprinter-revolutionises-skin-research

New insight into stem cell behaviour ‘highlights therapeutic target for cancer treatment’ (Dr Bing Hu) www.plymouth.ac.uk/news/new-insight-into-stem-cell-behaviour-highlights-therapeutic-target-for-cancer-treatment

New researchers to help tackle devastating brain tumours www.plymouth.ac.uk/news/new-researchers-to-help-tackle-devastating-brain-tumours

RESEARCH TEAMS

- Brain tumours – Professor C Oliver Hanemann
- Blood cancer – Professor Simon Rule, Dr Claire Hutchinson
- Cancer microenvironment – Professor Ji-Liang Li
- Health and behaviour change – Professor Adrian Taylor
- Oral/skin cancer – Dr Bing Hu
- Hematopoiesis and immune cell cancer – Dr Amiya Patra
- Peripheral nerve research/brain tumours – Professor David Parkinson
- Neural stem cells/brain tumours – Dr Claudia Barros
- Nanotechnology and biosensor diagnostics – Professor Genhua Pan
- Biostatistics and diagnostics – Dr Xinzhong Li
- Peninsula Clinical Trials Unit – Mrs Siobhan Creanor
Control of neuronal function is key to many of the most challenging diseases, including neurodegenerative conditions such as Parkinson’s disease, Huntington’s disease and dementia. These conditions remain poorly understood, hindering the development of new treatments. We use molecular and genetic approaches to identify neuropathologic pathways, novel disease markers and treatment targets.

Dr Shouqing Luo has funding from the Medical Research Council for his work on the role of autophagy and cell death in Huntington’s disease, including a study on autophagosome synthesis and the aggregation-prone protein toxicity in dementia diseases. Dr Luo has also been awarded funding for Huntington’s disease from neurodegenerative disease research charity BRACE, a key long-standing partner and supporter of ITSMed’s research.

Professor David Parkinson and Dr Xin-peng Dun have been awarded funding to develop models to investigate peripheral nerve injury and regeneration. Professor Bob Fern has also received PhD studentship funding from BRACE to investigate the vulnerability of white matter to induction of a human tau mutation associated with dementia.

We are delighted to welcome Dr Konstantin Glebov as lecturer in clinical neuroscience who joined the Biomedical Research Group this year from University Hospital Bonn. Dr Glebov will be investigating insulin degrading enzyme in neurodegenerative disease.

Professor Edgar Kramer joined the group last year and is investigating the role of cell surface protein signalling in the pathogenesis of neurodegenerative disorders with a particular focus on Parkinson’s disease; he is another of our researchers with recent BRACE funding.

ITSMed researchers Professor Genhua Pan, Dr Camille Carroll and Dr Xinzhong Li are leading a pan-European €3.5 million Horizon 2020 Marie Skłodowska-Curie Innovative Training Network, BBDiag, to identify blood-based biomarkers for early Alzheimer’s disease and develop associated diagnostic techniques.

BIOMEDICAL RESEARCH

Dementia – Person Aligned Care Team (D-PACT)

The Dementia Person Aligned Care Team (DPACT-Dementia Support Study) is a five year programme funded by the NIHR (£2.74 million), led by Professor Richard Byng and his team in the Community and Primary Care Research Group.

During the initial developmental phase of the programme, the team will investigate the uncertainties around the optimal components of a primary care-based dementia support intervention, and the uncertainties of trial science methodology in relation to recruitment and appropriateness of outcome measures for people with dementia and their carers.

Learning from the developmental phase will go on to inform a subsequent cluster randomised control trial (cRCT). The team will work closely with patient and public involvement throughout the programme, to ensure that people with dementia and their carers influence and shape the intervention developed and its delivery.

Started in November 2018, the programme is a collaboration with Devon Partnership NHS Trust, the University of Manchester, University of Exeter, the London School of Economics and Newcastle University.

The study is supported by the Peninsula Clinical Trials Unit (PenCTU) and the NIHR Collaboration for Leadership in Applied Health Research and Care South West Peninsula (PenCLAHRC).
Dr Craig Newman and his team’s innovative research at the interface between clinical assessment and e-Health technology development practice continues to drive innovation to support the care of patients with dementia. One such high impact project is ACEmobile, an app that helps doctors and nurses to carry out dementia screening tests, collects secure and anonymised data to allow practitioners to improve their understanding of dementia and ability to detect it earlier. The project was named as a winner at the world’s largest healthcare awards programme, the HSJ Awards in November.

ITSMed researcher, Professor Jeremy Hobart is a Consultant at University Hospitals Plymouth NHS Trust, supporting people with Multiple Sclerosis (MS). He is internationally recognised for his impact in health measurement science. This has included developing numerous Patient Reported Outcome (PRO) scales that have been key outcome measures for multi-million pound clinical trials and, therefore, have underpinned development and licensing of numerous treatments.

The research outcomes have been recognised by the FDA as high quality measures attracting over £1 million in license income. As such, Professor Hobart has been engaged by a number of commercial companies to support the development of new measures, or analysis of data, to underpin treatment development and licensing decisions.

Responding to concerns about the value of existing measures to determine Upper Limb Function (ULF) in people with MS, Professor Hobart has been developing a new PRO for this purpose. Using a development methodology preferred by the FDA, the Hobart ULF PRO will provide greater confidence and reliability in data assessing protection of ULF provided by potential treatments for MS. In growing this portfolio of work, Professor Hobart is establishing a Community Interest Company, which ensures that the commercial income generated is reinvested in clinical services for MS and further impactful research.

Dr Camille Carroll, ITSMed researcher and Consultant Neurologist at University Hospitals Plymouth NHS Trust, is also NIHR Clinical Research Network National Specialty Lead for Neurodegeneration. She recently co-collaborated on The Read codes, a project that has focused on diagnosis of dementia.

This new machine-learning model that scans routinely collected NHS data has shown promising signs of being able to predict undiagnosed dementia in primary care. The Read codes – a thesaurus of clinical terms used to summarise clinical and administrative data for UK GPs – were assessed on whether they may contribute to dementia risk, with factors included such as weight and blood pressure. Results indicate that the model can detect those with underlying dementia with an accuracy of 84%. This suggests that the machine-learning model could, in future, significantly reduce the number of those living with undiagnosed dementia – from around 50% (current estimated figure) to 8%.

Professor Bob Fern has led an international collaboration with colleagues at the University of Malta, to develop a new kind of combination treatment for diseases that involve damage to the white matter of the brain. Examples include multiple sclerosis and stroke, but also spinal cord injury, traumatic brain injury, and developmental disorders such as cerebral palsy.

Based on decades of research in his laboratory, Professor Fern revealed in a study, published in Nature Communications in February 2018, that specific types of a receptor for the neurotransmitter glutamate are activated in a cascade of events that result in damage to the myelin layer around axons. Myelin is essential for nervous system function. The results show that activation of a particular sub-type of receptor is necessary for myelin injury to occur, and that treatment with drugs that interfere with this receptor are highly protective.

This work continues to move forward and the group is identifying a treatment combination with minimal side effects that they hope to accelerate toward clinical trials in the near future.
PUBLICATION HIGHLIGHTS

Raghu SV, Mohammad F, Chua JY, Lam JSW, Loberas M, Sahani S, Barros CS, Claridge-Chang A
A zinc-finger fusion protein refines Gal4-defined neural circuits.
*Molecular Brain* 2018-08, 10.1186/s13041-018-0390-7

Network meta-analysis of antidepressants.
*The Lancet* 2018-09, 10.1016/s0140-6736(18)31784-7

Vesicular glutamate release from central axons contributes to myelin damage.
*Nature Communications* 2018-03, 10.1038/s41467-018-03427-1

Green EK, et al.
Genomic Dissection of Bipolar Disorder and Schizophrenia, Including 28 Subphenotypes.
*Cell* 2018-06, 10.1016/j.cell.2018.05.046

Germon T, Clifford D, Lee W, Hobart J
Low back pain.
*The Lancet* 2018-12, 10.1016/S0140-6736(18)32220-7

Hobart J, et al.
Effect of natalizumab on disease progression in secondary progressive multiple sclerosis (ASCEND): a phase 3, randomised, double-blind, placebo-controlled trial with an open-label extension.
*The Lancet Neurology* 2018-05, 10.1016/S1474-4422(18)30069-3

Targeting Gpr52 lowers mutant HTT levels and rescues Huntington’s disease-associated phenotypes.
*Brain* 2018-06, 10.1093/brain/awy081

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CLINICAL NEUROSCIENCE

RESEARCH IN THE NEWS

New research sheds light on underlying cause of stroke (Professor Bob Fern)
www.plymouth.ac.uk/news/new-research-sheds-light-on-underlying-cause-of-stroke

Fundraisers mark Huntington’s Disease Awareness Week (Dr Shouqing Luo)

Dementia could be detected via routinely collected data, new research shows (Dr Camille Carroll)
www.plymouth.ac.uk/news/dementia-could-be-detected-via-routinely-collected-data-new-research-shows

Dementia screening app wins national award (Dr Craig Newman)
www.plymouth.ac.uk/news/dementia-screening-app-wins-national-award

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RESEARCH TEAMS

- Brain tumours – Professor C Oliver Hanemann
- Multiple sclerosis and health measurement – Professor Jeremy Hobart
- Applied Parkinson’s disease research – Dr Camille Carroll
- Mental health in disadvantaged communities – Professor Richard Byng
- Health and behaviour change – Professor Adrian Taylor
- Huntington’s disease – Dr Shouqing Luo
- Stroke – Professor Bob Fern
- Peripheral nervous system – Professor David Parkinson
- E-Health/cognitive assessment – Dr Craig Newman
- Neural stem cells – Dr Claudia Barros
- Neurodegenerative disease – Professor Edgar Kramer
- Mitochondrial biology – Dr Charles Affourtit
- Nanotechnology and biosensor diagnostics – Professor Genhua Pan
- Biostatistics and diagnostics – Dr Xinzhong Li
- Peninsula Clinical Trials Unit – Mrs Siobhan Creanor
INFECTION, IMMUNITY AND INFLAMMATION
RESEARCH HIGHLIGHTS

Research in the 3Is theme will provide new ways to prevent or treat diseases that have an infectious or immunological aetiology. Our researchers are developing new tools to allow rapid detection of infectious agents and aberrant immunological reactions to facilitate targeted interventions, where often empirical ‘best guess’ therapies may be the current standard practice. This work is driven by the continued rise of infection and immunological disease, especially in our ageing population. Collaborations with partners in Public Health England, the NHS and international institutions strengthens the clinical relevance and impact of our research, which aims to address some of the most pressing threats to human health.

Dr Michael Jarvis and Professor Mathew Upton are combining their expertise to develop new vaccines to combat antimicrobial resistance. Support for this work includes an award of £50,000 from the MRC BactiVac network to conduct proof-of-concept work in bovine mastitis. Recent funding totalling over £1.3 million has been awarded by the Department of Health and Social Care, via Innovate UK, and the Chinese Ministry of Science and Technology, in a venture that will combine strengths in the UK and China to develop and test new vaccines for use in pigs.

Dr Jarvis’ expertise in the development of novel vaccines is evidenced by his inclusion as a key partner in a £7 million project sponsored by the US DARPA programme, aimed at helping to protect US troops from devastating zoonotic infections in the field. The Vaccine Group, a University of Plymouth spinout company established by Dr Jarvis, will develop disseminating vaccines for this project, which is led by the UC Davis School of Veterinary Medicine.

In other anti-infective research, Professor Mathew Upton’s spinout company, Amprologic, has been awarded a £1.2 million contract by the Department of Health and Social Care to progress the lead antimicrobial candidate through pre-clinical evaluation. The aim is to initiate a phase 1 human trial with the lead agent at the end of 2020. Professor Upton will also work over the next five years to train international partners in natural product discovery approaches. This is part of a University of Plymouth workpackage in the £20 million One Ocean Hub project, led by the University of Strathclyde and funded by the UK Research and Innovation Global Challenges Research Fund.

The hepatology research group continues to grow and conduct excellent clinical research into liver disease.

Dr Ashwin Dhanda, Consultant Hepatologist, is part of a UK-wide consortium aiming to minimise death from alcoholic hepatitis. The five-year, £5 million programme is part of the MRC Stratified Medicine initiative and is now recruiting patients for clinical trials at 40 centres across the UK. Dr Dahnda led a bid to the European Foundation for Alcohol Research and was awarded €70,000 to investigate the circulating microbiome in patients with alcohol related liver disease, in a project with other members of 3Is including Professor Mathew Upton and Professor Matthias Futshick.

Professor Matthew Cramp is a member of the Lancet Standing Commission on Liver Disease in the UK and co-authored their 5th report into alcohol-induced liver disease, examining the impact of escalating alcohol consumption on health in the UK. The Commission aims to inform strategies to reduce alcohol related disease and support implementation of minimum pricing for alcohol in England. Their recommendations are likely to directly inform government policy relating to controlling alcohol-related disease.

Additional research in the 3Is theme was published in a number of leading journals, including articles in Nature Communications (Dr Edwin Lasonder), Nature Medicine (Dr Michael Jarvis), PLoS Pathogens (Dr Gyuri Fejer) and Clinical Infectious Diseases (Dr Rupert Jones).

Several ITSMed staff are active in public engagement to increase awareness of our research and they were recognised last year by shortlisting for the national Antibiotic Guardian Awards in Public Engagement. As part of these activities, Dr Tina Joshi has spoken at several national events and she appeared in the BBC documentary The Truth About: Antibiotics. Dr Joshi was also recognised as the ‘Jewel of India’ by the Indian government for her international impact in the field of molecular microbiology.

Dr Rupert Jones is expanding his research horizons further to follow the huge success of his FRESH AIR project, addressing chronic lung disease in the developing world. Led by Leicester’s Hospitals and the University of Leicester, he is part of RECHARGE which has been awarded £2 million NIHR funding, building on existing expertise in the UK and wider global health community to address health issues affecting those in lower to middle income countries. Some of the pulmonary rehabilitation work will take place in Uganda, in the new centre which Rupert successfully crowdfunded in April 2018 via the Breathe Again project.
Minimising mortality from alcoholic hepatitis

Alcoholic hepatitis, a form of liver inflammation, is a serious consequence of alcohol dependence and leads to death in over half of sufferers within one year. Better methods in diagnosis, determining prognosis and response to treatment are urgently needed. ITSMed researcher Dr Ashwin Dhanda, Consultant and Honorary Lecturer in Hepatology, is part of the team that has successfully obtained Medical Research Council funding of £5 million for a national Precision Medicine Consortium to tackle these issues.

The five-year project will cover the breadth of the condition including investigating mechanism, novel diagnostic techniques and biomarkers of prognosis and response to therapy. It will also deliver several clinical trials of new therapies for alcoholic hepatitis and Plymouth is one of only a few sites around the country to participate, offering alternative treatment options to our local patients. Dr Dhanda is leading part of this project to validate his bioassay for predicting response to steroid treatment in a large multicentre study. Based on the assay results, clinicians will be able to personalise treatment to improve survival from alcoholic hepatitis.

Tackling antibiotic resistance with novel vaccines for pigs in new UK-China project

Antibiotic resistance (AMR) is a global issue that threatens to undermine all modern medical procedures and cause immense morbidity and mortality. A recent UK government report concluded that if nothing is done to stop the rise of drug resistant infections, over 10 million people will die every year by 2050 and the economic impact will reduce GDP by $100 trillion. Addressing AMR will require action on many fronts, including discovery of new antibiotics and prevention of infection through improved vaccination. The latter approach has been highly successful in the Norwegian aquaculture industry, where vaccination led to a 90% reduction in use of antibiotics in farmed fish, with no negative impact on productivity.

ITSMed researchers are adopting this excellent approach. Dr Michael Jarvis is a leading expert in development of novel vaccines and Professor Mathew Upton is a specialist in AMR. Together, they have been awarded funding totalling over £1.3 million from the Department of Health and Social Care, via Innovate UK and the Chinese Ministry of Science and Technology for a project that will combine strengths in the UK and China to develop and test new vaccines for use in pigs. China produces and consumes over half of the global pork, and use substantial amounts of antibiotics to treat and prevent disease caused by Streptococcus suis, which can cause meningitis in humans with a mortality rate of 20%. The three-year Innovate UK-sponsored project will support development of new vaccines to combat this disease.
PUBLICATION HIGHLIGHTS

Cramp M, et al.
Pre-treatment prediction of response to ursodeoxycholic acid in primary biliary cholangitis: development and validation of the UDCA Response Score.

Cramp M E, et al
Gathering momentum for the way ahead: fifth report of the Lancet Standing Commission on Liver Disease in the UK.
The Lancet 2018-12, 10.1016/S0140-6736(18)32561-3

Lung macrophage scavenger receptor SR-A6 (MARCO) is an adenovirus type-specific virus entry receptor.
PLOS Pathogens 2018-03, 10.1371/journal.ppat.1006914

Jarvis MA, et al
Prevention of tuberculosis in rhesus macaques by a cytomegalovirus-based vaccine.
Nature Medicine 2018-02, 10.1038/nm.4473

Association between Household Air Pollution Exposure and Chronic Obstructive Pulmonary Disease Outcomes in 13 Low- and Middle-Income Country Settings.
American Journal of Respiratory and Critical Care Medicine 2018-03, 10.1164/rccm.201709-1861OC

van Kampen SC, Jones R, Kisembo H, Houben RMGJ, Wei Y, Mugabe FR, Rutebemberwa E, Kirenga B
Chronic respiratory symptoms and lung abnormalities among people with a history of tuberculosis in Uganda: a national survey.
Clinical Infectious Diseases 2018-09, 10.1093/cid/ciy795

Lasonder E, et al
Unravelling the immune signature of Plasmodium falciparum transmission reducing immunity.
Nature Communications 2018-02, 10.1038/s41467-017-02646-2

INFECTION, IMMUNITY
AND INFLAMMATION
RESEARCH IN THE NEWS

Academic named ‘Jewel of India’ in recognition of international impact (Dr Tina Joshi)

Plymouth researcher co-authors landmark study on malaria – new findings could contribute to vaccine (Dr Edwin Lasonder)
www.plymouth.ac.uk/news/plymouth-researcher-co-authors-landmark-study-on-malaria-nil-new-findings-could-contribute-to-vaccine

Research grant to develop vaccine for mastitis in cows (Dr Michael Jarvis)
www.plymouth.ac.uk/news/research-grant-to-develop-vaccine-for-mastitis-in-cows

University spin-out company to develop new antibiotics (Professor Mathew Upton)
www.plymouth.ac.uk/news/university-spinout-company-to-develop-new-antibiotics

Water quality testing kits to be deployed in UK and Ireland (Professor Simon Jackson)

RESEARCH TEAMS

• Hepatology – Professor Matthew Cramp, Dr David Sheridan, Dr Ashwin Dhanda, Dr Daniel Felmlee

• Antibiotic resistance – Professor Mathew Upton, Dr Philip Warburton, Dr Tina Joshi

• Novel vaccines – Dr Michael Jarvis, Professor Mathew Upton

• Endotoxin and immunity – Professor Simon Jackson

• Respiratory health – Dr Rupert Jones

• Macrophages – Dr Gyorgy Fejer, Dr Andrew Foey

• Oral health and disease – Dr Svetislav Zaric, Dr Vehid Salih, Dr Louise Belfield, Dr Zoe Brookes

• Mitochondrial biology – Dr Charles Affourtit
DIAGNOSTICS

Utilising interdisciplinary approaches to identify novel molecular disease markers and therapies.

Bringing together laboratory scientists, clinicians and technical, statistical, bioinformatics and database expertise, our diagnostics cross-cutting research includes development of novel in vitro assays, clinical screening, biomarker discovery and patient assessment/stratification methods.

Technologies and methods utilised include proteomics, next generation sequencing (NGS), mass spectrometry, light microscopy and bioimaging, nanomaterials and biosensors, medical imaging (CT), database development, management, analysis and integration and statistical analysis.

DIAGNOSTICS RESEARCH GROUPS:

- Blood diagnostics – Dr Tracey Madgett
- Radiology/cardiac computed tomography – Professor Carl Roobottom
- Bioinformatics – Professor Matthias Futschik
- Medical statistics – Mrs Siobhan Creanor

CLINICAL TRIALS

Bringing together scientists, clinicians, practitioners and trial design, management, evaluation, statistical analysis and database expertise, ITSMed’s cross-cutting clinical trials research is facilitated by the University’s PenCTU and Medical Statistics teams.

We conduct single and multi-centre trials and other well-designed studies from early human drug trials (CTIMPs), to public health and health services complex interventions across the University’s health and medical research, focusing on three main areas:

- clinical neurosciences, mental health and wellbeing
- cancer treatment and prevention
- inflammation, infection and immunity

This research is enabled by our close working relationship with the South West Research Design Service, PenCLAHRC, South West Clinical Research Network and University Hospitals Plymouth NHS Trust, and is conducted with a range of regional and national partners including other NHS Trusts, universities and businesses.
PUBLIC HEALTH

Demonstrating whether new treatments work in clinical settings, and investigating how they can best be incorporated into routine practice, ITSMed’s public health cross-cutting research theme brings together researchers, clinicians, practitioners and expertise in the design and evaluation of complex interventions, clinical trials, epidemiological studies, service evaluation and systematic reviews to deliver improved healthcare for patient and public benefit.

Our research is facilitated by our involvement in the NIHR-funded PenCLAHRC partnership, a strong collaborative approach, and with particular focus on investigation and evaluation of nonmedicinal treatments and preventive approaches, including improved health through exercise and behaviour change. The key areas of research activity of relevance to cancer and neurodegenerative and inflammatory disease include:

- Dementia care and support (D-PACT) – Professor Richard Byng – £2.7 million NIHR Programme Grant for Applied Research (PGfAR) study
- Smoking reduction and cessation (TARS) – Professor Adrian Taylor – £1.8 million NIHR Health Technology Assessment (HTA) programme
- Chronic physical and mental health condition improvement through exercise (e-coachER) – Professor Adrian Taylor – £900,000 NIHR Health Technology Assessment (HTA) programme
- Alcohol and substance misuse (PHASED) – Dr Tom Thompson – NIHR Research for Patient Benefit (RfPB) programme
- Chronic lung disease caused by particulate pollution (FRESH AIR) – Dr Rupert Jones – projects funded by Horizon 2020, MRC and NIHR

RESEARCH IN THE NEWS

30-day project to fund pulmonary rehab centre in Uganda - pictured (Dr Rupert Jones)
www.plymouth.ac.uk/news/30-day-project-to-fund-pulmonary-rehab-centre-in-uganda

National prenatal screening contract renewed with University

Report shows progress of UK airports in helping people with hidden disabilities (Ian Sherriff)

£2 million research funding to address chronic lung disease in developing world (Dr Rupert Jones)
www.plymouth.ac.uk/news/two-million-pounds-research-funding-to-address-chronic-lung-disease-in-developing-world

£2.7 million study to focus on dementia support workers in primary care
www.plymouth.ac.uk/news/_27m-study-to-focus-on-dementia-support-workers-in-primary-care

Plymouth woman quits 33-year smoking habit thanks to research project – and you could too this New Year
INNOVATION AND IMPACT

2018 has been another excellent year for the development and translation of ITSMed’s research into intellectual property and technological innovations with potential real-world impact.

From licensing of patents to co-development of novel technologies with industry, and from NHS application of e-Health tools to spin-out companies, innovations from ITSMed’s researchers are realising economic, patient, public and environmental benefit outside of academia and across healthcare, business and society.

UNIVERSITY SPINOUT COMPANIES

The past year has seen the establishment of another ITSMed spinout company, Amprologix, and the further development of MolEndoTech and The Vaccine Group, both launched in 2017, continuing the commercialisation of patent protected innovations coming out of ITSMed’s laboratories.

Vaccines to prevent spread of antibiotic-resistant bacteria

ITSMed researchers Professor Mathew Upton and Dr Michael Jarvis have received over £700,000, as part of a consortium to combat an emerging antibiotic-resistant disease able to jump from pigs to humans with potentially fatal effect.

University spinout company The Vaccine Group (TVG), founded by Dr Michael Jarvis in 2017, will use the grant from the Department of Health and Social Care (DHSC) to develop a vaccine to prevent the spread of Streptococcus suis (S.suis) – which can cause infections of the brain lining, meningitis, blood poisoning, or septicaemia, as well as many other serious diseases in humans. S.suis is currently treated with antibiotics, but there is growing evidence that it is becoming resistant to them. Effective vaccines remove the need to use antibiotics in animals.

Administered by Innovate UK, the project will develop TVG’s novel herpesvirus-based platform technology to create a single-use vaccine for use in pigs, with Professor Upton’s research group identifying targets for the new vaccines being developed by TVG.

The work will be undertaken with Chinese partners, including the Shanghai Veterinary Research Institute at the Chinese Academy of Agricultural Sciences, and the Shanghai Jiao Tong University. A major producer of swine and poultry vaccines, the Pulike Biological Engineering Company, is the commercial partner.

The grant was awarded as part of a bilateral research competition between the DHSC’s Global Antimicrobial Resistance (AMR) Innovation Fund and the Chinese Ministry of Science and Technology.

For further information please contact: mathew.upton@plymouth.ac.uk, michael.jarvis@plymouth.ac.uk or michael.jarvis@thevaccinegroup.co.uk
Spinout company, The Vaccine Group (TVG), is to play a central role in a multi-million-dollar project to protect US military forces from Ebola, Lassa fever and other deadly zoonotic viruses that jump from animals to humans.

The company, established by ITSMed’s Dr Michael Jarvis, is a principal partner in an international team of scientists awarded up to $9.37 million (£7.2 million) by the US government’s Defense Advanced Research Project Agency (DARPA).

The three-and-a-half-year project, part of the Preventing Emerging Pathogenic Threats (PREEMPT) program, is to predict where zoonotic viruses might arise and then prevent them from spilling over into humans. It is being led by the One Health Institute in the UC Davis School of Veterinary Medicine, and the Center for Comparative Medicine, in the UC Davis schools of Medicine and Veterinary Medicine.

TVG’s role will be to develop novel CMV vaccine approaches to enable scalable vaccination of wildlife animal populations that harbour these zoonotic viruses. The other partners will work on analytic tools to predict when a zoonotic virus in a geographic hot spot is most likely to make the jump from animals into humans.

For further information please contact: michael.jarvis@plymouth.ac.uk or michael.jarvis@thevaccinegroup.co.uk

Novel vaccines for human and animal health

Amprologix is a new University spinout company, established to commercialise the work of Professor Mathew Upton on the development of a new class of antibiotics to help tackle the global problem of drug resistant infections.

Supported by recent £1.2 million funding from the Department of Health and Social Care through Innovate UK’s Small Business Research Initiative (SBRI), Amprologix, working in partnership with world-leading biotechnology and synthetic biology company Ingenza Ltd, is focused on four areas:

- developing their first lead compound, epidermicin, for commercial use;
- discovering additional sources for new classes of antibiotics;
- using AI to improve antibiotic properties, working with Ingenza, IBM and the National Physical Laboratory, and
- developing efficient techniques to manufacture antibiotics at scale in partnership with Ingenza.

In a relevant infection model, a single dose of epidermicin was as effective as six doses of the current standard of care in killing harmful bacteria, including MRSA. The antibiotic was initially recovered from a skin bacterium named Staphylococcus epidermidis, but can now be produced in a microbe suitable for industrial scale-up, using synthetic biology methods developed by Ingenza, which has a stake in the new business.

For further information please contact: mathew.upton@plymouth.ac.uk
A rapid water testing kit developed by University spinout company, MolEndoTech, is being rolled out commercially in the UK and Ireland.

The SirenBW system developed by MolEndoTech, established to commercialise the work of Professor Simon Jackson, can dramatically reduce the length of time it takes for local authorities and environmental agencies to assess the quality of recreational water. Currently, it can take at least two days because samples must be sent to a laboratory for culture of organisms. SirenBW can be used on location by moderately-skilled technicians and can produce a result in 20 minutes.

The commercial roll out is being carried out by Palintest, a subsidiary of FTSE 100 group Halma plc, and will initially focus on the UK and Ireland and include the establishment of a number of demonstrator sites. It follows a successful technical evaluation and demonstration during the 2018 bathing water season.

The technical demonstration programme has also begun at several iconic Australian locations to accelerate the global roll out of the SirenBW during the southern hemisphere summer.

MolEndoTech is also working with other commercial partners in food and beverage production, developing methods for detecting pathogens on fresh produce and in the water used to irrigate it.

For further information please contact: simon.jackson@molendotech.com or visit www.molendotech.com
Digital health innovation for dementia screening

A Plymouth-designed app that helps to carry out dementia screening tests was named a winner at the world’s largest healthcare awards programme, the 2018 HSJ Awards.

In a record pool of 1,500 applications, ACEmobile, developed by ITSMed’s Dr Craig Newman and Dr Rupert Noad from University Hospitals Plymouth NHS Trust, was named the winner of the ‘Using Technology to Improve Efficiency’ category at the ceremony at the Intercontinental at London’s O2 on 21 November.

ACEmobile is the first tool of its kind, supporting doctors and nurses through the whole process of a common dementia screening assessment known as the Addenbrooke’s Cognitive Examination III (ACE III). The ACE III consists of 19 activities testing cognitive domains including attention and memory processing. It uses the benefits of computerisation, such as onscreen instruction, to empower more members of the clinical team to feel confident carrying out screening for dementia.

A free-to-use iPad based tool, the app has been developed using human factors testing to reduce the error rate when used in routine clinical practice. It was also supported by the National Institute for Health Research Collaboration for Leadership in Applied Health Research and Care South West Peninsula (NIHR PenCLAHRC).

Designed by clinicians for clinicians, the app also collects secure and anonymised data to allow the team to improve their understanding of dementia and ability to detect it earlier.

ACEmobile currently has 1,200 registered clinical sites, and it is free for clinicians and clinical teams to access.

For further information please contact: craig.newman@plymouth.ac.uk or rupert.noad@nhs.net

New technology to empower Parkinson’s patients

People with Parkinson’s disease could see their care transformed, thanks to a new service involving wearable technology.

The project, entitled Developing Home-based Parkinson’s Care and led by Dr Camille Carroll at the University and University Hospitals Plymouth NHS Trust, will see patients use a wrist-worn device known as a Personal Kinetigraph (PKG®) as part of a new scheme to help them and a specialist team monitor their condition at home.

Developed by the Global Kinetics Corporation, the PKG monitors movement symptoms of Parkinson’s and processes them through a proprietary algorithm. Supplemented by a questionnaire that asks patients to detail non-motor symptoms such as changes in mood, patients will wear the PKG for six-day stints, enabling them and their care team to identify and implement any required changes to therapy.

The specialist Parkinson’s team can then work remotely, ensuring that help – including calls or clinic appointments – can be offered when it is needed. The project will also involve co-design of a new service to ensure that care delivery really meets the needs and expectations of people living with Parkinson’s.

The project, funded by The Health Foundation and a Parkinson’s UK Excellence Network Service Improvement Grant, will initially be delivered to 150 patients in Plymouth, West Devon and East Cornwall, as a pilot, with the potential for roll out across the UK if successful.

For further information please contact: camille.carroll@plymouth.ac.uk
During 2018, ITSMed has built on its highly successful funding track record, with research and innovation income from a range of traditional and non-traditional sources. The research output and funding are evidence of the investment made in our world-class researchers and facilities. Such investment supports the Institute’s aspirations and the continuing development of long-term programmes of research, alongside the added value of collaboration which it facilitates.

ITSMed is grateful for the support of all its funders in helping to deliver our world-class research.
### EXAMPLES OF OUR AWARDS

<table>
<thead>
<tr>
<th>PRINCIPAL INVESTIGATOR</th>
<th>FUNDER</th>
<th>AWARDED VALUE</th>
<th>TITLE/OUTLINE OF PROJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor Richard Byng</td>
<td>NIHR</td>
<td>£1,532,628</td>
<td>Dementia PACT</td>
</tr>
<tr>
<td>Mrs Siobhan Creanor</td>
<td>Public Health England</td>
<td>£537,900</td>
<td>Down’s Syndrome Screening Quality Assurance Support Service (DQASS) – 2018–20</td>
</tr>
<tr>
<td>Professor Mathew Upton</td>
<td>Innovate UK</td>
<td>£294,350</td>
<td>Development of attenuated bovine herpesvirus-4 as a safe, inexpensive, single dose vaccine to control Streptococcus suis infection in domestic pigs</td>
</tr>
<tr>
<td>PenCTU/Medical Statistics</td>
<td>Various, including NIHR</td>
<td>£301,633</td>
<td>Conducting clinical trials and statistical analysis</td>
</tr>
<tr>
<td>Professor Richard Byng</td>
<td>Torbay and South Devon NHS Foundation Trust</td>
<td>£149,360</td>
<td>Researcher in Residence (Integrated Care Organisation) – extension</td>
</tr>
<tr>
<td>Dr Sylwia Ammoun Sparks</td>
<td>Sparks</td>
<td>£112,072</td>
<td>The role of cellular prion protein PfPC and its homologue Doppel in the development of Neurofibromatosis type 11 related tumours</td>
</tr>
<tr>
<td>Dr Shouqin Luo</td>
<td>Royal Society</td>
<td>£111,000</td>
<td>Newton Advanced Fellowship</td>
</tr>
<tr>
<td>Dr Rupert Jones</td>
<td>NIHR</td>
<td>£93,188</td>
<td>Addressing chronic lung disease in the developing world through pulmonary rehabilitation (RECHARGE)</td>
</tr>
<tr>
<td>Professor C Oliver Hanneman</td>
<td>Brain Tumour Research</td>
<td>£365,000</td>
<td>Brain Tumour Research Centre funding</td>
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<tr>
<td>Dr Ashwin Dhanda</td>
<td>Medical Research Council</td>
<td>£83,454</td>
<td>Minimising mortality from alcoholic hepatitis</td>
</tr>
<tr>
<td>Dr Michael Jarvis</td>
<td>Defense Advanced Research Project Agency (DARPA)</td>
<td>£74,735</td>
<td>Preventing Emerging Pathogenic Threats (PREEMPT) program – part of £7.2 million consortium also involving ITSMed spinout company, The Vaccine Group</td>
</tr>
<tr>
<td>Professor Edgar Kramer</td>
<td>BRACE</td>
<td>£66,626</td>
<td>PhD studentship – Role of ubiquitin protein ligase Nedd4.1 and Nedd4.2 in dementia with Lewy bodies</td>
</tr>
<tr>
<td>Professor Matthias Futschik</td>
<td>Daphne Jackson Trust</td>
<td>£54,595</td>
<td>Mitochondrial biogenesis and cellular bioenergetic function iniaremic myopathy</td>
</tr>
<tr>
<td>Dr Shouqin Luo</td>
<td>BRACE</td>
<td>£52,754</td>
<td>PhD studentship – A Novel Role of Autophagy in Neurodegeneration</td>
</tr>
<tr>
<td>Dr Camille Carroll</td>
<td>Cure Parkinsons Trust</td>
<td>£37,491</td>
<td>Developing a multi-arm, multi-stage trial platform in Parkinson’s disease</td>
</tr>
<tr>
<td>Dr Ashwin Dhanda</td>
<td>European Foundation for Alcohol Research</td>
<td>£30,701</td>
<td>The role of the circulating microbiome in determining the outcome of patients with alcohol related liver disease</td>
</tr>
</tbody>
</table>
The Institute has welcomed 18 new postgraduate research degree students in 2018 and has been successful again in attracting external funding for a number of projects. The range of postgraduate research degrees offered are ResM, MPhil, MD, PhD and PhD by Prior Published Works.

The 2018 Postgraduate Research Survey confirmed that the experience of our postgraduate research students is a very positive one. The Faculty and Institute received the highest levels of satisfaction across the University for:

- opportunities to be part of the wider research community,
- supervisors helping students to identify training and development needs,
- students having a suitable working space, and
- students understanding their final assessment procedures.

Our Faculty Doctoral Committee is committed to ensuring quality and excellence in both the research and the student experience. The Committee has roles for staff with the responsibility of leading in the areas of quality assurance, growth and sustainability, student support and wellbeing, training and career development, and equality and inclusion. This has helped us to focus on providing outstanding research degrees and an excellent student experience. As well as offering a number of internally funded studentships, ITSMed has been successful in winning a number of awards to support postgraduate research.
2018 STUDENTSHIP AWARDS

<table>
<thead>
<tr>
<th>DIRECTOR OF STUDIES</th>
<th>FUNDING BODY</th>
<th>AMOUNT</th>
<th>PROJECT TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Shouqing Luo</td>
<td>BRACE</td>
<td>£52,754</td>
<td>A novel role of autophagy in neurodegeneration</td>
</tr>
<tr>
<td>Professor David Parkinson</td>
<td>Brain Tumour Research</td>
<td>£57,000</td>
<td>Targeting macrophages in schwannoma and meningioma tumours</td>
</tr>
<tr>
<td>Professor C Oliver Hanemann</td>
<td>Brain Tumour Research</td>
<td>£89,793</td>
<td>Identifying novel molecular differences between WHO grade I and II meningiomas</td>
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<tr>
<td>Professor C Oliver Hanemann</td>
<td>Brain Tumour Research</td>
<td>£65,536</td>
<td>Proteomic analysis of genetically stratified meningiomas</td>
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<tr>
<td>Dr Xinzhong Li</td>
<td>Marie Curie AiPBAND Project</td>
<td>£7,500</td>
<td>Biomarker discovery for brain cancer</td>
</tr>
<tr>
<td>Professor C Oliver Hanemann</td>
<td>Marie Curie AiPBAND Project</td>
<td>£31,199.68</td>
<td>From bench to personalised medicine: clinical evaluation of biomarkers and verification of the diagnostic system ESR 14 AiPBAND</td>
</tr>
</tbody>
</table>

EXAMPLES OF CONFERENCES ATTENDED AND PRESENTED AT BY OUR POSTGRADUATE RESEARCH STUDENTS IN 2018

<table>
<thead>
<tr>
<th>CONFERENCE NAME</th>
<th>DATE</th>
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<tbody>
<tr>
<td>ISBT International Conference. Canada</td>
<td>June 2018</td>
</tr>
<tr>
<td>Research and Development Forum. University Hospitals Plymouth NHS Trust, UK</td>
<td>June 2018</td>
</tr>
<tr>
<td>25th Biennial Congress of the European Association for Cancer Research (EACR25). Amsterdam, The Netherlands</td>
<td>July 2018</td>
</tr>
<tr>
<td>British Neuro-Oncology Society Conference. Winchester, UK</td>
<td>July 2018</td>
</tr>
<tr>
<td>Making it Personal: Cancer Precision Medicine. Bergamo, Italy</td>
<td>November 2018</td>
</tr>
<tr>
<td>Joint Global Neurofibromatosis Conference. Paris, France</td>
<td>November 2018</td>
</tr>
<tr>
<td>Transposable Elements Conference. Cold Spring Harbor, New York, USA</td>
<td>November 2018</td>
</tr>
</tbody>
</table>
PhD student Charlotte Illsley joined Dr Bing Hu and his team, using a new 3D bioprinter to test whether some of the current coastal plants in Cornwall could have powerful skincare applications. Proximity to the sea, combined with the unique climate of the area, means certain types of plants have always thrived here – and a range of them could have as yet untapped potential.

Charlotte said: “Skin is the largest organ in the body accounting for around 15% of adult body weight. It is made up of three layers – epidermis, dermis and hypodermis with each component performing specialist functions. If any of these components malfunction, it usually results in undesirable conditions from a rash to cellulitis or even cancer.

There is currently a massive market for skin-engineered substitutes, but to the best of our knowledge there is currently no skin model that is able to mimic all aspects of the skin. The 3D bioprinter is a great start to helping us on the long road of testing to enable this to happen.”

The research is funded as part of Agri-tech Cornwall, a three-year, £10 million initiative part-funded by the European Regional Development Fund, with match-funding from Cornwall Council.
<table>
<thead>
<tr>
<th>DATE</th>
<th>SPEAKER</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>02/02/18</td>
<td>Professor Elizabeth Fisher, Institute of Neurology, UCL London</td>
<td>‘Mouse modelling of motor neuron disease’</td>
</tr>
<tr>
<td>28/03/18</td>
<td>Dr Simona Parrinello, Imperial College London</td>
<td>‘Glial plasticity in regeneration and tumorigenesis’</td>
</tr>
<tr>
<td>25/04/18</td>
<td>Dr Peter Arthur-Farraj, Cambridge Centre for Brain Repair, University of Cambridge</td>
<td>‘Repair schwann cells in nerve injury – genetic and epigenetic control and clinical significance’</td>
</tr>
<tr>
<td>17/05/18</td>
<td>Dr Jonathan Cox, School of Life and Health Sciences, Aston University</td>
<td>‘Adventures in mycobacterial drug discovery: tackling the real Beast from the East’</td>
</tr>
<tr>
<td>20/06/18</td>
<td>Professor Divya Maitreyi Chari, Faculty of Medicine and Health Sciences, Keele University</td>
<td>‘Neural tissue engineering approaches for regenerative neurology’</td>
</tr>
<tr>
<td>03/07/18</td>
<td>Dr Matthew Gegg, UCL Institute of Neurology</td>
<td>‘The role of glucocerebrosidase in Parkinson disease pathogenesis’</td>
</tr>
<tr>
<td>10/07/18</td>
<td>Dr Richard Hill, School of Pharmacy and Biomedical Sciences, University of Portsmouth, Brain Tumour Research Centre</td>
<td>‘Clomipramine instigates a potent anti-paediatric glioma response via autophagy and metabolic reprogramming’</td>
</tr>
<tr>
<td>15/11/18</td>
<td>Professor Lorna Harries, University of Exeter</td>
<td>‘The splice of life’</td>
</tr>
</tbody>
</table>
# ITSMed STAFF

<table>
<thead>
<tr>
<th>STAFF MEMBER</th>
<th>RESEARCH AREA</th>
<th>CONTACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor C Oliver Hanemann</td>
<td>Brain tumour research</td>
<td><a href="mailto:oliver.hanemann@plymouth.ac.uk">oliver.hanemann@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Professor Mathew Upton</td>
<td>Antibiotic resistant pathogens</td>
<td><a href="mailto:mathew.upton@plymouth.ac.uk">mathew.upton@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Professor Bob Fern</td>
<td>Stroke</td>
<td><a href="mailto:robert.fern@plymouth.ac.uk">robert.fern@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Professor Adrian Taylor</td>
<td>Health and behaviour change</td>
<td><a href="mailto:adrian.taylor@plymouth.ac.uk">adrian.taylor@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Professor Richard Byng</td>
<td>Mental health/dementia</td>
<td><a href="mailto:richard.byng@plymouth.ac.uk">richard.byng@plymouth.ac.uk</a></td>
</tr>
<tr>
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