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Media Release

Smartphone technology uses AI to help arthritis patients

Researchers at the Royal United Hospitals Bath NHS Foundation Trust are helping to develop an app that allows arthritis patients to monitor their symptoms on a smartphone.

A partnership between the healthtech company Living With, the Royal United Hospitals Bath NHS Foundation Trust (RUH), and the University of Bath has been awarded a major grant to develop a Rheumatoid Arthritis Flare Profiler.

The award, from Innovate UK, will allow rheumatoid arthritis patients to use new methods capturing key disease activity data using smartphones, which will support clinicians to be able to classify and optimise care pathways.

The aim of the Flare Profiler is to demonstrate how better monitoring can provide earlier detection of issues, allow more timely clinical intervention and over time reduce need for costly acute treatments. It also aims to reduce the stress and need for patients to travel to hospital during treatment for specialist tests.

Jane Carter, Research Manager Development at the RNHRD/RUH, said: "The Trust has an established international reputation for research and expertise in rheumatology. We are always looking at ways to further improve the care and treatments we can offer patients. Clinical input into the project is provided by Consultant Rheumatologist Dr Bashaar Boyce. Using the latest technology and artificial intelligence is an exciting development. We are very excited to be part of this innovative project."

Living With is developing the Flare Profiler in partnership with the RUH Trust's Royal National Hospital for Rheumatic Diseases (RNHRD), which is the internationally leading centre of excellence for rheumatic conditions, and University of Bath's Centre for the Analysis of Motion, Entertainment Research and Applications (CAMERA), a leader in developing and evaluating new digital technologies such as the use of video, sound and motion for clinical application.



“We’re thrilled to have won an Innovate UK grant,’ said Living With’s CEO Chris Robson. “This will transform the way patients with rheumatoid arthritis can be monitored intelligently between appointments and hopefully help the NHS reduce the cost of treating patients with RA. It also adds a transformational new capability to our existing Living With Rheumatoid Arthritis product.”

CAMERA was created to help further and transfer the knowledge developed within computer science, often targeting the entertainment industries, to other sectors such as healthcare. CAMERA Director, Prof. Darren Cosker, said: “This is a great project. Being able to take some of the computer vision techniques we developed for hand tracking for animation and transferring it into a condition monitoring platform that can operate in a person’s home is a very positive use of technology and exactly the kind of work we should all be doing.”

The Flare Profiler will test a unique range of patient data sources including video and thermal imaging technology. The project will then analyse patient data using cutting edge artificial intelligence (AI) and machine-learning technology to group patient disease activity patterns and identify the most effective treatment pathways for them.

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About RNHRD

The Royal National Hospital for Rheumatic Diseases (RNHRD), known locally as 'the Min', is a specialist hospital in the centre of Bath with an international reputation for research and expertise in rheumatology, chronic fatigue and pain management. We also provide diagnostic, endoscopy and clinical measurement services. The hospital was acquired by our local acute hospital the Royal United Hospitals Bath in February 2015.

Research and development is an important part of our hospital’s work. It informs our treatment programmes and contributes to a better understanding of many conditions. In partnership with local universities in Bath and Bristol, as well as many other universities and NHS trusts, we ensure that this research is carried out to the highest standards.

Research is undertaken in all our service areas, with approximately 30 projects being carried out at any one time. This rolling programme of research includes basic science studies, looking at blood and tissue cells to find the causes of disease and illness; multi-centre clinical trials, testing new treatments; and the development and assessment of new therapies.

About Living With: Living With is an award-winning digital health company and developers of the top paid medical app in the UK, Squeezy. The Living With condition



management platform enables clinicians to connect to their patients and monitor their conditions remotely while saving costs and improving outcomes.

The Living With platform currently has three live products; Squeezy, the UK's top paid medical app; Living With Pelvic Health and Living With Rheumatoid Arthritis. The products are live across fourteen NHS trusts and four private clinics. There are five further products in development.

For more information visit: livingwith.health

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About Innovate UK: Innovate UK drives productivity and economic growth by supporting businesses to develop and realise the potential of new ideas.

We connect businesses to the partners, customers and investors that can help them turn ideas into commercially successful products and services and business growth.

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Innovate UK is part of UK Research and Innovation. For more information visit: innovateuk.ukri.org

About CAMERA at the University of Bath

The Centre for the Analysis of Motion, Entertainment Research & Applications (CAMERA) is a £5 million RCUK-funded research centre based at the University of Bath. CAMERA creates advanced motion tracking technologies for use in the entertainment industry, to enhance training and athlete performance, and to help develop assistive technologies.

The University of Bath is one of the UK's leading universities both in terms of research and our reputation for excellence in teaching, learning and graduate prospects.

In the Research Excellence Framework (REF) 2014 research assessment 87 per cent of our research was defined as 'world-leading' or 'internationally excellent'. From developing fuel efficient cars of the future, to identifying infectious diseases more quickly, or working



to improve the lives of female farmers in West Africa, research from Bath is making a difference around the world. Find out more: <http://www.bath.ac.uk/research/>

Well established as a nurturing environment for enterprising minds, Bath is ranked highly in all national league tables. We are ranked 6th in the UK by The Guardian University Guide 2019, 5th for graduate employment in The Times & Sunday Times Good University Guide 2019, and 4th in the Times Higher Education Student Experience Survey 2018.

Editor's notes:

Rheumatoid arthritis (RA) is a long-term condition, which affects an estimated 690,000 people in the UK and costs the NHS just under £700 million per year.¹ According to a 2010 report from National Rheumatoid Arthritis Society (NRAS), the overall impact of RA on the UK economy is estimated at almost £8 billion per year.¹

RA patients can experience large fluctuations in their disease severity. These unpredictable acute flare-ups can be debilitating and in 2013, as many as 78% of RA respondents to a US survey conducted by rheumatoidarthritis.net said they had flares monthly or more frequently.²

Flare frequency, duration and severity are key indicators of disease progression in rheumatoid arthritis (RA). While undergoing a flare, patients are exposed to systemic inflammation that can be permanently damaging.

The impact on the lives of people living with RA can be seen in the NRAS report from 2007 where they found that 28.4% gave up work as a result of their condition within one year of diagnosis, and more than half (59%) did so within six years.³

Current clinical management of RA is based on either pre-scheduled appointments at 6, 12 or 18-month intervals or emergency clinics. There is no regular mapping of fluctuations in disease severity. As a result, it remains very difficult to make informed treatment plans, because of the unpredictability of the disease and patients' fluctuating symptoms.

Sources:

1 National Rheumatoid Arthritis Society, *The Economic Burden of Rheumatoid Arthritis*, 2010

2 rheumatoidarthritis.net, RA in America study, 2013

3 National Rheumatoid Arthritis Society, *I want to work...*, 2007



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Notes to Editor:

- The Royal United Hospitals Bath NHS Foundation Trust provides acute treatment and care for a catchment population of around 500,000 people in Bath, and the surrounding towns and villages in North East Somerset and Western Wiltshire. The hospital provides healthcare to the population served by four Clinical Commissioning Groups: Bath & North East Somerset CCG, Wiltshire CCG, Somerset CCG and South Gloucestershire CCG.
- The Trust provides 759 beds and a comprehensive range of acute services including medicine and surgery, services for women and children, accident and emergency services, and diagnostic and clinical support services.
- In 2015 The Royal United Hospitals NHS Foundation Trust acquired the Royal National Hospital for Rheumatic Diseases (RNHRD) NHS Foundation Trust. The RNHRD treats patients from across the country offering services in rheumatology, chronic pain and chronic fatigue syndrome/ME, cancer related fatigue and fatigue linked to other long term conditions such as multiple sclerosis.
- The RUH is changing - we have an exciting programme of redevelopment underway transforming our site and further improving the services we provide. The Trust is now building a purpose-built RNHRD and Therapies Centre and working towards new Dyson Cancer Centre. For more details visit: www.ruh.nhs.uk/about/fit_for_the_future
- For more information about the Royal United Hospitals Bath NHS Foundation Trust visit: www.ruh.nhs.uk

