



NEWSLETTER

AUTUMN

2017

Front cover designed by PhD students Emma Henly and Kirstie Rawson.

This is the new window sticker for the Microbiology Window Laboratory N701. Organisms (top to bottom): H1N1 Flu Virus, *Campylobacter jejuni*, *Aspergillus fumigatus*, *Staphylococcus aureus*, *Candida albicans*, *Pseudomonas aeruginosa*, *Mycobacterium tuberculosis*, *Methylococcus capsulatus* (Bath), *Methylosinus trichosporium* OB3b, *Escherichia coli*, *Giardia lamblia*, *Porphyromonas gingivalis*, *Tannerella forsythia*, *Streptococcus pneumoniae*

NEWSLETTER - AUTUMN 2017

Welcome to the Biomolecular Sciences Research Centre (BMRC) Autumn Newsletter

The BMRC is an active research environment, which is the research arm of the Department of Biosciences and Chemistry, on floors 7 and 8 Norfolk Building, with well equipped research laboratories (<https://www.shu.ac.uk/research/specialisms/biomolecular-sciences-research-centre/facilities>). Staff, PhD students, MSci/MChem as well as undergraduate and Master's students have access to these state of the art laboratories during specific lab classes and in research projects.

The following news stories give a picture of some of our activities over the last 6-8 months which I hope you agree recognise the fantastic work done by staff and students in BMRC.

Nicola Woodroffe
Head of BMRC

Recent doctoral completions

Liz Leese, part time PhD student at the Health and Safety Laboratories in Buxton, passed her PhD. The title of Liz's thesis was *Analytical methods to investigate occupational exposure to toxic elements and their species*. Director of studies was Dr Vikki Carolan and supervisors were Dr Jackie Morton (Health and Safety Laboratory, Buxton) and Dr Philip Gardiner. Jackie is a SHU alumni.

Amal Arohama has completed her PhD. Her thesis title is *Enhancement of Death Receptor-mediated apoptosis in Multiple Myeloma* and her supervisory team include Dr Neil Cross (director of studies) and Dr Sarah Haywood-Small.

Abbey Thorpe's *Mesenchymal Stem Cell Differentiation to Musculoskeletal Tissues in Injectable Hydrogel Scaffolds* is an article based PhD. She passed her viva with no corrections. Abbey's supervisory team was director of studies Prof Christine Le Maitre and supervisor Prof Chris Sammon (MERI).

Nikhil Lalwani completed his PhD on *Arsonium- and phosphonium-functionalised gold nanoparticles for mitochondria targeted therapeutics*. His supervisory team include director of studies Prof Neil Bricklebank and supervisor Dr Neil Cross.

Characterisation of Novel Antimicrobial Peptides from Egyptian Scorpion and Snake Venoms is the PhD title of **Mohamed Tawfik** who has completed his PhD. He was supervised by director of studies Dr Keith Miller and supervisor Prof Peter Strong.

Nicola Wright completed her PhD entitled *Role of cancer stem cells in breast and prostate cancer*. Dr Neil Cross was director of studies, with Dr David Smith co-supervisor at SHU and Dr Tom Sayers co-supervisor at the National Cancer Institute, USA, where Nicola did some of the work.

Ekta Patel passed her PhD entitled *Using ion mobility mass spectrometry to investigate the distribution and effect of dosed compounds on endogenous molecules*. Ekta was supervised by Dr Simona Francese and Prof Malcolm Clench.

Doctoral student **Mariam Sheilabi** passed her viva and has been awarded a PhD. Her studies were funded by the Libyan Embassy and the title is *Studies of Biomarkers in Temporal Lobe Epilepsy*. Her director of studies was Dr Alessandra Princivale and Dr Adrian Hall was her first supervisor.

Another PhD by publication, **Scott Martin**, one of our part-time PhD students based at Astra-Zeneca's Cambridge site, passed his PhD under the supervision of Prof Malcolm Clench (director of studies). His project was a entitled *Mechanistic Study of Novel Drug Metabolites by LC-MS*.

Sheikh Adnan successfully passed his MPhil subje to minor amendments. The thesis title is *Mechanism of Action of Scorpion Toxin, Chlorotoxin, a Bioinformatics Approach*. His director of studies was Dr Kirsti Newton and Prof Peter Strong was his supervisor.

Ben Sholademi successfully passed his DProf viva. Ben's thesis title is *Identification and Reduction of Pre-analytical Errors in Clinical Chemistry through Expert Advice*. Ben is a clinical biochemist working for the NHS and the study was done at the Northern General Hospital, Sheffield, with Prof Nicola Woodroffe as director of studies.

BMRC graduates taking up positions

Dr Claire Bradford, supervised by Prof Nicola Woodroffe, graduated with a PhD in 2012 has just started on a clinical scientist training programme in Glasgow.

Dr Rebecca Day has a new post working for Novartis as medical scientific liaison in neuroscience. She is involved in the non promotional translation of scientific/medical data to healthcare professionals and therapy area experts. She also plays a major role in the support of clinical trials, medical education and building partnerships with healthcare professionals to improve patient care and to help with any medical, technical and development issues relating to the products or therapeutic areas.

Jodie Brookes has been employed as a Higher Scientist at the Health and Safety Laboratory in Buxton since February 2017.

Dr Abbey Thorpe has taken up a two-year Post Doctoral MRC research position with Prof Christine Le Maitre. This is funded by the BMRC.

Ieva Palubeckaitė will be working as a post-doctoral researcher at Leiden University Medical Centre, Netherlands, in the Pathology department. Her two-year contract starts on 2nd October. Ieva will be developing 3D cell culture of patient sarcoma cells and will be using mass spectrometry imaging on these cultures.

Emma Beasley has taken a position as a science teacher at Penistone Grammar School via the School Direct training route in partnership with Sheffield Hallam. She will be specialising in chemistry and was awarded a prestigious Royal Society of Chemistry Scholarship in order to train.

Mohamed Tawfik Elzayat secured a lecturer position at Port Said University, Egypt, as a Toxicology - Biotechnology lecturer.

Dr Louise Vickers has taken up a new role as Knowledge Exchange Funding Executive in the Research and Innovation Office (RIO). Her main duties will be to manage a portfolio of Knowledge Exchange Transfer Partnerships (KTPs).

New faces and visitors to the BMRC

New academic staff in the Department of Biosciences and Chemistry

Dr Franziska (Fran) Ludwig started on Monday, 4th September. She is a senior biomedical scientist as well as holding a post with Public Health England so will be particularly involved with supporting 'science practitioners'.

Dr Tetyana (Tanya) Klymenko started as a new lecturer in biochemistry. Tanya is a research scientist with over 15 years of postgraduate laboratory experience and is a Fellow of the Higher Education Academy. Tanya is joining us from Barts Cancer Institute, Queen Mary University London, and started at the BMRC on 4th September.

Dr Patrick Harrison is covering for Dr Sarah Forbes' lectureship in microbiology whilst she is going on maternity leave from 11th September for 6 months.

New doctoral students

We have seven new full-time PhD students, starting in October 2017 and January 2018.

Lucy Flint, who will be working under the supervision of director of studies Prof Malcolm Clench and supervisors 1 and 2, Dr Neil Cross and Dr Laura Cole, will be investigating *Biopharmaceutical Quantification by Mass Spectrometry Imaging*

Human identification through advanced forensic mass spectrometry of blood and fingerprints is the PhD title of **Cameron Heaton**. His supervisory team consists of director of studies Dr Simona Francese and supervisor 1 Dr Laura Cole, as well as external supervisor Richard McCollm from the Defence Science and Technology Laboratory (Dstl), an executive agency, sponsored by the Ministry of Defence. Dstl have half funded this VC Scholarship.

With a January 2018 start, **Paul Mardling**'s PhD *Bladder tissue engineering using auxetic materials* is funded by a Vice Chancellor's Scholarship and Pioneer Healthcare Ltd. Director of studies is Prof Christine Le Maitre with supervisors Prof Andy Alderson (MERI) and Dr Nikki Jordan-Mahy. Paul will attend the Doctoral Training Alliance.

Jack Slater will be supervised by Dr Danny Allwood (director of studies) and Drs Alex Hamilton and Keith Miller as supervisors 1 and 2. His PhD is entitled *Synthesis of potential new antibiotics using visible light photoredox catalysis*. This PhD is funded by the BMRC.

Another January 2018 start, **Oliver Slay**'s PhD is entitled *Identification of variants contributing to schizophrenia using high-throughput genomics*. His supervisory team consist of director of studies Dr Lucy Crooks and supervisor Dr Caroline Dalton. This PhD is funded by the BMRC.

Robert Tempest will be looking at *Colon-derived extracellular vesicles: impact on adipose cells: linking fat to colorectal disease*, a PhD supervised by Dr Nick Peake as director of studies and supervisors Drs Dan Kelly and Caroline Dalton. This PhD is funded by the BMRC.

Identification of Mineral Fibres & Biomarkers in Malignant Mesothelioma is the title of **Oana Voloaca**'s PhD which is funded by the BMRC and June Hancock Mesothelioma Research Fund. Established in 1997, The June Hancock Fund is the UK's first and largest independent mesothelioma charity. During this project, Oana will also support activities for people with mesothelioma and their carers as part of Action Mesothelioma Day. Dr Sarah Haywood-Small will be her director of studies and supervisors will be Prof Malcolm Clench and Dr Laura Cole. Oana will also be attending the Doctoral Training Alliance. This PhD is funded 50/50 by the June Hancock Fund and the BMRC.

Our **Integrated Masters students** for the upcoming academic year are: Joseph Quick, Robin Thompson, Alexander Knowles, Alex Van-Gelder, Joshua Dowling, Josh Browes, Peka Hagouang, Lauren Jaques, Kyle Owens, Joe Mills, Anna Mirza, Lewis Hudspith, Phoebe Bray, Gemma Portlock, Muhammad Hasin Rayhan, Ryan Wilson, Joshua Adams, Lauren Skibinski, Amir Dirjal, Shazia Ansari and Beth Rushworth.

Last year's Integrated Masters students: Where are they now?

Jack Slater	PhD on <i>Synthesis of potential new antibiotics using visible light photoredox catalysis</i> here at the BMRC with Dr Danny Allwood
Ashley Gains	PhD at the University of Sheffield (competitive studentship 100% funded by Sheffield University) at the School of Clinical Dentistry with Graham Stafford as PI and Prachi Stafford is co-supervisor
Lauren Hatfield	PhD at Manchester Metropolitan University with Prof Chris van der Gast looking into developing bacteriophages for identification of bacteria in cystic fibrosis
Rachel Gatenby	PhD at the University of Sheffield
James Toy	Working as a NHS blood bank lab technician on a 2-month contract
Emma Surplice	Internship in research and development at Kirkstall Ltd (a medical biotech company)
Roslyn Williams	PhD at the University of Sheffield
Alice Fantom	PhD at University of Manchester / Liverpool
Sarah Rennicks	PGCE course at Hallam University
Jack Roberts	PhD in Manchester in Native Mass Spectrometry
Andrew West	Physical organic chemistry PhD in the lab of Dr Scot Cockroft at the University of Edinburgh

Conference round-up

Abdurrahman Eswayah attended the **2nd International Conference on Environmental Science and Technology (ICOEST)** in Belgrade, Serbia from 27th September - 4th October 2016. He gave an oral presentation entitled "Remediation of Selenium (IV) by Methane-oxidising Bacteria". The ICOEST was an interdisciplinary platform addressing questions related to Biotechnology, and Environmental Science and Technology.

Rasha Dosh attended the **8th International Conference on Clinical Gastroenterology & Hepatology** in October 2016 in Toronto, Canada. The theme was "Updates on Clinical Gastroenterology & Hepatology". Rasha gave an oral presentation on *Novel In vitro Three Dimensional Culture of Human Intestinal Cell Lines to develop a 3D Model for Inflammatory Bowel Disease*, and participated with a poster on her work on *Interleukin-1 Receptor Antagonist Knockout Mice as a Model of the Inflammatory Bowel Disease*.

Two doctoral students, Cristina Russo and Ieva Palubeckaitė visited Ustron, Poland for the mass spectrometry conference **Ourcon IV** which was held 16th - 21st October 2016. Both, Ieva and Cristina presented a poster and Cristina had received a BMSS travel grant over £300 for this trip. It was here that Prof Malcolm Clench formed a collaboration with Leiden University which lead to Ieva being able to do a lab visit there between 13th - 24th March 2017. Ieva received funding from the Biochemical Society of £550 for her travel to Leiden.

Novel In vitro Three Dimensional Culture of Human Intestinal Cell Lines to develop a 3D Model for Inflammatory Bowel Disease was the title of the talk PhD student Rasha Dosh gave at the **9th Euro-Global Gastroenterology Conference** in October 2016 in Valencia, Spain. The theme was 'Exploring New Dimensions of Gastroenterology'. Rasha also presented a poster with the title *Interleukin-1 Receptor Antagonist Knockout Mice as a Model of the Inflammatory Bowel Disease*. The conference was also attended by Dr Nikki Jordan-Mahy.

Mootaz Salman was invited to attend the **CAJAL-International Society of Neurochemistry training course** *Glial Cells in Health and Disease*. Mootaz was one of four applicants (out of 170) who were awarded the CAJAL Full Stipend Award of €2,500 to cover the costs of the conference, which took place in Bordeaux, France, from 27th November to 10th December 2016.

Prof Christine Le Maitre attended the **RSC Biomaterials Chemistry Conference**, Ulster, Ireland, in January 2017 and presented 4 talks and 2 posters from the cell biology and regenerative medicine research group.

Mootaz Salman was invited to attend the **10th International Conference on Neuroscience and Neurochemistry** held on 27th-28th February 2017 in Amsterdam, Netherlands and was awarded the Best Student Talk Award for his talk entitled *Validation of the aquaporin role as a novel drug target in therapeutic mannitol action and resistance in cerebral oedema and stroke*.

Joseph Snuggs, Dr Louise Vickers and Prof Christine Le Maitre attended the **Orthopaedic Research Society (ORS) conference**, 18th - 23rd March 2017, which took place in San Diego, USA. Joseph presented two posters, *Aquaporin expression in the human and canine intervertebral disc* and *Regulation of aquaporin gene expression in human nucleus pulposus cells*, related to his work on the expression and regulation of aquaporins during intervertebral disc biology and degeneration. Dr Louise Vickers presented the poster *Modelling The Degenerate Niche To Investigate Efficacy Of Mesenchymal Stem Cell Therapies For Intervertebral Disc Degeneration* and Prof Le Maitre presented the poster *In Vivo Safety and Efficacy Testing of a Thermally Triggered Injectable Hydrogel, Loaded with Hydroxyapatite Nanoparticles, to Promote Repair and Regeneration of Bone Defects* and a talk entitled *Thermally Triggered Hydrogel Induces Nucleus Pulposus Differentiation of Mesenchymal Stem Cells and Restores Mechanical Function Following Injection into Bovine Intervertebral Disc*.

ORS is the leading research society that supports researchers, surgeons, clinicians and engineers focussed on the understanding and treatment of all musculoskeletal disorders. The conference itself gathered all the above together and provided the opportunity to not only disseminate Joseph's own work but for him to gain an insight into cutting edge research and treatments currently being developed.

The American Academy of Neurology Meeting was held in Boston from 22nd - 28th April 2017. Inês Ramos presented a poster and received a travel award of £1000 from Guarantors of Brain. The title of her poster was *Revealing the underlying differences of NAWM from primary and secondary Multiple Sclerosis*.

Hasan Aldewachi attended the **5th International Conference on Bio-Sensing Technology** which took place between 7th and 10th May 2017 in Riva del Garda (on Lake Garda), Italy. Hasan participated with a poster presentation *A Facile and Real Time Colorimetric Assay for DPP IV Activity Based on an Enzyme-Responsive Nanoparticle System* and was awarded a £400 travel grant by the Royal Society of Chemistry to support his attendance.

In May 2017, PhD student Alex Andrews and Dr Prachi Stafford travelled to Lidingö island on the outskirts of Stockholm City, Sweden, for the **12th European Oral Microbiology Workshop**. The EOMWs is held once every three years attracting a number of laboratory and clinical researchers with special interest in oral and general microbiology.

Both senior and junior scientists had the chance to participate and interact, propagating their knowledge and giving rise to new research ideas. Cutting edge research was discussed on the topics of oral ecology, etiology and pathogenesis of oral infectious diseases, microbiological methods, microbial diagnostics and antimicrobial therapies. Whilst at the conference, Alex presented a poster on his research with periodontal pathogens and platelet interactions. The funding was provided by the BMRC.

The **annual ASMS Conference** (American Society for Mass Spectrometry) was held in Indianapolis, USA between 2nd and 9th June 2017. Four of our doctoral students attended: Ieva Palubeckaitė, Becky Mason, Emma Beasley and Cristina Russo. Ieva received funding from the Analytical Chemistry Fund and the American Society for Mass Spectrometry and was accepted for a poster presentation entitled *Mass spectrometric imaging of a three-dimensional osteosarcoma model*. Ieva's poster showed a novel three-dimensional (3D) method in order to produce osteosarcoma 'clumpoids', treatment of these with a well-known chemotherapeutic and analysis using Matrix-Assisted Laser Desorption Ionisation Mass Spectrometry (MALDI-MS) imaging. Cristina participated with a poster *Method development for quantitative investigation of Terbinafine hydrochloride in a 3D skin model by MALDI-MSI*.

TERMIS-EU 2017 was a conference attended by Prof Christine Le Maitre and PhD student Rasha Dosh in June 2017, taking place in Davos, Switzerland. The theme of the conference was 'Personalised Therapies for Regenerative Medicine' and Rasha contributed with a poster on *The use of pNIPAM-Laponite hydrogel in 3D cell culture of the intestine*. Prof Le Maitre presented two talks and two posters from the group: Talk 1: *In vivo safety and efficacy testing of a thermally triggered injectable hydrogel, loaded with hydroxyapatite nanoparticles, to promote repair and regeneration of bone defects*; Talk 2: *Stem cell therapies for intervertebral disc degeneration - targeting the degenerate microenvironment*. The poster titles were: 1. *Thermally triggered hydrogel delivers mesenchymal stem cells and induces differentiation towards NP phenotype and restores mechanical function following injection into bovine intervertebral disc*, (a poster by PhD student Abbey Thorpe) and 2. *Auxetic materials in tissue engineering* (a poster by Paul Mardling).

Post-doctoral Researcher, Inês Ramos, together with Prof Nicola Woodroffe, attended the **XXVI AINI Congress and 16th European School of Neuroimmunology Course** held in Venice from 26th to 30th of June. Inês presented a poster and was further selected for an oral poster trailer presentation. Inês had received a travel award from the organisers (free registration) and had also been awarded the International PARSUK Travel Grant 2017, worth £300 by the Portuguese Association of Researchers and Students in UK.

From 22nd to 25th August Lisa Deininger attended the 21st triennial meeting of the **International Association of Forensic Sciences (IAFS)** in Toronto, Canada. The conference was attended by 1450 delegates from 86 countries, which made for a brilliant networking experience and audience to present her poster *Bottom Up Proteomics for Detection and Provenance Determination of Blood in Stains and Fingermarks*. Due to the number of presenters no general poster prizes were given but the reception was very positive. The topics presented were very varied, ranging from issues in human migration and identification over veterinary forensics, the training of cadaver dogs and miscarriage of justice to the development of new analytical techniques to advance the field and

efforts to make the community more collaborative. Overall it was a very interesting and informative conference.

Paula Chirila attended the **Europacat 2017** conference in Florence, Italy from the 27th to 31st August, where she presented her poster *Preparation of 1,2,3-Benzotriazin-4-ones Through a Co-catalysed C-H Functionalization Approach, Using Dioxazolones as the Key Coupling Partner*.

Rachel Hodgson and Teresa Whiteley went to Paris, France, to attend the **International Society of Neurochemistry (ISN) and the European Society for Neurochemistry (ESN)** conference on 20th -24th August 2017. Both presented a poster, Teresa's poster was entitled *Establishing a three-dimensional cell culture model of Parkinson's disease* and Rachel's characterisation of *eIF2B bodies in vanishing white matter disease*.

Dr Simona Francese had been invited to attend the **European Network of Forensic Science Institutes - Fingerprint Working Group**, and gave a presentation entitled *MALDI Mass Spectrometry based chemical criminal profiling: towards operational deployment*. The Annual Meeting was in Pontoise, France, held on 12th - 15th Sept 2017.

Commercial Team update

The Science of Brewing workshop took place over two days, 12th and 19th June, at Sheffield Hallam and was attended by eight local microbreweries. It included both seminars and practical demonstrations led by Dr Susan Campbell, Dr Danny Allwood, Dr Pat Harrison, Dr Jamie Young and Dr Jill Newton. Feedback from the workshop was very positive with regards to the content of the lectures, having the opportunity to connect with other local brewers and discuss current practises. In addition, the breweries were keen to utilise our services and work to collaborate on research projects. The next workshop is on the 11th and 18th of September.

Prof Malcolm Clench with support from Drs Jamie Young and Jill Newton, ran a very successful 4th Mass Spectrometry Imaging Symposium at Sheffield Hallam University on Wednesday, 5th July 2017. The symposium was run in association with the British Mass spectrometry Society, and attended by over 120 delegates from all over the UK and Europe. This year the plenary speakers were: Professor Bernhard Spengler (Justin Liebig University Giessen, Germany) and Professor Mark Brouard (University of Oxford UK). The feedback received was excellent.

Public engagement

Prof Christine Le Maitre and Dr Catherine Duckett have been working on the **Virtual Reality Prosthetics (VRP) Project**, a Wellcome Trust funded public engagement project that has been running for over one year now and will be finishing in November 2017.

The team have delivered exhibitions in various locations around the country, including Kelham Island Museum (Sheffield), World Para Athletics Championships (London), Special Olympics (Sheffield Winter Gardens) and will have their final exhibition at the National Museum of Scotland (Edinburgh) in October 2017.

There has been wide interest in this project and it is anticipated that the project will travel on to Singapore for a 6-month exhibition there.



Prof Le Maitre with Lord Coe at the World Para Athletics Championships, London

To find out more about this interdisciplinary project, you can visit their web page: <https://vrprosthetics.shu.ac.uk/>.

Pint of Science is a non-profit organisation that brings some of the most brilliant scientists to a local pub to discuss their latest research and findings with the public. The festival runs over a few days in May every year. Keith Miller's talk on 16th May, was held at the Nottingham Contemporary and was entitled *Medicine from Poisons: Antibiotics from Scorpion Venom*; it was part of an evening about All Things Tiny.

On 9th March, Dr Simona Francese took part in the Sheffield Festival of Science and Engineering **Bitesize X Lectures**, talking about Fingerprints and Drugs. Bitesize X lectures are evenings in the Sheffield Tap open to the public to hear about research of leading academics over a pint.

Dr Liz Allen received funding from The Royal College of Pathologists' Public Engagement Innovation Grant Scheme. The panel awarded £620 as partial funding to an outreach event at the Millennium Gallery, Sheffield, jointly organised with Museums Sheffield called **The Horror Within**, an evening of talks and hands on activities exploring parasites and gut pathology. The outreach event is being organised together with Dr Mel Lacey, Dr Sarah Forbes, Kirstie Rawson and other PhD students within the BMRC. PhD student Kirstie Rawson received a £1000 grant from the Microbiology Society towards the Horror Within event. The grant was awarded for *Meet your Microbiome* to host a series of mini-lectures and provide a light box filled with agar plates to enable people to explore the microbiological world. The night has a microbiological horror theme and will be discussing everything from diagnostic nightmares to real life zombies. Additionally there will be lots of activities throughout the evening including a live version of Pandemic and Death Drawing (<http://www.museums-sheffield.org.uk/whats-on/events/2017/10/live-late-halloween-special-the-horror-within>).



Explore Science & Engineering at SHU, organised by the BMRC, took place on 11th March in the Atrium, Heartspace, Sheffield Hallam, and featured a range of interactive stands aimed at children and families. It was attended by approximately 900 people which was a huge increase from the 500 attendees in previous years. Explore was part of the week-long Sheffield Festival of Science & Engineering and a film was produced which can be viewed here: <https://youtu.be/8oxHwsip-AY>.

Travel grants

Doctoral student Ieva Palubeckaite received a £550 travel grant from the **Biochemical Society** for a two-week lab visit to Leiden, Netherlands, in order to do some quantitative peptide and protein mass spectrometry imaging.

Dr Tom Bassindale was awarded an international travel grant from the **Partnership for Clean Competition (PCC)** to attend their conference in New York in April this year. The conference was an opportunity to meet with many organisations and laboratories around the world involved in the anti-doping movement, as well as hear from athletes and their representatives. The talks will be on the cutting edge research in anti-doping science, as well as highlighting the current biggest challenges within the field. The PCC works to protect the integrity of sport and public health by engaging and supporting the world's top scientists and innovators in high-quality anti-doping research and development.

Doctoral student Hasan Aldewachi was awarded a £400 travel grant from the **Royal Society of Chemistry** to attend the 5th International Conference on Bio-Sensing Technology which took place in Riva del Garda, Italy, between 7th - 10th May 2017. Bio-sensing technologies are of increasing importance in healthcare, agri-food, environmental and security sectors, and this is reflected in the continued growth of global markets for such technologies.

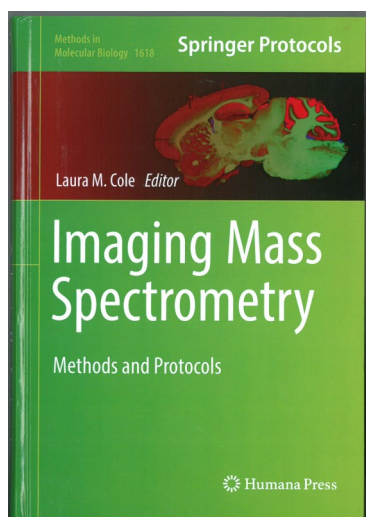
PhD student Becky Mason secured a grant for £500 from the **Biochemical Society** to present a poster at the **65th Conference on Mass Spectrometry and Allied Topics (ASMS)** which took place in Indianapolis, USA, in June this year.

Joseph Snuggs received a travel grant of £4500 awarded by the **Society for Back Pain Research (SBPR)** for his 2-month work placement at the Thomas Jefferson University in Philadelphia, USA.

Athena SWAN

Dr Susan Campbell gave a talk at The Babraham Institute on 21st April entitled *Alternative routes to Independence*. This was part of the Institute's My Life in Science seminar series which is led by their Athena SWAN team.

Publications



Dr Laura Cole has had an edited book published by Springer *Imaging Mass Spectrometry - Methods and Protocols*. Many of our students and staff have contributed chapters to the book.

Dr Kim Lawson was interviewed by ITV about fibromyalgia following a petition by two sisters who are calling on the government to recognise the debilitating condition as a disability. Along with local GP Dr Peter Scriven, Dr Kim Lawson is acting in the capacity of advisor to the campaign and contributed to the news item.

External funding awarded

Dr Simona Francese has been awarded an **EU COST Action Grant** of £129K for this year, and for 4 years in total (the amount increases each year based on the number of countries involved). This year, Dr Francese is coordinating 26 countries and 85+ scientists across Europe. The title of the Action is MULTI-FORESEE - 'MULTi-modal imaging of FOREnsic SciEnce Evidence (MULTI-FORESEE) - tools for Forensic Science'.

Dr Chris Whiteoak has been successful in his application for a **Royal Society of Chemistry Research Fund Grant** (grant number ID RF17-1110). He was awarded £3,894 to purchase a high pressure reactor, allowing him to work on projects relating to the use of carbon dioxide as a chemical feedstock. The proposed project involves preparing novel cellulose surfaces with carbon dioxide derived functionalities and assessing their resulting physical and microbiological properties.

Dr Tim Nichol (PI), Dr Mel Lacey and Prof Tom Smith have been awarded £57K from the **MRC Confidence in Concept funding** for a research project called *Developing an Antimicrobial Sol-gel Coating for Catheters and In-dwelling Devices* to further evaluate and test an antimicrobial coating for catheters and in dwelling devices, using a sol gel technology that allows controlled release of non-antibiotic antimicrobial agents. This project is in collaboration with Prof Paul Hatton (University of Sheffield) and Prof Bob Akid (University of Manchester).

Prof Neil Bricklebank, Prof Malcolm Clench and Dr Catherine Duckett have been awarded £100K from **Innovate UK Health & Life Sciences** for a project on *Enhancing Metal Uptake in Soya Crops*. Dr Jamie Young provided the team with excellent support for the submission. The project is in collaboration with two companies, Plant Impact Ltd and Croda Europe.

Prof Christine Le Maitre and Prof Chris Sammon (MERI) have been awarded an **MRC grant** of £200k for their project *Injectable hydrogel for the regeneration of the intervertebral disc: evaluation using an ex vivo loaded disc culture model*. The grant will fund a PostDoc for 2 years.

Prof Christine Le Maitre, Prof Chris Sammon (MERI), T Smit and collaborators A Cole and N Chiverton. (CoI) have been awarded a grant of £100k from **Arthritis Research UK (ARUK)** and Medical Technologies Innovation and Knowledge Centre for their project *Surgical Nanoformulations of Injectable PolyNIPAM for Effective Regeneration of Intervertebral Disc (IVD)*. This project will be led by MERI.

A **BBSRC-Science Foundation Ireland** joint funding grant (where Sue Campbell is a collaborator) has been funded by the BBSRC. The main project holders are Dr Anne Parle-McDermott (Dublin City University, Ireland) and Prof Nicholas Green (UCL, London) and the programme of research is entitled *Deciphering the function of the human dihydrofolate reductase 2 gene*. The employed postdoc will come here to carry out polysome analysis during the project.

Professors Le Maitre and Sammon (MERI) were invited to present their work on hydrogels for regeneration to the strategic investment board which has been established to support potential commercial projects. They have been awarded £50,008 for a project to validate the use of the injectable hydrogel they have developed to fill bone cages to enable potential commercial partners and links to be developed. Clinical partners (Rex Michael, Ashley Cole, Neil Chiverton and Lee Breakwell) will be involved in the development of the project.

In other news

The MassSpec-Forum is the main annual meeting of the Austrian Mass Spectrometry Society and took place in Vienna between 15th - 17th Feb 2017. Professor Clench gave a plenary lecture entitled Mass Spectrometry Imaging of 3D Living Skin Equivalent Models and Tumour Spheroids. Having previously worked with Dr Martina Marchetti-Deschmann from the Technical University of Vienna as part of EU COST Action BM1104 'Mass Spectrometry Imaging New Tools for Health Care,' the visit was also an opportunity to discuss future collaboration.

Doctoral Student Mootaz Salman was invited to be a member of the organising committee and keynote speaker at the Young Investigator Forum at the 10th International Conference on Neuroscience and Neurochemistry held on 27th -28th February 2017 in Amsterdam, Netherlands.

Drs Neil Cross and Amanda Harvey had a visiting graduate student from Canada, Lisa Decotret, between April and June. Lisa worked on a project related to the Innovate UK grant awarded to Dr Cross, testing Asterand's model in breast cancer. She was awarded a travel scholarship, funded primarily by the Canadian Institute of Health Research - Michael Smith Foreign Study Supplement, which covered her three month trip.

The NC3Rs is the National Centre for the Replacement, Refinement and Reduction of Animals in Research, the NC3Rs is the government organisation which seeks to reduce the number of animals used in laboratory/medical research and funds research which will lead to these objectives. Professor Malcolm Clench is a previous PI (2014-2016) on an NC3Rs Strategic Grant entitled Labelled IMS TAG Proteins for Quantitative Mass Spectrometry Imaging and gave a talk at the workshop on 1st March 2017 entitled *Molecular Pathology/Mass Spectrometry Imaging In Cancer Research* which detailed the outcomes of this award and future work in the area of quantitative

imaging that is required to extend the use of MS imaging (and take advantage of its multiplexed nature) in this area.

Lecturer Dr Rob Bradshaw was invited to speak at the Chemistry and Forensic Science Colloquium on 22nd March 2017 at Nottingham Trent University. He gave a talk on our work on fingerprints entitled *CSI Sheffield Hallam University - The analysis of latent fingerprints using MALDI MS profiling and imaging*.

Emma Beasley travelled to Maastricht in the Netherlands between 28th March and 13th April. Emma worked at the M4I (Maastricht 4 Imaging) at Maastricht University where she set up experiments to assess whether it was possible to detect contamination of hair samples from cannabis smoke using MALDI Imaging and profiling. The trip was funded by the Vice Chancellors Scholarship.

Dr Prachi Stafford was selected as one of only ten early career lecturers to join the Royal Society of Biology Early Career Lecturers' Forum, following a competitive application process. This group consists of ten staff from different Heads of University Biosciences (HUBS) member institutions who are in the first 5 years of their first permanent academic appointment. The group will elect its own Chair and Secretary, and the Chair will attend meetings of the HUBS executive to feed in the views of early careers staff, informing HUBS and Royal Society of Biology activities as appropriate.

Microbiology laboratory fire

At the beginning of March, we had a major shock in the BMRC when the fire brigade had to attend the University to deal with a fire in the BMRC laboratory in the Norfolk building one evening. The security staff and fire brigade responded quickly and the fire was extinguished with no one being harmed. The Forensic report was completed by the fire brigade and the university insurers, and it was concluded that the fire was started by an electrical fault in a new fridge in the laboratory. The laboratory has been closed for the last 6 months and we have been working hard to ensure the microbiology laboratory is ready for staff and students to return to, as well as the new intake of students this September. We would like to thank all staff at the University for their hard work in getting the laboratory back up and running, in particular the technical team in Biosciences and Chemistry who have led the refurbishment. The front-page image is of the new laboratory window and represents the range of microbial organisms that staff and students are researching in BMRC. It was designed by PhD students Kirstie Rawson and Emma Henly.

In May 2017, Dr David Smith was presented with his sixth Faculty Inspirational Teaching Award in recognition of his commitment to supporting the learning of his students.

Dr David Smith has been awarded a National Teaching Fellowship by the Higher Education Academy (HEA) in recognition of how he has influenced teaching practice and inspired learners. A National Teaching Fellowship is the most prestigious individual award for excellence in teaching in higher education and is awarded for individual excellence, raising the profile of excellence and developing excellence.

Dr Susan Campbell was invited to give a seminar at The University of Manchester on 19th June as part of their 'protein and RNA fate' seminar series by Dr Mark Ashe.

Doctoral student Hasan Aldewachi has achieved associate fellowship of the Higher Education Academy.



Every year, the Acta Journals grant twelve awards of \$2,000/each for Best Student Paper 2017 and we are proud to announce that PhD student Abbey Thorpe (pictured) won this year's Best Student Paper Award from the Acta Biomaterialia Journal. Her paper was entitled *Thermally triggered injectable hydrogel, which induces mesenchymal stem cell differentiation to nucleus pulposus cells: Potential for regeneration of the intervertebral disc*.

From 10th June to 8th July 2017 Cristina Russo went to Newcastle, Delaware, USA, for an exciting work experience in the laboratories of Croda Inc., Griffin Innovation Center. During this month Cristina had the opportunity to learn new laboratory techniques and expand her knowledge. It was a fantastic experience for her professional and personal growth.

On 20th July, we welcomed Prof John Martin, University College London and an honorary doctorate at Sheffield Hallam University, to two events. In the morning staff in the BMRC with research that is near to commercial exploitation gave talks on their work. This included: Dr Tim Nichol's research on antibacterial coatings for prosthetic joint implants; Prof Neil Bricklebank on novel clay based wound dressing materials; Dr Keith Miller on venom derived antibacterial peptides; Dr Sarah Forbes on antibacterial catheter coatings; Prof Christine Le Maitre on Therapeutic Hydrogels for treatment of low back pain and Prof Malcolm Clench on MALDI Imaging. Prof Martin has been involved in commercialisation of medical research in his current role and has launched spin out companies based on his research, thus his insights into this process were very well received. In the afternoon session which was open to all staff and students we focused on *Recent Advances in Stem Cell Research*. Prof Martin gave a talk on his own research entitled *Does Regenerative Medicine Have a Future*. Several staff with research interests in stem cells also gave talks including: Dr Neil Cross, Dr Rebecca Leyland, Dr Daniel Kelly and Dr Nick Peake. We look forward to having closer links with Professor Martin in the coming year.

At the HWB Faculty Research Day in July 2017, PhD student Abbey Thorpe won the prize for the Best Oral Presentation and MSci student James Hough won Best Poster Presentation.

It was a great pleasure to announce that Christine Le Maitre had been awarded a personal chair and is now Professor of Cell Biology and Tissue Regeneration. This is very well deserved, Christine has published extensively and is recognised internationally for her work on low back pain.

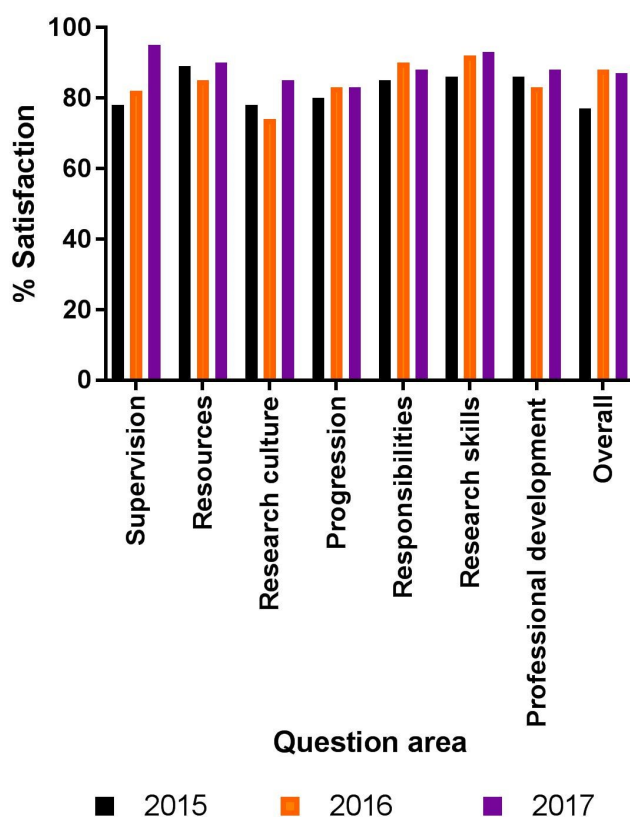
In July 2017, Prof Christine Le Maitre was appointed to the role of Faculty of Head of Research Degrees.

Dr Catherine Duckett has been appointed as the Postgraduate Research Tutor.

The postgraduate research student experience survey (PRES) that our PhD students completed provided excellent feedback on our performance in the University and in BMRC. Institutionally Sheffield Hallam was in the top quartile against 100+ other HEIs and BMRC was congratulated by the Doctoral School for exceptionally strong performance both across the sector (all other UoA 5s)

and SHU. BMRC (REF UoA 5) was placed in the top quartile against the sector in most categories and 95% of students were satisfied with their supervision.

**Postgraduate Research Experience Survey:
Year on year improvements in BMRC**



Joseph Snuggs is currently undertaking a work placement under the supervision of Professor Makarand Risbud at the Thomas Jefferson University in Philadelphia, USA, investigating the molecular mechanisms that regulate aquaporin expression and function in nucleus pulposus cells to elucidate how they contribute to intervertebral disc biology. The placement, which is for the period of 21st August until 27th October, will conclude with Joseph attending the Philadelphia Spine Research Symposium (PSRS), where all the latest research into spine disorders will be presented. His supervisor is Prof Christine Le Maitre.

Dr Emily Lewis, KTP Associate, entered a competition being held by Journal of Visual Experiments (JoVE) to create a 2 minute video on her project which has been short-listed as one of the top 10 videos for the completion out of 100+ applications. The video, entitled *Novel wound assessment*, is a collaboration between Sheffield Hallam University and Innovenn, an SME. The final assessment is by public vote.

PhD student Ranwa Elrayess has passed her viva at the Suez Canal University in Ismailia, Egypt. Ranwa studied at Hallam University and Suez Canal University on a split PhD and the title of her studies was *Cellular Effects of Antimicrobial Peptides Derived from Scorpion Venoms*. Ranwa spent time at Sheffield Hallam from June 2014 to August 2016.

Successful summer studentships

Dr Nick Peake with student Evie Gruszyk, Animal Free Research UK, *Building an adipose-rich tumour microenvironment model to study fat-cancer cross-talk*, 8 weeks

Prof Malcolm Clench with student Alex Harding, British Mass Spectrometry Society, *MAIV-MS Imaging and Profiling of Biological Tissue*, 6 weeks

Dr David Smith with student Emma Proctor, The Biochemical Society, *Investigating the role of iron in the aggregation and transmissibility of α -synuclein in Parkinson's disease*, 6 weeks. This summer studentship was lead by PhD student Teresa Whiteley (writing and supervision).

Dr Mel Lacey with student Oana Voloaca, Animal Free Research UK, *Creation of a 3D gastrointestinal culture model to study the influence of commensal bacterial on gut growth and differentiation*, 8 weeks

Publications

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preparation and instrumental parameters for the rapid analysis of drugs of abuse in hair samples by MALDI-MS/MS imaging. *Journal of the American Society for Mass Spectrometry*. (In Press)

LEESE, Elizabeth, **STAFF**, James F., **CAROLAN**, Vikki and **MORTON**, Jackie (2017). Exhaled breath condensate: a novel matrix for biological monitoring to assess occupational exposure to respirable crystalline silica. *Annals of work exposures and health*, 61 (7), 902-906.

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Dr Susan **Campbell** and PhD student Karl **Norris** have co-authored a paper with Matthew Campbell's lab, Trinity College Dublin, which was accepted for publication in Molecular Psychiatry entitled Dose dependent expression of claudin-5 is a modifying factor in schizophrenia.

Keeping in touch

There are several ways of keeping up to date with current research projects, news and events and PhD opportunities in the BMRC. You can follow us


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