Am pleased to write the executive summary of the fourth 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 & Inflammation, with crosscutting expertise in diagnostics, clinical trials and public health. We provide a permissive environment with core infrastructure platforms for effective trans-disciplinary research.

ITSMed’s staff continue to publish in high impact journals. I am proud to say that almost 50% of research publications are in the top 10% journals by CiteScore. You will see examples of the publications in each thematic section, including papers in The Lancet and Nature Communications. In line with our research outputs, our research income has continued to grow. Here I just wanted to highlight our success as lead or co-applicant in three large EU collaborative grants and large NIHR awards. Also, our Brain Tumour Research Centre of Excellence has been supported with additional funding to facilitate its growth and expansion in recognition of its continued success.

2017 saw some excellent new staff joining us; Professor Edgar Kramer who has a track record in Parkinson disease joined ITSMed from the Mammalian Genetics Unit MRC Harwell, UK. Our main growth this year was however on rising stars including Dr Tina Joshi, who has recently joined ITSMed from Cardiff University as Lecturer in Medical Microbiology, and importantly we had a further 29% growth in postgraduate student numbers. Last but not least I must mention that our Faculty has successfully achieved Athena Swann Silver award.

In October 2017 we finally moved into the Derriford Research Facility, ITSMed’s new state-of-the-art headquarters, providing us with 2,500 m² of additional laboratory space and hosting most of our core services and technical facilities, further enhancing our biomedical and clinical research capabilities.

A particular highlight from this year was the commercialisation of two of our infection and immunity-based projects with the generation of IP and spin-out companies. In addition, our commercialisation pipeline continues to identify and develop further opportunities in different areas of our research and innovation activity, several of which we hope to realise during 2018.

I hope this annual report will show that in our fourth year we have continued to consolidate and develop our strong research position and that we are indeed 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 Sue Varley for their support in producing this annual report.

Professor C Oliver Hanemann
ITSMed Director
Headquartered in the University of Plymouth’s prestigious new £17M Derriford Research Facility, ITSMed brings together scientists, clinicians and expertise from across the spectrum of scientific discovery, medical research and health technology, to conduct world-class laboratory and clinical 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, 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 of Plymouth’s Faculty of Medicine and Dentistry and beyond.

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

Our focus is on three core research themes: Cancer; Clinical Neuroscience; and Infection, Immunity & Inflammation, facilitated by cross-cutting expertise in Diagnostics, Clinical Trials and Public Health research.

This translational research is facilitated by the University of Plymouth’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 first in the UK for quality of research outputs in clinical medicine, above medical schools at Oxford and Cambridge.

ITSMed is managed by a ‘management board’ that comprises the Director (Professor Oliver Hanemann) supported by the Research Group Leads Professor Simon Jackson (Biomedical Research) and Professor Adrian Taylor (Clinical Trials and Population Studies), the Faculty’s Research & Innovation Business Partner (Dr Tom Nicholson) and the Faculty’s Research Facilitator (Sue Varley). Since the start of 2018 we have also established our external scientific advisory board.

ITSMed OVERVIEW

Director: Professor C Oliver Hanemann

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.

INSTITUTE FACILITIES

DERRIFORD RESEARCH FACILITY (DRF)

Opened in October 2017, ITSMed’s new, state-of-the-art Derriford Research Facility (DRF) headquarters represents a landmark investment by the University of Plymouth into its biomedical and clinical research infrastructure.

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

The John Bull Building, Derriford

PenCTU is a UK Clinical Research Collaboration (UKCRC) registered, NIHR supported Clinical Trials Unit with clinical, methodological, trial and data management expertise 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 of Plymouth’s health and medical research and with academic, NHS and business partners.
MEDICAL STATISTICS

Dedicated medical statistics team providing 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.

PLYMOUTH UNIVERSITY SYSTEMS BIOLOGY CENTRE

High quality genomic and proteomic analysis facilities and expertise, including Next Generation Sequencing and quantitative mass spectrometry.

It provides a comprehensive, dedicated service to support delivery of research, from experimental design to data analysis, for academic and commercial partners.

PLYMOUTH LIGHT MICROSCOPY SERVICE (PLIMS)

Light / confocal microscopy and image analysis service for bioimaging applications for academic and commercial partners.

Comprehensive service including 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.

BIOMEDICAL LABORATORY FACILITIES

ITSMed’s state-of-the-art biomedical research laboratories in its Derriford Research Facility HQ and adjacent John Bull Building at Plymouth Science Park incorporate a range of cutting edge technical capabilities in addition to Systems Biology and Light Microscopy including:

- Level 2 and 3 containment facilities
- Cell / tissue culture and analysis facilities
- Flow cytometry / FACS suite
- HPLC / LCMS analytical services
- Microarray platform technology
- Extracellular Flux Analysis
- Electron paramagnetic resonance (EPR)
- HRA accredited tissue storage, biobanking facilities and sample collections
- Small molecule mass spectrometry analysis

For further information about ITSMed’s facilities and services please visit: www.plymouth.ac.uk/research/institutes/translational-stratified-medicine-itsmed

CELL / TISSUE MODEL TECHNOLOGIES

Unique cell and tissue models and technical expertise for studying health and disease and development of new diagnostics and therapeutics, supporting collaboration with business, academic and other health related organisations.

Application areas include: brain tumours, stem cells, oral / skin health, infection, environmental health, cardiotoxicity and blood cancer.
International recognised translational research into the prevention, diagnosis and treatment of cancer

RESEARCH HIGHLIGHTS
Our biomedical and clinical cancer research continues to be productive. We apply modern cell biology to elucidate the molecular pathology of cancer, in particular the development of brain tumours, lymphomas/leukemia and bladder cancer, and translate this research into the clinic.

BIOMEDICAL RESEARCH
Our success in this area is highlighted by the £850k funding extension for our internationally renowned Brain Tumour Research Centre of Excellence, led by Professor Oliver Hanemann. Further developing our standing in brain tumour research, Dr Xinzhong Li has been awarded a £3.7M Horizon 2020 Marie Curie Innovative Training Network award to develop An Integrated Platform for Developing Brain Cancer Diagnostic Techniques (AIPBAND). Dr Claudia Barros has been awarded funding from the Brain Research Trust for the identification of novel genes controlling human glioblastoma initiation and growth mechanisms.

Dental interests in oral cancer are led by Dr Bing Hu and include early markers of initiation and biomarkers for metastasis. An important focus in the development of new therapies lies at the interface between two of our research areas: cancer and immunology. Promising research at this interface is being carried out by Professor Ji-Liang Li investigating the tumour microenvironment and Dr Amiya Patra on hematopoietic stem cells.

RESEARCH HIGHLIGHTS
Internationally recognised translational research into the prevention, diagnosis and treatment of cancer

CLINICAL RESEARCH
Biomedical research to elucidate the molecular mechanisms of carcinogenesis is being translated into new therapies evaluated in clinical trials. For example, Professor Simon Rule is leading a national research study (ENRICH), funded by Cancer Research UK to compare the efficacy and side effects of using a BTK (Bruton’s Tyrosine Kinase) inhibitor in a trial against standard chemotherapy in patients with mantle cell lymphoma.

Professor Syed Hussain, joined ITSmed in 2017 and is continuing his international bladder cancer clinical trials, on which he has recently published in The Lancet, alongside his consultant clinician role at University Hospitals Plymouth NHS Trust.

CANCER PREVENTION
The link between lifestyle behaviours and cancer are well established. Within this theme some ground breaking multi-million pound NIHR funded research, led by Professor Adrian Taylor with Peninsula Clinical Trials Unit (PenCTU) support, is seeking to test the effects of different web-based and face to face interventions to support behaviour change.

In 2017 recruitment closed for the e-coachER study with 450 participants signing up across Plymouth (as the lead site), Glasgow and Birmingham. Participants have metabolic, muscular-skeletal or mental health conditions but being physically inactive and having an average body mass index of 33 they are at elevated risk of cancer. All participants have been referred into a primary care exercise referral scheme with half having access to web-based support to increase physical activity. In April 2018 the effects of 12 month changes in physical activity will be assessed.

AIPBAND aims to address four key objectives:
- Identify new blood biomarkers from patients with brain tumours
- Design three types of multiplex biosensors - plasmatic-based, graphene-based, and digital ELISA assay-based
- Development of a big data-empowered intelligent data management infrastructure
- Development of cloud-based diagnostic systems

Accuracy, sensitivity and specificity will be assessed through clinical trials with individual research projects arranged into local training courses, network wide events, secondments, personalised career development plans and with strong involvement of the private sector.

This approach will ensure exploitation of AIPBAND’s achievements, maximising the abilities of early-stage researchers in creative and innovative thinking and knowledge transformation, while encouraging entrepreneurship and a business-oriented mind-set.

Could smokers who do not wish to quit reduce consumption with exercise?

Researchers from ITSmed led by Professor Adrian Taylor are leading a national £1.8 million NIHR Health Technology Assessment programme funded study, Trial of physical Activity and Reduction of Smoking (TARMS), to test the effectiveness of new support to help smokers who want to reduce but not quit.

Around 10 million adults in the UK smoke and whilst smoking prevalence has declined, the habit still claims approximately 100,000 lives each year. Around two-thirds of current smokers want to reduce smoking but apart from e-cigarettes little support is available to help them - even though those who reduce are more likely to make a quit attempt.

A recent pilot study which recruited Plymouth smokers showed preliminary evidence that providing personal Health Trainer support to reduce cigarette consumption and increase physical exercise may reduce smoking rates and encourage more quit attempts and increase short-term abstinence.

This new study aims to provide compelling evidence as to whether Health Trainer support is better at helping people to quit smoking for longer, compared with existing support, and result in data which will bring this approach to future updated guidelines on the support which should be provided to reduce smoking.

The study will recruit 900 people who currently smoke and who wish to reduce their cigarette consumption but who may have no immediate plan to quit. The volunteers are being recruited from four cities – Plymouth, Oxford, Nottingham and London.

As well as measuring effectiveness for the quitting smoker, the research team will also estimate costs and predict long-term health and social care savings that the programme may produce.

The study, which is being managed by the University of Plymouth’s UKCRC registered Peninsula Clinical Trials Unit, started recruiting in October 2017 and will report its findings in September 2020.
Brain Tumour Research

Internationally renowned Centre of Excellence for research into low-grade brain tumours.

ITSMed is home to the University of Plymouth’s internationally renowned Brain Tumour Research Centre of Excellence. Led by Professor Oliver Hanemann, the group has four principal investigators and is one of four specialist Centres in the UK supported since 2014 through our partnership with the charity Brain Tumour Research. Funding for the Centre has recently been extended.

The team are leaders in the investigation of low-grade brain tumours with research focussing on:
• Identifying and understanding the mechanisms that make a cell become cancerous and exploring ways in which to halt or reverse this process.
• Discovery of new biomarkers and therapeutic targets for low-grade brain tumours, testing new drugs and investigating how existing drugs could be re-purposed as therapies for brain tumours.

This is vital work, as the only treatments currently available for these brain tumours are invasive surgery and/or radiotherapy.

**2017 PROJECTS AND ACHIEVEMENTS**

During the Centre’s first three years we built a large tumour collection, mostly meningioma and schwannoma as well as some gliomas and ependymomas. For a year now this collection has included blood samples in addition to tumour tissue. This growing collection allows us to stratify meningioma into genetically defined subtypes.

We aim to discover biomarkers and new drug targets for meningioma of different defined make up (tumour grade and genetic subtype). To achieve this we have finished a first unbiased screen for proteins, activated proteins and miRNAs and started collaborations within the International Meningioma Consortium (ICOM). This approach has already resulted in quite a number of biomarker candidates for tumour progression as well as drug target candidates.

Building on these results, we will expand our analysis using stratified subgroups of meningioma. We have just finished a clinical trial with a design testing the biological effects of a drug in schwannoma based on our laboratory work.

In addition, we are examining the role immune infiltrating cells play in both meningioma and schwannoma and we will use a drug to reduce immune cells using in vivo models for these tumours.

**PUBLICATION HIGHLIGHTS**

**BLADDER CANCER**

**LYMPHOMA**

**BRAIN TUMOURS**

**CANCER IMMUNOLOGY**

**IMMUNE RESPONSE TO CANCER**

**RESEARCH TEAMS**

- Brain tumours – Professor C. Oliver Hanemann
- Blood cancer – Professor Simon Rule, Dr Claire Hutchinson
- Urological cancer – Professor Syed Hussain
- Cancer immunology – 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

**CANCER RESEARCH IN THE NEWS**

Researchers recruiting local smokers to major national study looking at reducing cigarette consumption (Professor Adrian Taylor)


Bladder cancer – finding new treatments and raising awareness (Professor Syed Hussain)

https://www.plymouth.ac.uk/news/pr-opinion/bladder-cancer-finding-new-treatments-and-raising-awareness

Researcher secures funding to further investigate treatment for neuro-tumours (Dr Sylwia Ammoun)

https://www.plymouth.ac.uk/news/researcher-secures-funding-to-further-investigate-treatment-for-neuro-tumours

Research to explore the development of deadly brain tumours (Dr Claudia Barros)

https://www.plymouth.ac.uk/news/research-to-explore-the-development-of-deadly-brain-tumours

New research offers hope to neuro-tumour patients (Dr Sylwia Ammoun)

https://www.plymouth.ac.uk/news/new-research-offers-hope-to-neuro-tumour-patients
CLINICAL NEUROSCIENCES

Internationally recognised research into the prevention, diagnosis and treatment of neurological conditions.

RESEARCH HIGHLIGHTS

BIOMEDICAL RESEARCH

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 Lou had been awarded funding by the MRC 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. Shouqing 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 Xinpeng Du 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 that Professor Edgar Kramer has joined the Biomedical Research Group this year as Professor of Neurodegenerative Diseases. Edgar joins ITSMed from the Mammalian Genetics Unit MRC Harwell, UK and was previously Research Group Leader at the Institute for Applied Physiology, University of Ulm, Germany. He is investigating the role of cell surface protein signalling in the pathogenesis of neurodegenerative disorders with particular interest in Parkinson’s disease.

ITSMed researchers Professor Genhua Pan, Dr Camille Carroll and Dr Xinzhong Li are leading a pan-European €3.5M Horizon 2020 Marie Curie programme, that could revolutionise the effectiveness of Alzheimer’s disease and clinical drug trials – which in turn may lead to disease-modifying treatments and prevention strategies.

The project will address the lack of specific, sensitive and minimally-invasive ways to identify people with the early stages of Alzheimer’s, a common reason for the failure of clinical trials investigating the treatment of this condition.

Central to the diagnostics problem is the identification of Alzheimer’s disease biomarkers and the development of techniques to aid that identification. The research required to achieve this is complex and requires input from academics and industrial experts from across a number of disciplines.

BBDiag brings together leading academic and industrial experts from five major consortia in Europe. Together they are developing a research and training platform incorporating entrepreneurship, multidisciplinary expertise and cutting-edge technologies in biomarker discovery, clinical trials, graphne and ELISA biosensing, and big data processing.

As well as training BBDiag Fellows, the European Training Networks has a highly-innovative research programme designed to discover Alzheimer’s disease biomarkers, develop new biosensing techniques and ‘point of care’ tools, and to maximise the technical exploitation of diagnostics.

Blood Biomarker-based Diagnostic tools for early-stage Alzheimer’s disease (BBDiag)

BBDiag is a pan-European project being delivered by a consortium of researchers and diagnostic experts led by Professor Genhua Pan and the University of Plymouth, funded by Horizon 2020 Marie Curie programme, that could revolutionise the effectiveness of Alzheimer’s disease and clinical drug trials – which in turn may lead to disease-modifying treatments and prevention strategies.

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CLINICAL NEUROLOGY

Dr Camille Carroll, ITSMed researcher and Consultant Neurologist at University Hospitals Plymouth NHS Trust, where she leads development of the Parkinson’s disease service, has been appointed NIHR Clinical Research Network National Specialty Lead for Neurodegeneration. In this influential role Camille will provide national leadership across commercial and non-commercial clinical studies in neurodegeneration, including Parkinson’s disease, motor neuron disease and Huntington’s disease. She will also develop relationships with a variety of groups including the public sector, charities and life-science funding organisations and maintain oversight of the specialty’s research portfolio.

The high-impact, nationwide multi-centre PD STAT clinical trial, led by Dr Camille Carroll, to investigate the repurposing of cholesterol-lowering statin drug Simvastatin as a neuroprotective treatment for Parkinson’s disease, has recently had its funding extended by the Cure Parkinson’s Trust. Camille also has an interest in the use of technology (wearable sensors and apps) for early disease detection, personalising therapy and monitoring disease progression and her innovative patient pathways won a Parkinson’s Excellence Network Award in 2017.

Dr Craig Newman’s innovative research at the interface between clinical assessment and e-Health technology development practice continues to drive the evaluation and NHS adoption of the ground breaking EpsMon epilepsy sudden death risk management service innovation, and other high impact projects.

In addition Craig is a key member of the University of Plymouth’s £2.7M European Regional Development Fund supported EPIC (E-health Productivity and Innovation in Cornwall and the Isles of Scilly) project to improve the use of technology in both health and social care and enhance the Cornish economy in this sector.

Cholesterol-lowering drug Simvastatin trialled as a potential neuro-protective treatment for Parkinson’s

PD STAT, a nationwide clinical trial led by Dr Camille Carroll using cholesterol-lowering treatment Simvastatin in people living with Parkinson’s, is underway in 25 centres across the country – with the hope that it could become one of a number of effective treatments available to treat Parkinson’s.

Funded by The JP Moulton Trust and The Cure Parkinson’s Trust, the PD STAT study is run by the University of Plymouth’s Peninsula Clinical Trials Unit. It is part of The Cure Parkinson’s Trust’s Linked Clinical Trials Programme, which brings drugs with proven safety records in people from treatment of other conditions that show the potential to slow, stop or reverse Parkinson’s into clinical trials.

Evidence from multiple sclerosis studies and pre-clinical work investigating its effect on alpha-synuclein clumping suggests Simvastatin might protect nerve cells in the brain from injury or loss. The PD STAT trial is investigating whether simvastatin has the potential to slow or halt the progression of Parkinson’s disease in patients with moderate severity.

There have been few innovations in the treatment of Parkinson’s for over 40 years and for the more than 127,000 people living with the condition in the UK, the results of this trial programme could lead to new and highly effective treatments in the armoury of medications to tackle Parkinson’s.
RESEARCH HIGHLIGHTS

Infectious disease remains a major threat to human health and well-being. Development of antibiotic resistance and the emergence or re-emergence of virulent pathogens is a significant healthcare challenge. In collaboration with Public Health England, the NHS and international partners, we are developing new models of infection to produce diagnostic targets, antimicrobial therapies and novel vaccines.

We have been awarded funds to take new antimicrobial peptides, discovered by our researchers (Dr Matthew Upton), into early phase clinical trials. Dr Michael Jarvis has been awarded funding by the MRC and Innovate UK for his work on developing herpes-based vaccines for infectious diseases. Our hepatology research led by Professor Matthew Cramp on HCV immunity in exposed but unaffected cases continues to uncover new findings and shed light on mechanisms of viral resistance including novel innate immune mechanisms. Dr Ashwin Dhanda is a member of a £3M consortium investigating ‘Minimising Mortality from Alcoholic Hepatitis’ funded by the MRC’s Stratified Medicine programme, and the hepatology research group continues to publish extensively including in Lancet and Nature journals.

Dr Tina Joshi, who has recently joined ITSMed from Cardiff University as Lecturer in Medical Microbiology, is focused on research into rapid diagnostic innovations for antimicrobial resistant pathogens in healthcare and bacterial infection control, further strengthening our Antibiotic Resistance research efforts.

ITSMed’s Antibiotic Resistant Pathogens research group, led by Dr Matthew Upton, has been awarded over £1M of Innovative UK funding for projects to design and identify novel peptide based antibiotics, develop industrial scale production methods and evaluate them pre-clinically, including in partnership with Ingerenza and the National Physical Laboratory.

Ingerenza is the UK’s premier industrial biotechnology company and will engineer systems for production of the new antibiotics. NPL will apply its expertise in the design and measurement of antibiotics that selectively attack microbial cells, and contribute artificial intelligence approaches for antimicrobial discovery developed in collaboration with IBM and the Science and Technology Facilities Council’s (STFC) Harrie Centre.

The consortium will develop new antibiotics that not only combat infection but also provide potential for redesign to enhance effectiveness – resulting in longevity and sustainability of useful antibiotics which have similar capabilities.

The team will work with bacteriocins, potent toxins produced by bacteria to kill other, closely-related strains. Bacteriocins are naturally active in the human body but have not evolved to function as effective drugs in the clinic.

The consortium will take a model bacteriocin and enhance its performance in terms of range of action, stability and potency. The aim is to generate derivatives which show drug-like properties without compromising stability and potency. The aim is to generate derivatives which show drug-like properties without compromising stability and potency. The aim is to generate derivatives which show drug-like properties without compromising stability and potency. The aim is to generate derivatives which show drug-like properties. This will be achieved by engineering the parental bacteriocin’s original potent bacteria-killing abilities. The consortium will take similar capabilities.

The consortium will then be scaled-up into commercially attractive production systems.
Novel vaccines to target pathogenic emerging from animals

A team of international scientists led by ITSMed’s Dr Michael Jarvis has received over £400k from Innovate UK to develop a new and economic vaccine designed to halt the spread of highly pathogenic ‘zoonotic’ (spreading from animals to humans) infectious diseases. This study focuses on a new kind of vaccine which is aimed at human health by targeting the deadly pathogens in the animal species from which they are emerging. Due to the lower stringent of approval requirements for animal compared to human vaccines, the predicted time to commercial availability of such vaccines is greatly reduced compared to a vaccine destined for direct use in humans.

Zoonotic transmission of microbes from animals to humans is the most common route whereby highly pathogenic microbes such as Ebola enter the human population, the rate of which is increasing dramatically due to the ever more frequent interaction of humans with wild animals and their environments. Strategies to control such diseases are, however, limited and the severity of outbreaks is compounded by the fact that they commonly occur in under-resourced, low and middle income countries (LMICs).

In answer to a call from the UK Vaccine Network to address the capacity gap in how to control emergence of pathogens such as SARS and Rift Valley Fever Virus, Dr Jarvis’s collaborative network has been awarded the funding for an initial ‘proof-of-concept’ project to target imminent animal populations involved in the spread of RVFV to humans using an attenuated bovine herpesvirus platform.

EXCESSIVE INFLAMMATION AND ABERRANT IMMUNE RESPONSES ARE A FEATURE OF MANY DISEASES AND UNDERSTOOD TO BE ONE IMPORTANT AREA OF OUR RESEARCH. RESEARCH LED BY PROFESSOR SIMON JACKSON HAS IDENTIFIED LIPID MODIFYING ENZYMES THAT CAN MODIFY PROTEINS INVOLVED IN THE IMMUNE RESPONSE TO INFECTION. DR GYURI FEJER WITH FUNDING FROM PUBLIC HEALTH ENGLAND IS UTILISING NOVEL NON-TRANSFORMED ALVEOLAR MACROPHAGE MODELS TO STUDY RESPIRATORY VIRAL AND BACTERIAL INFECTIONS.

IN ADDITION, WE ARE RESEARCHING, IN COLLABORATION WITH PARTNERS IN MULTI-DISCIPLINARY AREAS, THE ROLE OF THE ENVIRONMENT ON INFECTIOUS CHALLENGES TO HUMAN HEALTH. THIS INCLUDES HOW PARTICULATE MATTER AIR POLLUTION CAN INDUCE OR EXACERBATE LUNG INFECTIONS AND HOW MICROPLASTICS MIGHT SPREAD ANTIMICROBIAL RESISTANCE IN SEAWATER AND RIVERS (DR PHIL WARBURTON).

2017 ALSO SAW THE COMMERCIALISATION OF TWO OF OUR INFECTION AND IMMUNITY-BASED PROJECTS WITH THE GENERATION OF IP AND SPIN-OUT COMPANIES DEVELOPED TO EXPLORE VACCINE DESIGN TECHNOLOGY AND RAPID ASSAYS FOR Faecal contamination of WATER.

AT THE CLINICAL TRIAL AND PUBLIC HEALTH LEVEL, DR RUPERT JONES CONTINUES TO LEAD GLOBALLY SIGNIFICANT WORK, FUNDED BY THE MRC AND HORIZON 2020, IN EAST AFRICA AND OTHER DEVELOPING COUNTRIES TO EMBARK CHRONIC OBSTRUCTIVE PULMONARY DISEASE AND CLEAN AIR INTERVENTIONS INTO LOCAL HEALTH SERVICES AND THE COMMUNITY, WHICH ALSO HAVE IMPACT ON INFAMMATION AND CANCER RATES. RUPERT’S WORK HAS RECENTLY BEEN PUBLISHED IN THE LANCASTER.
CROSS CUTTING RESEARCH THEMES AND EXPERTISE

ITSMed’s world-class Cancer, Clinical Neuroscience and Infection, Immunity, Inflammation biomedical, clinical and applied health research is facilitated by cross-cutting expertise in Diagnostics, Clinical Trials and Public Health research.

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 genomics, 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 – Professor Neil Avent, Dr Tracey Madgett
- Radiology / Cardiac Computed Tomography – Prof Carl Roobottom
- Bioinformatics – Professor Matthias Futschik
- Medical statistics – Siobhan Creanor
- Genomics and Genetics Group – Professor Matthias Futschik, Dr Mat Upton, Dr Xinzhong Li, Professor Neil Avent, Dr Tracey Madgett, Dr Elaine Green, Dr Robert Belshaw
- Proteomics Research Group – Dr Edwin Lasonder, Dr Ansgar Poetsch, Dr Vikram Sharma
- Nanotechnology and biosensor diagnostics – Professor Genhua Pan
- Biostatistics and diagnostics – Dr Xinzhong Li

CLINICAL TRIALS

Bringing together scientists, clinicians, practitioners and trial design, management, evaluation, statistical analysis and database expertise our ITSMed’s cross-cutting Clinical Trials research is facilitated by the University of Plymouth’s UKCRC-registered Peninsula Clinical Trials Unit (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 four main areas:

- clinical neurosciences, mental health and well-being
- cancer treatment and prevention
- inflammation, infection and immunity
- musculoskeletal and pain management.

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.

Facilitated by a strong collaborative approach and with particular focus on investigation and evaluation of non-medicinal treatments and preventive approaches, including improved health through exercise and behaviour change, key areas of research activity of relevance to cancer and neurodegenerative and inflammatory disease include:

- Smoking reduction and cessation – Professor Adrian Taylor
- Alcohol and substance misuse – Dr Tom Thompson
- Chronic lung disease caused by particulate pollution – Dr Rupert Jones
2017 has been an exceptional year for the development and translation of ITSMed’s research into IP and technological innovations with potential real-world impact.

From licensing of patents to co-development of novel technologies with industry and from NHS adoption 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 OF PLYMOUTH SPINOUT COMPANIES

The past year has seen the establishment of two new spinout companies to develop and commercialise patent protected innovations coming out of ITSMed’s laboratories, with further such opportunities in the pipeline for 2018.

MolEndoTech Limited has been developed by Professor Simon Jackson to commercialise research into immune responses to infection and detection of bacterial contamination from ITSMed’s Endotoxin and Immunity Research Group.

The company has developed an innovative patent protected assay that is able to rapidly identify the concentration of faecal bacteria in water without the need to wait days for laboratory results. Working in both salt and fresh water, it can deliver results in a matter of minutes, significantly improving the ability to identify and track any pollution source.

It has recently signed an agreement with Palintest Limited (part of FTSE 100 Halma group), a market leader in water testing products, who will work with MolEndotech to bring the test to market and develop further ground-breaking new products.

The new test uses Lipopolysaccharide as a biomarker, as it is commonly found in faecal bacteria, and water samples can be tested in situ with the new kit developed, providing a much quicker – and cheaper – test for regulatory authorities. The technology and others in the company’s development pipeline will be capable of addressing a wide range of water-testing applications from beaches to the beverage industry.

For further information please contact: simon.jackson@plymouth.ac.uk

The Vaccine Group Limited has been established by Dr Michael Jarvis, Associate Professor in Virology and Immunology at the University of Plymouth, who specialises in the creative design of herpesvirus-based vaccines for the control of disease.

The Vaccine Group aims to commercialise new vaccine platforms for the development of vaccines for use in infection control (such as bovine tuberculosis) and for a rapid response to pathogens which unpredictably cross the species barrier and pose a significant threat to human health. Target pathogens include avian influenza A, Ebola and Marburg viruses, MERS and SARS coronaviruses and Rift Valley fever virus.

Dr Jarvis’ work has previously received funding from a number of sources, including Innovate UK, National Institutes of Health and the Medical Research Council. Initial work in The Vaccine Group will focus on herpesvirus-based platforms suitable for use in animals, to protect human health by targeting the animal species from which disease is transmitted to humans, for vaccination (termed zoonoses barrier vaccines). Future developments will include vaccines for use in humans.

For further information please contact: michael.jarvis@plymouth.ac.uk
Dr Charles Affourtit and Anthony Wynne from ITSMed’s Mitochondrial Biology Research Group have developed a novel assay for measuring real-time bioenergetics of electrically stimulated skeletal and cardiac muscle cells that should allow physiological workload to be mimicked at user-controlled rates. This approach, for which patent has recently been filed, provides the opportunity to:

• Grow and control the work rate of contracting muscle cells within multiwell plates
• Conduct high throughput screening of contracting muscle cells with pharmacological drugs
• Test drugs for cardiotoxicity where use of working heart muscle cells could address shortcomings and high cost of current methods

The technology is designed to fit with analysis platforms, such as the Seahorse Extracellular Flux analyser, that are already established in thousands of labs worldwide.

To date this work has been supported by the Daphne Jackson Trust and the team are currently developing refined prototypes in consultation with the Pharmaceutical industry to enable comparative drug toxicity testing analysis to be conducted.

For further information please contact: charles.affourtit@plymouth.ac.uk

Epilepsy costs the UK £1.5 billion per year and is one of the top ten causes of death for those under the age of 70 and the third main cause of maternal deaths in the UK. A preventative tool developed by ITSMed researcher Dr Craig Newman, in partnership with charity SUDEP Action, Cornwall Partnership NHS Foundation Trust and Royal Cornwall Hospitals NHS Trust, could have a significant impact on the personal and financial costs of epilepsy through reductions in deaths and decrease in A&E appointments.

The epilepsy risk management service delivery innovation, which includes an app, EpSMON, designed and developed in the South West was one of eight innovations to join the NHS Innovation Accelerator (NIA) programme in its second year.

EpSMON is an epilepsy self-management tool which enables patients to monitor their well-being and know when to seek medical support, a behaviour change which could lead to a reduction in the number of deaths of people with epilepsy. EpSMON is based on evidence from the SUDEP and Seizure Safety Checklist, a facility that enables clinicians to monitor changes in risk factors in their patients.

The app, which is available free of charge to patients across mobile technology platforms, has won a tranche of industry awards, including app developer and clinical psychologist Dr Craig Newman being shortlisted for the prestigious Health Service Journal Rising Star award, and is currently being refined for commissioning and adoption by the NHS as part of the wider service delivery innovation, which also includes clinical management protocols.

Epilepsy innovation for epilepsy risk management

The University of Plymouth, including ITSMed’s Dr Craig Newman, and a collaboration of Cornish and national partners have been awarded £2.7 million European funding to improve the use of e-health in Cornwall and the Isles of Scilly.

The project, known as E-health Productivity and Innovation in Cornwall and the Isles of Scilly (EPIC), will involve doctors, nurses, care homes, patients, University academics and small companies in the region to help find the best uses of the internet, apps, and robotics in health and social care.

Funded by the European Regional Development Fund (ERDF), EPIC started in 2017 and runs for three years.

Initiatives could include use of video calls to better connect care home residents, development and implementation of apps that support people wanting to make positive behavioural changes, care robots to comfort people with dementia, or even the use of drones to get emergency equipment to rural locations quickly.

The collaboration includes Kernel Health CIC, Cornwall Partners in Care, Patients Association, and Creative England, who will work to find technologies that can best help improve services, along with those which are, or can be, produced within Cornwall.

ITSMed’s Dr Craig Newman will be working on the e-Health technology innovation development, evaluation and commercialisation component of the EPIC project, facilitating the bringing-to-market of novel digital tools for the delivery of health and social care.

For further information: https://www.plymouth.ac.uk/research/epic

£2.7M European funding to improve e-health in Cornwall

The University of Plymouth, including ITSMed’s Dr Craig Newman, and a collaboration of Cornish and national partners have been awarded £2.7 million European funding to improve the use of e-health in Cornwall and the Isles of Scilly.

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For further information: https://www.plymouth.ac.uk/research/epic
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>Dr Xinzhong Li</td>
<td>Horizon 2020 - Marie Curie</td>
<td>£2,633,794</td>
<td>An Integrated Platform for Developing Brain Cancer Diagnostic Techniques (AiPBAND)</td>
</tr>
<tr>
<td>Dr Craig Newman (Co-I)</td>
<td>European Regional Development Fund</td>
<td>£2,430,510</td>
<td>E-Health Innovation &amp; productivity Cornwall (EPIC)</td>
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<tr>
<td>PenCTU / Med Stats</td>
<td>Various, inc. NIHR</td>
<td>£1,054,438</td>
<td>Conducting clinical trials and statistical analysis</td>
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<tr>
<td>Dr Mathew Upton</td>
<td>Innovate UK</td>
<td>£932,701</td>
<td>Efficient production, testing and iterative enhancement of first class antimicrobials</td>
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<tr>
<td>Prof. Oliver Hanemann</td>
<td>Brain Tumour Research</td>
<td>£858,063</td>
<td>Brain Tumour Research Centre of Excellence - extension</td>
</tr>
<tr>
<td>Dr Michael Jarvis</td>
<td>Innovate UK</td>
<td>£408,589</td>
<td>Multivalent Attenuated Vaccine against Viral and Bacterial Zoonoses in Ruminants</td>
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<tr>
<td>Dr Bing Hu</td>
<td>European Regional Development Fund</td>
<td>£275,913</td>
<td>Plant extracts for use in skin care</td>
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<tr>
<td>Dr Claudia Barros</td>
<td>Brain Research Trust</td>
<td>£165,066</td>
<td>Identification of novel genes controlling human glioblastoma initiation and growth mechanisms</td>
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<tr>
<td>Prof. Adrian Taylor</td>
<td>NIHR</td>
<td>£88,539</td>
<td>STRENGTHEN project extension</td>
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<td>Prof. Bob Fern</td>
<td>BRACE</td>
<td>£86,244</td>
<td>PhD studentship - Vulnerability of white matter to induction of a human tau mutation associated with dementia</td>
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<tr>
<td>Dr Michael Jarvis</td>
<td>National Pork Board</td>
<td>£74,393</td>
<td>Development of Porcine Cytomegalovirus as a Conventional and Disseminating Vaccine for Classical Swine Fever Virus – A Pilot Study</td>
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<td>Dr Mathew Upton</td>
<td>Society for Applied Microbiology</td>
<td>£67,251</td>
<td>PhD studentship - Deep sea discovery - mining marine environments for novel biologics</td>
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<tr>
<td>Dr Shouqing Luo</td>
<td>BRACE</td>
<td>£58,545</td>
<td>Does lowering futile autophagosome synthesis alleviate aggregation-prone protein toxicity in dementia diseases</td>
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<tr>
<td>Dr Michael Jarvis</td>
<td>National Institutes of Health</td>
<td>£50,892</td>
<td>Induction of SIV Antibody Responses to RhCMV-SIV Vaccines</td>
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<tr>
<td>Dr Craig Newman</td>
<td>SUDEP Action</td>
<td>£33,911</td>
<td>Epison - Research Development</td>
</tr>
<tr>
<td>Dr Camille Carroll</td>
<td>Cure Parkinsons Trust</td>
<td>£25,000</td>
<td>Extension of sub-study to explore the experiences of participants in the PD STAT study</td>
</tr>
</tbody>
</table>

* Projected funding level based on initial award funding may be subject to change based on progression of project.
POSTGRADUATE RESEARCH STUDENTS

The Institute has seen another increase (29%) in the number of postgraduate research degree students 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 Published Works.

The results from the 2017 Post Graduate Research Survey (PRES), showed 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
- 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. This year the Committee restructured, creating 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.

2017 STUDENTSHIP AWARDS

<table>
<thead>
<tr>
<th>DIRECTOR OF STUDIES</th>
<th>FUNDING BODY</th>
<th>AMOUNT</th>
<th>PROJECT TITLE</th>
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</thead>
<tbody>
<tr>
<td>Dr Helen Lloyd</td>
<td>University of Gothenburg Centre for Person Centred Care</td>
<td>£57,000</td>
<td>Assessment and monitoring of treatment fidelity in a multiple behaviour change intervention for smokers wishing to reduce but not quit</td>
</tr>
<tr>
<td>Prof. Oliver Hanemann</td>
<td>Brain Tumour Research</td>
<td>£65,536</td>
<td>Identifying candidates for biomarkers and drug targets in meningiomas with Traf7/Kif4 and AKT1/TRAF7 mutations</td>
</tr>
<tr>
<td>Prof. Oliver Hanemann</td>
<td>Brain Tumour Research</td>
<td>£90,000</td>
<td>Targeting macrophages in schwannoma and meningioma tumours</td>
</tr>
<tr>
<td>Prof. Oliver Hanemann</td>
<td>Brain Tumour Research</td>
<td>£89,793</td>
<td>Identifying molecular targets and potential drug targets in progression of meningiomas (grade 1 to grade 2)</td>
</tr>
<tr>
<td>Prof. Robert Fern</td>
<td>BRACE</td>
<td>£88,000</td>
<td>The vulnerability of white matter to induction of a human tau mutation associated with dementia</td>
</tr>
<tr>
<td>Dr Claire Hutchinson</td>
<td>Plymouth &amp; District Leukemia Fund</td>
<td>£72,000</td>
<td>Novel approaches to assess cellular interactions and their role in the pathology and treatment</td>
</tr>
<tr>
<td>Dr Mathew Upton</td>
<td>Society for Applied Microbiology</td>
<td>£87,251</td>
<td>Deep sea discovery - mining marine environments for novel biologics</td>
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</tbody>
</table>

EXAMPLES OF CONFERENCES ATTENDED AND PRESENTED AT BY OUR PGR STUDENTS IN 2017

<table>
<thead>
<tr>
<th>CONFERENCE NAME</th>
<th>DATE</th>
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<tbody>
<tr>
<td>Microbiology Society Annual Conference 2017.</td>
<td>April 2017</td>
</tr>
<tr>
<td>27th European Congress of Clinical Microbiology and Infectious Diseases.</td>
<td>April 2017</td>
</tr>
<tr>
<td>27th Europe Congress of Clinical Microbiology and Infectious Diseases (ECCMID), Vienna, Austria</td>
<td>April 2017</td>
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<tr>
<td>British-Irish Meningioma Society 2nd Annual Meningioma Symposium</td>
<td>May 2017</td>
</tr>
<tr>
<td>Brain Tumor Meeting 2017 Berlin</td>
<td>May 2017</td>
</tr>
<tr>
<td>ASM Microbe 2017, Oregon USA</td>
<td>June 2017</td>
</tr>
<tr>
<td>International Society of Blood Transfusion 27th Regional Congress in Copenhagen.</td>
<td>June 2017</td>
</tr>
<tr>
<td>20th Conference in Genomics and Proteomics of Human Pathogens</td>
<td>June 2017</td>
</tr>
<tr>
<td>British Neuro-Oncology Society (BNOS)</td>
<td>June 2017</td>
</tr>
<tr>
<td>RA Spathies in Asia: Advances in RASopathies and Neurofibromatosis; Identification of New Therapeutic Targets 2017</td>
<td>November 2017</td>
</tr>
</tbody>
</table>
**POSTGRADUATE RESEARCH NEWS**

**NATIONAL PRIZE WIN FOR DENTAL PHD STUDENT**

Jonathan Davies won the Unilever Poster Prize, one of the key prizes awarded at the British Society of Oral and Dental Research (BSODR) 2017 annual conference. The Unilever prize is awarded for the best poster and presentation on an unpublished piece of research by a PhD or early career researcher. His poster and presentation focused on Primary Sjögren’s Syndrome (PSS), a disease in which the immune cells attack the salivary glands, and discussed the use of stem cells in gland regeneration.

**€3.7 MILLION PROJECT FOR THE NEXT GENERATION OF BRAIN TUMOUR RESEARCHERS**

A pan-European initiative led by the University of Plymouth designed to train the next generation of brain tumour researchers, has received funding of almost €3.7 million from the European Commission’s Horizon 2020 – Research and Innovation Framework Programme. Together with partner organisations in China, the initiative is called AiPBAND and will train a new generation of entrepreneurial and innovative early-stage researchers in the early diagnosis of brain tumours.

For current studentships, please see our website: [www.plymouth.ac.uk/your-university/about-us/university-structure/faculties/medicine-dentistry/postgraduate-research-degrees](http://www.plymouth.ac.uk/your-university/about-us/university-structure/faculties/medicine-dentistry/postgraduate-research-degrees)

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**ITSMed SEMINAR SERIES 2017**

<table>
<thead>
<tr>
<th>DATE</th>
<th>SPEAKER</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>31/10/17</td>
<td>Professor Joseph Kissil</td>
<td>“New insights into the pathogenesis of NF2 - the role of the Hippo/YAP pathway”</td>
</tr>
<tr>
<td>7/11/17</td>
<td>Professor Paul Sharpe</td>
<td>“Dental pulp stem cells in tooth growth and repair”</td>
</tr>
<tr>
<td>22/11/17</td>
<td>Professor Mart Saarna</td>
<td>“Biology and Therapeutic Potential of ER localized Trophic Factor CDNF”</td>
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<tr>
<td>30/11/17</td>
<td>Dr Vicki Chalker</td>
<td>“Respiratory and Systemic Bacterial Infections, the National Reference Laboratory perspective”</td>
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<tr>
<td>14/12/17</td>
<td>Professor Carlos Matute</td>
<td>“Searching for new targets to attenuate brain ischemic damage”</td>
</tr>
</tbody>
</table>

**ITSMed RESEARCH IN THE NEWS**

- Research panel chair appointment for Plymouth medical research statistician [https://www.plymouth.ac.uk/news/research-panel-chair-appointment-for-plymouth-medical-research-statistician](https://www.plymouth.ac.uk/news/research-panel-chair-appointment-for-plymouth-medical-research-statistician)
<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 Simon Jackson</td>
<td>Endotoxin and immunity research</td>
<td><a href="mailto:simon.jackson@plymouth.ac.uk">simon.jackson@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 Neil Avent</td>
<td>Blood diagnostics</td>
<td><a href="mailto:neil.avent@plymouth.ac.uk">neil.avent@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Professor Matthew Cramp</td>
<td>Hepatology</td>
<td><a href="mailto:matthew.cramp@plymouth.ac.uk">matthew.cramp@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Professor Robert 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 Matthias Futschik</td>
<td>Bioinformatics &amp; systems biology</td>
<td><a href="mailto:matthias.futschik@plymouth.ac.uk">matthias.futschik@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Professor Jeremy Hobart</td>
<td>Multiple sclerosis / patient outcome scales</td>
<td><a href="mailto:jeremy.hobart@plymouth.ac.uk">jeremy.hobart@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Professor Syed Hussain</td>
<td>Urological cancer</td>
<td><a href="mailto:syed.hussain@plymouth.ac.uk">syed.hussain@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Professor Edgar Kramer</td>
<td>Parkinson’s disease</td>
<td><a href="mailto:edgar.kramer@plymouth.ac.uk">edgar.kramer@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Professor Ji-Liang Li</td>
<td>Cancer immunology/brain tumour</td>
<td><a href="mailto:ji-liang.li@plymouth.ac.uk">ji-liang.li@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Professor Genhua Pan</td>
<td>Nanotechnology and biosensor diagnostics</td>
<td><a href="mailto:G.Pan@plymouth.ac.uk">G.Pan@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Professor David Parkinson</td>
<td>Peripheral nerve /brain tumour</td>
<td><a href="mailto:david.parkinson@plymouth.ac.uk">david.parkinson@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Professor Simon Rule</td>
<td>Blood cancer</td>
<td><a href="mailto:simon.rule@plymouth.ac.uk">simon.rule@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Professor Robert Sneyd</td>
<td>Anaesthesia</td>
<td><a href="mailto:robert.sneyd@pms.ac.uk">robert.sneyd@pms.ac.uk</a></td>
</tr>
<tr>
<td>Professor Christoph Tredwin</td>
<td>Dental materials</td>
<td><a href="mailto:christopher.tredwin@pcmd.ac.uk">christopher.tredwin@pcmd.ac.uk</a></td>
</tr>
<tr>
<td>Dr Wondwossen Abate Voldie</td>
<td>Endotoxin and immunity research</td>
<td><a href="mailto:wondwossen.abatevoldie@plymouth.ac.uk">wondwossen.abatevoldie@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Dr Charles Affourtit</td>
<td>Mitochondrial biology</td>
<td><a href="mailto:charles.affourtit@plymouth.ac.uk">charles.affourtit@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Dr Sylvia Ammoun</td>
<td>Brain tumour research</td>
<td><a href="mailto:sylvia.ammoun@plymouth.ac.uk">sylvia.ammoun@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Dr Claudia Barros</td>
<td>Neural stem cells/ brain tumour</td>
<td><a href="mailto:claudia.barros@plymouth.ac.uk">claudia.barros@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Dr Louise Belfield</td>
<td>Inflammation and the vasculature in oral disease</td>
<td><a href="mailto:louise.belfield@plymouth.ac.uk">louise.belfield@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Dr Robert Belshaw</td>
<td>Retroviruses</td>
<td><a href="mailto:robert.belshaw@plymouth.ac.uk">robert.belshaw@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Dr Torsten Bossing</td>
<td>Light microscopy</td>
<td><a href="mailto:torsten.bossing@plymouth.ac.uk">torsten.bossing@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Dr Zoe Brookes</td>
<td>Inflammation and the vasculature in oral disease</td>
<td><a href="mailto:zoe.brookes@plymouth.ac.uk">zoe.brookes@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Dr Camille Carroll</td>
<td>Parkinson’s disease</td>
<td><a href="mailto:camille.carroll@plymouth.ac.uk">camille.carroll@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Mrs Siobhan Creanor</td>
<td>Clinical trials &amp; medical statistics</td>
<td><a href="mailto:siobhan.creanor@plymouth.ac.uk">siobhan.creanor@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Dr Ashwin Dhanda</td>
<td>Hepatology</td>
<td><a href="mailto:ashwin.dhanda@plymouth.ac.uk">ashwin.dhanda@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Dr Xinpeng Dun</td>
<td>Peripheral nerve research</td>
<td><a href="mailto:xin-peng.dun@plymouth.ac.uk">xin-peng.dun@plymouth.ac.uk</a></td>
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<tr>
<td>Dr Doyo Enki</td>
<td>Medical statistics</td>
<td><a href="mailto:doyo.enki@plymouth.ac.uk">doyo.enki@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Dr Gary Farnham</td>
<td>Antibiotic resistant pathogens</td>
<td><a href="mailto:gary.farnham@plymouth.ac.uk">gary.farnham@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Dr Gyorgy Fejer</td>
<td>Macrophages</td>
<td><a href="mailto:gyorgy.fejer@plymouth.ac.uk">gyorgy.fejer@plymouth.ac.uk</a></td>
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<td>Dr Dan Felmeie</td>
<td>Hepatology</td>
<td><a href="mailto:daniel.felmeie@plymouth.ac.uk">daniel.felmeie@plymouth.ac.uk</a></td>
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<tr>
<td>Dr Andrew Foey</td>
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<td><a href="mailto:andrew.foey@plymouth.ac.uk">andrew.foey@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Dr Elaine Green</td>
<td>Psychiatry / genetics</td>
<td><a href="mailto:elaine.green@plymouth.ac.uk">elaine.green@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Dr Joanne Hosking</td>
<td>Medical statistics</td>
<td><a href="mailto:joanne.hosking@plymouth.ac.uk">joanne.hosking@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Dr Bing Hu</td>
<td>Oral / skin cancer</td>
<td><a href="mailto:bing.hu@plymouth.ac.uk">bing.hu@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Dr Claire Hutchinson</td>
<td>Blood cancer</td>
<td><a href="mailto:claire.hutchinson@plymouth.ac.uk">claire.hutchinson@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Dr Michael Jarvis</td>
<td>Vaccines</td>
<td><a href="mailto:michael.jarvis@plymouth.ac.uk">michael.jarvis@plymouth.ac.uk</a></td>
</tr>
<tr>
<td>Dr Rupert Jones</td>
<td>Respiratory health</td>
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