Dr David Sanders

Leverhulme Trust Senior Research Fellow

The Leverhulme Trust

Dr David Sanders, Reader at the School of Engineering at the University of Portsmouth, held a Leverhulme Trust Senior Research Fellowship from 2014 to 2015 to develop research in automation, robotics and the application of artificial intelligence in powered wheelchair systems.

ROYAL ACADEMY OF **ENGINEERING**

"My Leverhulme Trust Senior Research Fellowship provided time to think and to reinvigorate my research after returning to academia from a period of extended mobilised military service."

RESEARCH

Dr Sanders' earlier research in automation and robotics led to the development of analogue user-friendly control, navigation and communication systems for powered wheelchairs. However, being mobilised for an extended spell of military service had impacted his research. "Being away for so long allowed my research to run down and I had not been able to dedicate the time needed to rebuild it," he explains. "Relief from teaching and management duties gave me the opportunity to reinvigorate my research."

Dr Sanders used the time provided by the Fellowship to investigate methods for digitising some of the analogue systems in powered wheelchairs that had previously been created at the University of Portsmouth. The research resulted in a prototype of an innovative ultrasonic device that can give audible warnings of collision – the Langner Scanning Collision Avoidance Device (Langner SCAD).

IMPACT

Development of the Langner SCAD demonstrated the possibility of digitisation in the context of powered wheelchairs. Devices such as this have the potential to improve independent mobility for powered wheelchair users by giving audible collision warning to visually impaired children, for example. Furthermore, by increasing the sample rate of the digitised data, the device could be adapted to assist with steering without any need for helpers, even for blind or severely disabled users.

Having used this dedicated research time to prove concepts, Dr Sanders' research will now address new ways to make powered wheelchairs easier to drive and steer. This will be achieved by investigating efficient mechanisms for post-processing of user data that will enable systems to learn from the behaviour of wheelchair drivers and perceive motion-lag. Ongoing work will seek to create a 'decision-making system' that can suggest the best possible course of action for a wheelchair.

CAREER DEVELOPMENT

The Fellowship was timely in providing an opportunity for Dr Sanders to build on his work in this field. "I have been taking on new research students, undertaking new design projects, testing in the laboratory, applying for research funding, writing up work and publishing again," he says.

Additionally, he was able to further develop a collaboration with the Chailey Heritage Foundation that provides education, care and transition services for children and young people with complex physical disabilities and health needs. He also presented his work at three international conferences.

LEVERHULME TRUST SENIOR RESEARCH FELLOWSHIPS

Royal Academy of Engineering Leverhulme Trust Senior Research Fellowships allow academics to concentrate on full-time research by covering the salary costs of a replacement academic who takes over the awardee's teaching and administrative duties for up to one year.

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