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Welcome to **ORIBU**



Professor Robert Middleton
Head of Orthopaedic
Research Institute

In our third annual review I will outline how ORI BU is having an impact locally, nationally and internationally.

Locally we are aiming to transform healthcare through innovation. Our vision is a partnership between the University, integrated care systems, industry and clinicians to deliver better health and wellbeing to the people of Dorset and surrounding counties. Two examples of this are the CHAIN programme and robotic hip replacement. CHAIN, a lifestyle exercise programme treating people with arthritic hips, is now available on the NHS at the Royal Bournemouth Hospital. Run by ORI BU it delivers decreased pain and improved quality of life to people as an alternative to surgery. I have been involved in the research that has led to robotic hip replacement since the 1990s and for patients in Bournemouth to be some of the first to benefit from this is truly rewarding. ORI BU has been awarded an international grant to study the improvements to function patients have after robotic surgery using its state of the art gait labs and muscle testing equipment.

Nationally it was a great honour for ORI BU to be chosen to represent Bournemouth University and to be showcased by Universities UK in its "Made AT Uni" national campaign. "Made AT Uni" aims to celebrate significant interventions, discoveries and social

initiatives made by academics which have a transformative impact on people's everyday lives. ORI was recognised for its work on the conservative treatment of arthritis and robotics.

Internationally we have embarked on The ORI Global Gateway Project. This 5 year project builds on Bournemouth University's Global Engagement Strategy and will see it opening "hubs" across the globe. Each "hub" will consist of research offices and labs located in partner Universities in each continent of the World. Coordinated from ORI BU these hubs will work with the Dorset Local Enterprise Partnership (LEP) to promote trade with the world through research and education. In recognition of its work the Dorset LEP has awarded £950,000 from Local Government Finance Investment Fund to build and develop the facilities at ORI BU to enable it to deliver the project.

There is an exciting and no doubt challenging year ahead with so much going on. I am confident that the superb team that has been put together at ORI BU and with our supporters both inside and outside the University that we can deliver and improve the health and wellbeing of all.



ORI believes that no-one should suffer from arthritis

The Orthopaedic Research Institute (ORI) at Bournemouth University works with patients, the health service, colleagues at the university, the local community, and industry partners to prevent and treat osteoarthritis. It's led by Professor Robert Middleton and Associate Professor Tom Wainwright, who believe that in the future, no-one should suffer from arthritis.

ORI is driven by the needs of patients and society. We combine world-class research with the latest professional thinking to stimulate new ideas, learning and thought leadership. State-of-the-art scientific facilities help us develop new techniques and treatments for osteoarthritis, through high quality research and educational outputs that have a proven impact for patients, clinicians and society.

Our research and academic outputs have advanced the fields of orthopaedic surgery,

related diseases, treatments and devices. We work to improve patient outcomes with local and international partners by engaging with clinicians, patients and the public, and involving them in our research, education and consultancy activities.

We can offer our expertise and services to partners through a variety of educational, research, professional practice, and consultancy related activities. If you think we could help you in any way, please get in touch for an informal chat.

Osteoarthritis in numbers

An estimated **17.8 million people** live with a musculoskeletal condition in the UK. That's around **28.9% of the total population**.

Musculoskeletal conditions account for **the third largest area of NHS** programme spending at **£4.7billion in 2013-14**.

Over 8.75million people aged 45 and over have sought treatment for osteoarthritis.

The cost of working days lost due to osteoarthritis and rheumatoid arthritis is estimated at **£3.43billion by 2030**.

Every £1 invested in medical research delivers a **return equivalent to around 25p** (7p of direct health benefits with a further 15-18p in benefits to the wider community) every year, forever.

ORI in numbers

49

Peer-reviewed journal publications

45

Peer-reviewed international conference papers

£1,000

Prize money for best abstract at World Congress of Enhanced Recovery after Surgery

44

invited international lectures

11

Visiting fellows

169,623

air miles travelled to attend conferences, meetings and presentations

£2.7million

in research grant funding

6.4FTE

Full time staff

10

cross faculty academic research collaborators at BU

13

active agreements/partnerships with industry/healthcare/academia

6

Associated PhD students

Over 800

participants in ORI research studies

Over 600

members of the public spoken to at BU public engagement events

7

Undergraduate Research Assistants

3

strategic investment areas linked to BU 2025



Going global

How ORI fits with the Government's industrial strategy for innovation

ORI's work directly aligns with UK industrial strategy to bring novel medical technologies into clinical practice¹. The Dorset Local Enterprise Partnership (LEP) has recognised this, and has provided further funding to ORI for expansion through its global gateway project. This project will see ORI open global hubs in order to facilitate wider impact and reach of ORI's research and innovation. This project supports the Government's ambition to place the UK as a global leader in the rapid adoption of technology by 2023, and Innovation 2020's goal to engage 40,000 research personnel in enterprise².

ORI responds to the national need for new technologies by addressing the formidable and increasing musculoskeletal challenges associated with ageing populations, and the Engineering and Physical Sciences Research Council (EPSRC) delivery plan for a healthy nation and its priority area 'Design and innovation in inclusive

technologies for health and care'. Furthermore, the Industrial Strategy Challenge Fund and the BEIS Science and Innovation Audits (2017) inform ORI's work with Medtech and UK SMEs³.

Latest research indicates that hip replacements save the UK economy £70 million per year, and have returned thousands of people to the workplace⁴. Therefore, ORI's work, to further improve the outcomes of this surgery through virtual reality training for surgeons, the use of robotic surgery, new types of hip replacement, enhanced recovery pathways after surgery, and on medical devices to reduce complications of surgery is extremely well placed. 100,000 total hip replacements were performed in 2016, approximately 40% more than in 2009, and almost a third of hip replacement patients are of working age, with around 60% returning to work after their operations. Just over 18,500 people, who would otherwise have been unable to,

are therefore able to return to work. This saves the UK economy £70 million per year in benefits alone⁵.



Supporting Documents

- ¹ Life Sciences Industrial Strategy: A report to Government from the Life Sciences Sector.
- ² Ireland's strategy for research development, science and technology.
- ³ Government collections: Industrial strategy challenge fund: for research and innovation. Leading-edge healthcare.
- ⁴ Government publications: Science and innovation audits
- ⁵ The Medical Technology Group: Keeping Britain Working.

Enhanced recovery after surgery – Have we reached our goal?

Over the last twenty years, the significant growth and adoption of Enhanced Recovery after Surgery (ERAS) pathways represents a paradigm shift in how surgical care is delivered.

The multimodal, multidisciplinary approach to the care of a patient comprises of a combination of evidence-based interventions in the perioperative period that aim to reduce convalescence by reducing the stress of the operation to retain anabolic homeostasis. The successful implementation of ERAS has significant societal impact, as it improves patient outcomes and makes financial savings with the health service.

Over the last twelve months, ORI has continued to develop its work on ERAS, with contribution to guidelines, textbooks, publications, conference posters and implementation. Associate Professor Thomas Wainwright recently collaborated with Professor Henrik Kehlet from Denmark, who first initiated ERAS or "fast-track surgery" to colorectal procedures in the 1990s. Their publication, entitled: "Fast-track hip and knee arthroplasty – have we reached the goal?" discusses the remaining challenges with implementation of ERAS pathways to hip and knee replacement in order to achieve the goal of pain and risk free surgery¹. ORI has also extended its research on ERAS to other surgical procedures, collaborating with international and local surgeons looking at ERAS in spinal, ankle and shoulder surgery²⁻⁴. Associate Professor Thomas Wainwright continues his work in this area by collaborating with experts in the fields of hip replacement, knee

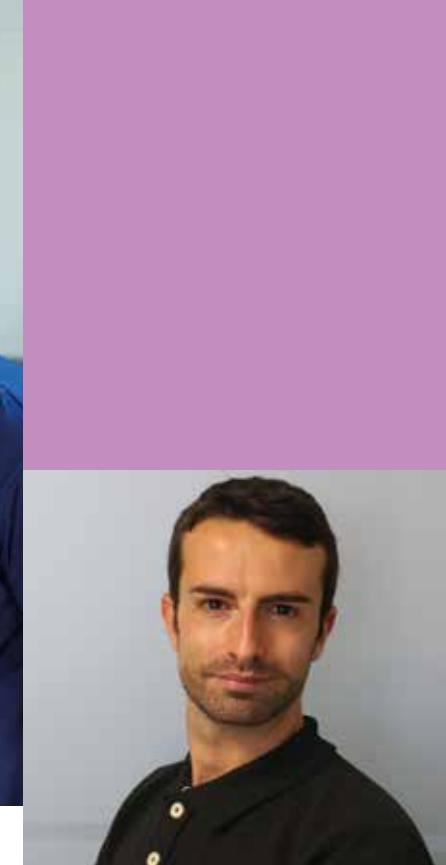
replacement and spinal procedures to develop best-practice, evidence-based guidelines for the clinical care of the surgical patient.

¹ Wainwright TW, Kehlet H. Fast-track hip and knee arthroplasty – have we reached the goal? *Acta Orthop* 2019;90(1)3-5.

² Wainwright TW, Wang MY, Immins T and Middleton RG. Enhanced recovery after surgery (ERAS)—Concepts, components, and application to spine surgery. *Seminars in Spine Surgery* 2018;30(2):104-110.

³ Wainwright TW, Immins T, Antonis JHA, Hartley RH, Middleton RG. Enhanced Recovery after Surgery (ERAS): Concepts and application to total shoulder replacement. *Orthopaedic Nursing* 2019, in press.

⁴ Wainwright TW, Immins T, Antonis JHA et al. Can the introduction of Enhanced Recovery after Surgery (ERAS) reduce the variation in length of stay after total ankle replacement surgery? *Foot Ankle Surg* 2017;17:31368-8.



Robotic hip surgery

This year, ORI is pioneering the research into robotic total hip replacement surgery by launching an observational study to evaluate the health outcomes from a Mako-Robotic-Arm assisted total hip replacement (the HELLO trial) in partnership with the Nuffield Health Hospital, Bournemouth.

Professor Middleton's research into surgical robots started in the 1990's and his initial work with a group of scientists in London eventually led to the robots used today. ORI continues to develop this work with the HELLO trial, and this year welcomed Dr Francesco Ferraro to join us as trial manager. The study will recruit 100 patients from The Nuffield Health Hospital, Bournemouth, who will be evaluated at using ORI's world-class laboratories.

As the quality of available implants improves, hip replacements increasingly perform well in terms of function. Failure is usually more dependent on how they are inserted, rather than what type of implant they are. Operating with a robot can achieve better accuracy of placement of a hip replacement than can be achieved by even the most

experienced surgeons and evidence is now emerging that demonstrates better outcomes for patients.

Professor Middleton was involved with developing a technique called "active constraint" which is where the surgeon actively performs the operation and the robot prevents the surgeon from performing anything but the perfect operation. This ensures complete safety as only the surgeon can do the operation. The robot holds the instruments and ensures that they are in the perfect position, if not; it nudges the surgeon to the correct place. The stages of robotic hip surgery include 1) performing a CT scan, 2) developing a 3D virtual model of the hip, 3) planning the perfect position for the hip replacement using computer algorithms and then 4) delivering the operation.

In the next few years, it is expected that most hip replacements will be assisted by robots. ORI continues to support this major advance in medical science by carrying out research and training surgeons.



“ This technology is expensive and at this stage we need to find out how it affects outcomes. The collaboration with Bournemouth University and Nuffield Hospital means that in the next year or two we will know if the Mako robotic-arm has benefits for the patients and whether it reduces overall surgical costs. If that's the case, then this type of surgery should be available for all total hip replacement patients. ”

Professor Robert Middleton

MEET:

Dr Francesco Ferraro

In 2019, Dr. Francesco Ferraro completed a PhD in physiology and biomechanics that looked at the effect of inspiratory muscle training on balance and functional mobility with older adults.

He has joined the team at the Orthopaedic Research Institute to evaluate the health outcomes after a Mako Robotic-Arm Assisted Total Hip replacement (HELLO Study Trial).

Francesco on joining the ORI team:

“I am very excited to be part of the Orthopaedic Research Institute. The research team works tirelessly to achieve high-quality research standards and improve patients' quality of life. I am looking forward to increasing my orthopaedic knowledge and networking with the orthopaedic research team.”

Participant feedback

“The most useful thing was to learn that you won’t make your hip worse by exercising and that you can use exercise to manage pain. I have also given up smoking, joined slimming world and the gym. I enjoyed the group sessions and made friends. There is a lot you can do to help yourself and the education part of the programme helped me realise that”

Jackie
Completed CHAIN in 2018

“The CHAIN programme was really good, the life changing thing (I had/have very early osteoarthritis) was that I didn’t have to stop exercising because my hip hurt. I have no hip pain at all now and recommend anyone who has hip problems to go on the CHAIN programme or just to cycle.”

Katie
Completed CHAIN in 2014



Non-surgical management of osteoarthritis

Around a third of people aged over 45 years in the UK (8.75 million in total) have sought treatment for osteoarthritis, and 2.12 million people have done so for osteoarthritis of the hip.

CHAIN, Cycling Against Hip Pain, is a 6 week programme conceived by Professor Middleton and Associate Professor Wainwright. It was originally designed as an effective way to implement NICE guidelines on the management of hip osteoarthritis. The programme was first launched in 2013, and has since been relaunched in partnership with the Royal Bournemouth and Christchurch Hospitals NHS Trust. The programme is delivered at The Littledown Centre, BH Live, and is securely managed through an innovative online platform from local software experts, Actipath Limited. The programme includes a 30 minute education session, led by a physiotherapist, followed by 30 minutes of exercise on a static bike, led by an exercise instructor. Participants are also given a home exercise programme and encouraged to cycle and stretch at home.

Since the programme was relaunched in February 2018, over 200 patients have been referred onto the CHAIN programme. Neil Cowan, Director of Operation for Surgery at the Royal Bournemouth and Christchurch Hospitals has said: “This fantastic collaboration between Bournemouth University, BH Live, Actipath and The Royal Bournemouth and Christchurch Hospitals is helping people to manage their hip pain and avoid complex surgery.

Furthermore, patients are supported in the longer term with lifestyle and wellbeing help, alongside all the marvellous benefits that increased exercise brings. We are very excited about the results of this programme and look forward to developing it further for the benefit of more NHS patients both locally and nationally.”

Associate Professor Tom Wainwright added: “We continue to be delighted with the results of the CHAIN course. Participant feedback is excellent, with 100% recommending the programme to others, and many achieving life changing results. It is an excellent example of how working across organisations in partnership can bring benefits to our patients.”



The CLEAT (Cycling and Education) Trial

Tom Wainwright, Deputy Head of ORI, has been awarded £350,000 by The National Institute of Health Research (NIHR) to run a three-year trial comparing an exercise and education programme for people with osteoarthritis of the hip (the CHAIN programme) with routine physiotherapy care. The trial is being run in collaboration with The Royal Bournemouth Hospital and The University of Exeter, and will recruit

256 patients referred for physiotherapy from Bournemouth and surrounding areas. Patients will be randomised to either the 8 weeks exercise and education programme or routine physiotherapy care; and measures of function, hip pain, quality of life, resource use and costs will be compared.



MEET:
Dr Erika Parkinson

This year, ORI welcomed new team member Erika Parkinson, who will be managing the CLEAT trial.

“I am incredibly excited to work with the team at the Orthopaedic Research Institute and start my transition into Clinical Research. I am looking forward to learning about orthopaedics and how the world class research being undertaken by the team here strives to improve the quality of life and outcomes for our patients.”

Erika Parkinson, CLEAT trial Manager



MEET:

Ranti Samaratunga

Role: PhD Student

Joined ORI: January 2019

Collaborating with: Dorset Creative

I am eager to start my PhD so that I can apply my engineering background to a field I am passionate about. I get to work with a variety of people from difference disciplines, including virtual reality artists and surgeons. I have an amazing opportunity to help turn surgical novices into experts through well-designed training platforms, with the help and expertise of Dorset Creative, Orthopaedic Research Institute and Bournemouth University.



Virtual reality surgical training

Professor Middleton has been involved in the development of robotic surgery and the use of computer navigation in surgery since 1997 when he published a paper titled “Active compliance in robotic surgery – the use of force control as a dynamic constraint.” More recently Professor Middleton and Associate Professor Wainwright have collaborated with colleagues from the Faculty of Science & Technology at Bournemouth University to publish a review of the current literature on virtual reality based training in orthopaedic surgery. Further work on the use of virtual reality training simulators in orthopaedics continues within ORI and with academic partners from the BU National Centre for Computer Animation (NCCA), and

also leading industry partners. ORI has worked in collaboration with Virtamed in Switzerland and OSSIM Technologies in Canada in developing world leading virtual reality trainers. This has resulted in ORI having the only lab in the world to have both simulators, and the only OSSIM Technologies knee replacement simulator outside of North America. Current research and educational projects on the simulators include the vital clinical validation studies required to further develop the simulators, so that they may be adopted into mainstream clinical practice and in September 2017, a team from ORI attended the British Orthopaedic Association Annual Conference to collect data from surgeons across the country.

Publications

Gallagher K, Bahadori S, Antonis J, Immins T, Wainwright TW, Middleton R. Validation of the Hip Arthroscopy Module of the VirtaMed Virtual Reality Arthroscopy Trainer. Surgical Technology International 2019;34:430-436.

Newman S, Gulati V, Bahadori S, Wainwright TW, Middleton R. Content and Face Validity Assessment of the Sim-K Haptic-Feedback Enhanced Total Knee Replacement Virtual Reality Simulator. Internet Journal of Orthopaedic Surgery 2019;27:1.

Antonis J, Bahadori S, Gallagher K, Immins T, Wainwright TW, Middleton RG. Validation of the Anterior Cruciate Ligament (ACL) Module of the VirtaMed Virtual Reality Arthroscopy Trainer. Surg Technol Int 2019;18.

An update on Functional Electrical Stimulation

The work led by Professor Ian Swain on Functional Electrical Stimulation (FES) in neurorehabilitation has expanded into other clinical areas over the last year. Papers have been published on the use of electrical stimulation to reduce oedema and to improve blood flow in the lower leg. In addition, work has been completed on the safety implications of using electrical stimulation for a person with a pacemaker or implanted defibrillator. Work in the associated clinical service at Salisbury, National FES Clinical Centre, has also explored the use of electrical stimulation to improve constipation in people with neurological problems such as MS, PD and SCI. Collaboration with a local company, Odstock Medical Limited, has led to the development of a Musculoskeletal stimulator aimed at the Orthopaedic market which is going through the CE marking process at present. A project is also underway in collaboration with Loughborough University in order to use FES to improve recovery and prevent further injury in people with severe ankle sprains.

In addition, we welcome two new PhD students in this field. Louise Burgess aims to explore the role of electrical stimulation in recovery from total hip replacement, and Varshini Nandakumar is looking at adaptive walking FES systems for people with neurological problems which are able to detect changes in terrain, such as slopes and curbs, and automatically adjust the stimulation parameter accordingly. Another PhD student, Nathan Barrett has just submitted his PhD thesis on the use of FES and computer games to improve hand and arm function after a stroke.

Finally, a grant of £157,000 has been obtained from the charity INSPIRE to develop a practical stimulation system for people with tetraplegia in order to improve their hand function. A research fellow, Dr Vinil Chackochan has been appointed in the Faculty of Science & Technology for 30 months to work on this project. It is planned that a practical device, suitable for CE marking, will be developed for use at home by the end of the project. In this next year, we will continue to develop our work on electrical stimulation and its application to orthopaedic patients.



¹ Wainwright TW, Burgess LC, Middleton RG. A feasibility randomised controlled trial to evaluate the effectiveness of a novel neuromuscular electro-stimulation device in preventing the formation of oedema following total hip replacement surgery. Heylion 2018;4(7):e00697.

² Gavin JP, Cooper M, Wainwright TW. The effects of knee joint angle on neuromuscular activity during electrostimulation in healthy older adults. J Rehabil Assist Technol Eng 2018;5:1-10.

³ Bahadori S, Immins T, Wainwright TW. The effect of calf neuromuscular electrical stimulation and intermittent pneumatic compression on thigh microcirculation. Microvasc Res. 2017;111:37-41.

⁴ Bahadori S, Immins T, Wainwright TW. A Novel Approach to Overcome Movement Artifact When Using a Laser Speckle Contrast Imaging System for Alternating Speeds of Blood Microcirculation. J Vis Exp. 2017;30(126).

⁵ Burgess LC, Immins T, Swain I, Wainwright TW. A systematic review to evaluate the effectiveness of neuromuscular electrical stimulation for reducing oedema. J Rehabil Med 2019;51:237-243.

⁶ Wainwright TW, Burgess LC, Middleton RM. Does neuromuscular electrical stimulation improve recovery following acute ankle sprain? A pilot randomised controlled trial. Clin Med Insights Musculoskelet Disord 2019;12:1-6

⁷ Burgess LC, Swain ID, Taylor P, Wainwright TW. Strengthening quadriceps muscles with Neuromuscular electrical stimulation following total hip replacement: a Review. Curr Phys Med Rehabil Rep 2019; doi:10.1007/s40141-019-00225-8



The ORI Gait Lab

The ORI Gait Lab is a world-class facility utilising the Motekforce Link GRAIL system that uses an instrumented dual-belt treadmill, Vicon motion-capture system and synchronized virtual reality (VR) environment next to three video cameras and electromyography. This is the best available equipment on the market and one of only a limited number of GRAIL systems in the world.

ORI also has a fully equipped biomechanics lab with state-of-the-art equipment such as the PrimusRS for muscle testing. At ORI we use the gait analysis equipment to monitor patient outcomes after surgery. It is a unique selling point that, combined with a proven 10-year track record of industry research, high volumes of surgery, and excellent clinical outcomes, makes ORI such an attractive partner for international orthopaedic multinationals.

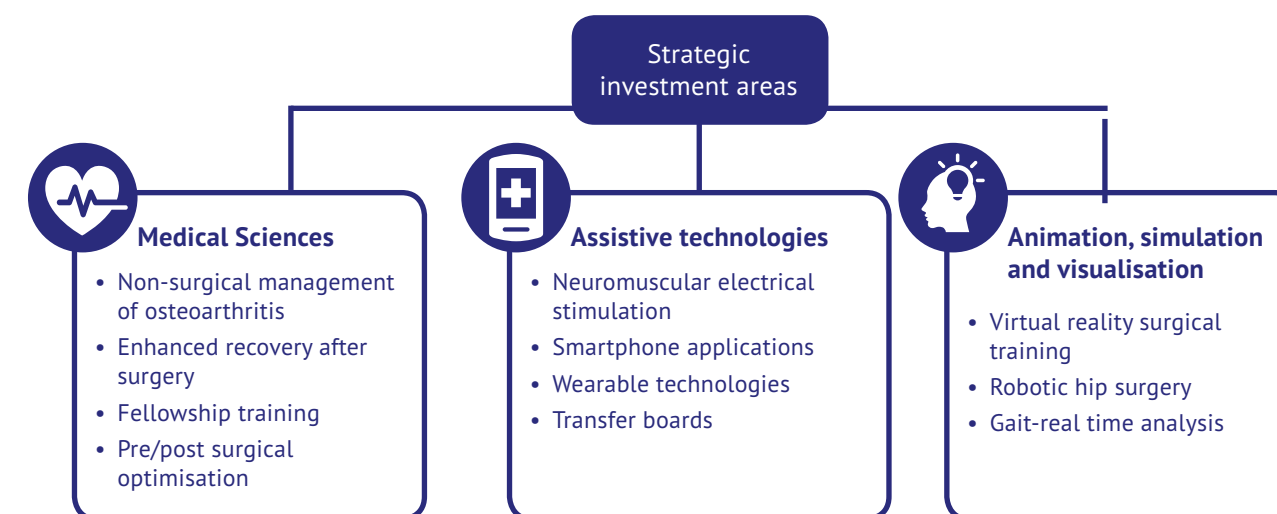


Research project:

An important area of research for ORI is improving rehabilitation following total hip replacement and total knee replacement surgeries. ORI plans to carry out gait analysis and assess muscle performance for patients following these surgeries, in order to build up a picture over the months following surgery of changes in gait and muscle performance, and how these changes affect functional performance. To understand these changes, we recently established a database of normal hip and knee joint functioning, to use as a reference to identify abnormalities of joint function in people with hip and knee pathology. The project started in May 2018 and saw 100 participants (aged 18 – 90) without a history of hip or knee joint injuries volunteer to take part in the study.

BU 2025 and Strategic Investment Areas for Research

The aims of ORI align directly with Bournemouth University's current strategy (BU2025) for integrating a 'fusion' of research, education and professional practice. The University's complimentary strategic investment in the related research areas of; animation, simulation and visualisation, medical sciences, and assistive technologies, are a perfect fit for ORI's cross faculty and cross discipline approach to research.



Funding sources

- National Institute of Health Research
- Innovate UK
- Dorset Creative
- Dorset Local Enterprise Partnership
- Odstock Medical
- Wessex AHSN
- British Council
- NHS Hospitals
- Industry partners (Stryker, FirstKind Ltd, Zimmer Biomet, LimaCorporate UK)



Hospital Partners

- Nuffield Health Bournemouth
- The Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust
- BMI The Harbour Hospital Bournemouth
- University Hospital Llandough, Cardiff
- Salisbury NHS Trust
- Chapel Allerton Hospital, Leeds
- Altnagelvin Hospital, Northern Ireland
- The Robert Jones and Agnes Hunt Orthopaedic Hospital NHS Foundation Trust
- University Hospital Southampton



International research collaboration

- Copenhagen University, Denmark
- Catholic University of Murcia, Spain
- McMaster University, Canada
- University of Szeged, Hungary
- Scottish Government, Glasgow
- Karolinska University
- Cardiff University, Wales
- Edinburgh University, Scotland
- University of Miami, Florida



Cross-faculty academic collaborators

- Faculty of Media and Communication
- Faculty of Management
- Faculty of Health and Social Sciences
- Faculty of Science and Technology

The Student Research Assistant Scheme

The Student Research Assistant (SRA) scheme enables students to work with Bournemouth University academics and researchers on their projects, allowing the development of research skills and knowledge. The opportunity provides a valuable experience to both students and staff, and facilitates cross-faculty collaboration on projects and publications. Since opening in 2015, ORI has welcomed seven SRAs to collaborate on research projects. Read more about some of the work they have done here...



Meryl Cooper, BSc (Hons) Exercise Science, 2015

Meryl was the first SRA to join ORI in 2015 and collaborated with Dr James Gavin (Faculty of Management) and Associate Professor Tom Wainwright. The research team looked at different knee joint angles and whether they influence calf neuromuscular activity during electrostimulation. Their work was presented at the 20th European Congress of Physical and Rehabilitation Medicine in Lisbon, Portugal, and later published in the Journal of Rehabilitation and Assistive Technologies. Following her time at ORI, Meryl went on to complete a Master's degree in Physiotherapy.

Publication:
Gavin JP, Cooper M, Wainwright TW. The effects of knee joint angle on neuromuscular activity during electrostimulation in healthy older adults. Journal of Rehabilitation and Assistive Technologies 2018;5:1-10

Conference posters:
Gavin JP, Cooper M, Wainwright TW. Electrical nerve stimulation for 20 minutes does not induce neuromuscular fatigue in older adults, regardless of leg position. 20th European Congress of Physical and Rehabilitation Medicine 2016. Lisbon, Portugal.

Wainwright TW, Cooper M, Gavin J. Electrical nerve stimulation affects lower-leg neuromuscular activity, but not balance ability, in healthy, older adults. 20th European Congress of Physical and Rehabilitation Medicine 2016. Lisbon, Portugal.

Gavin JP, Cooper M, Wainwright TW. Knee joint angle influences gastrocnemius neuromuscular activity during geko electrostimulation in health, older adults: A pilot study. 20th European Congress of Physical and Rehabilitation Medicine 2016. Lisbon, Portugal.

Louise Burgess, BSc (Hons) Sports Psychology and Coaching Science, 2016

Louise joined ORI in 2016 after completing her undergraduate degree at Bournemouth University. Louise was later offered a full time position at ORI and alongside her career in research is now completing a part-time PhD investigating rehabilitation after total hip replacement surgery.

"The opportunity I was offered with ORI inspired me to pursue a career in research and was a hugely valuable experience. In the future, I hope to complete my PhD and work towards becoming a lecturer."

Publication:
Gavin JP, Immins T, Burgess LC, Wainwright TW. Functional sit-to-stands evoke greater neuromuscular activation than orthopaedic bed exercises in healthy older adults. Isokinetics and Exercise Science 2018;26:139-148.

Conference posters:
Gavin JP, Burgess LC, Wainwright TW. Neuromuscular comparison of the upper-leg during isometric bed exercises and functional sit-to-stand exercises in older adults. OARSI 2017 World Congress. Las Vegas, United States.



Joe Arundel, BSc (Hons) Sports Psychology and Coaching Science, 2017

Joe joined ORI in 2017, and completed a SRA studentship as part of his mandatory 40 week placement. Joe finished the rest of his placement in South Africa, and then came back to work at ORI for the summer of 2018.

"Having just completed my second year, I started a Student Research Assistantship with ORI. My experience as a SRA exceeded my expectations. I am hugely grateful to the Student Research Assistantship Scheme, Dr James Gavin and the Orthopaedic Research Institute for providing me with the opportunity to learn from such high-quality professionals within a positive, supportive and inspirational environment."

Publication:
Burgess LC, Arundel J, Wainwright TW. The effect of preoperative education on psychological, clinical and economic outcomes in elective spinal surgery: A systematic review. Healthcare 2019;7:E48.

Conference posters:
Burgess L, Arundel J, Wainwright TW. The inclusion of preoperative education in ERAS spinal surgery pathways: A systematic review. 7th World ERAS Congress 2019. Liverpool, UK.

Mira Obersteiner, BA (Hons) Public Relations, MA Media and Communication, 2018

In 2018, the SRA programme grew and ORI welcomed two students, Mira and Doriana, to the research team. Mira utilised innovative marketing strategies to help drive forward ORI's ethos and disseminate research.

"Being the only ORI team member with a communication and public relations background, I was given the great opportunity to work independently on ORI's online communication. During my two months at ORI I successfully launched and created a Facebook page, changed the content and design of the ORI website, implemented an online strategy for all platforms online, and finally, created social media promotion cards."



Doriana Re, BA (Hons) Computer Animation Arts, 2018

Doriana worked closely with ORI PhD student, Mara, to support the development phase of an augmented reality based simulator, aimed to train surgeons in the relevant skills needed to perform robotic-assisted hip replacement. Doriana is now working for local company Dorset Creative as a 3-D artist.

"Working for ORI opened my mind to the many opportunities that my course offers; computer graphic studies can be utilised not only in the entertainment field but it is really important in health and medical industry as well."

Katie Webb, BSc (Hons) Psychology, 2019

2019 saw ORI welcome two more SRA's, Katie and Layla, who both study Psychology at Bournemouth University. Katie worked on a project with Professor Tim Rees (Faculty of Management) and Associate Professor Thomas Wainwright, entitled "Could the features and content of smartphone mental health apps be incorporated in apps for total hip replacement and total knee replacement surgery patients".

"I applied for this role as I was determined to gain experience and enhance my research skills in a respected facility. I have found this experience extremely useful as I developed new skills and knowledge within research beyond University level, which will be attractive to future career prospects."



Layla Johnson, BSc (Hons) Psychology, 2019

Layla worked closely with PhD student, Ranti Samaratunga, on a project entitled "Surgical expertise in total hip replacement: A breakdown of total hip replacement surgical volume performed by experts and novices"

"I have loved working with the team at ORI. The team, their focus on innovation and their passion for their work is both motivating and inspiring. This project gave me the excellent learning opportunity to contribute to research with a clear impact on society."



MEET:

Name: Alastair Dick

Role: Hip Fellow

Joined ORI: April 2019

"I applied to join Professor Middleton's fellowship programme primarily for the opportunity to perform large volumes of independent hip arthroplasty in a supportive environment which focuses on safety, excellence and learning. Since starting, in addition to the fantastic clinical opportunities, I have particularly enjoyed the opportunity to get involved in exciting research projects at Bournemouth University's Orthopaedic Research Institute; a visionary institute delivering research to help devier a future where technology meets orthopaedics."



Fellowship training with Professor Robert Middleton

In partnership with the Royal Bournemouth Hospital, Professor Middleton offers three Hip Fellowships a year. The Fellowships are suitable for Orthopaedic Surgeons from the UK and internationally who have completed their training and wish to specialise in hip surgery.

Combining experience in clinic, on the ward and in the operating theatre with research at ORI BU, the surgeons are then able to return to their units with the expertise to provide a specialist hip service.

ORI BU is unique in the world offering surgeons the opportunity to train on both the GRAIL gait lab and the VirtaMed surgical trainers. Using virtual reality the surgeons can practice their technique to perfection before entering the operating theatre. This allows for better training and safeguarding of patients.

This year Professor Middleton offers training in Robotic Hip Surgery, one of the first units to offer this at fellowship level. Robotic surgery allows perfect positioning of hip replacement components and are likely to dominate innovation in surgery in the coming years.

Meet the team

Staff members:



Professor Robert Middleton
Head of ORI



Associate Professor Tom Wainwright: Deputy Head of ORI



Tikki Immins
Research Development Manager



Professor Ian Swain
Professor in Clinical Engineering



Shay Bahadori
Project Manager



Louise Burgess
Research Assistant



Erika Parkinson
CLEAT Trial Manager



Francesco Ferraro
HELLO Trial Manager

Visiting Fellows

Kieran Gallagher - Consultant Surgeon

Vivek Gulati - Consultant Surgeon

Sam Heaton - Consultant Surgeon

Jop Antonis - Consultant Surgeon

Simon Newman - Consultant Surgeon

Paddy Subramanian - Consultant Surgeon

Ravi Pagoti - Consultant Surgeon

István Batta - Consultant Surgeon

David McDonald - Service Improvement Manager

Paul Haggis - Hip Fellow

Joe Pagkalos - Hip Fellow

Alastair Dick - Hip Fellow

Visiting Associates

Matthew Low - Consultant Physiotherapist

Eduardo Martinez-Carbonell - Sports Scientist

Associated PhD Students

Mara Catalina Aguilera Canon

Susanna Bentman

Ranti Samaratunga