Ageing and Assisted Living

Background

The UK's population is getting older and this has resulted in rising numbers of people with chronic conditions who will place unsustainable pressure on our economy, health and social care systems. As the number of people with chronic illness and disabilities increases, the demand has grown for assisted living technology to support independent living, enhance quality of life and promote cost-effective care solutions. Ageing and assisted living are complex areas, touching on a wide range of disciplines, and require a co-ordinated multi-disciplinary approach to research. Therefore, developing partnerships across academic disciplines, the NHS and social care, the third sector, service users, Government and industry will be key to ensuring that research findings are used effectively to inform policy, practice and delivery of health and social care with the ultimate aim of improving the health and quality of life of older people and people with disabilities.

To address these challenges, the Ageing and Assisted Living theme and an associated research network, the Ageing and Assisted Living Network were established in our Faculty. The Ageing and Assisted Living theme has three focus areas:

Lifelong Health and Healthy Ageing
Health behaviours and lifestyle choices are major determinants of life expectancy, health and wellbeing in old age. Researchers within this focus area will explore novel approaches and interventions to promote, and sustain, health and wellbeing across the life course into old age.

Age-related Disease: Cause, Cure, Care
Age is the single biggest risk factor for many life-threatening diseases, such as heart failure, cancer and dementia which can lead to chronic ill health and dependence. Researchers working within this focus area will examine the cause, cure and care of a range of age-related diseases and conditions.

Assisted Living
The physical environment plays a central role in determining disabled and older people's independence, mobility and wellbeing. Researchers within this focus area will aim to develop new tools and technologies that will enable the elderly, disabled and those with long-term conditions to live independent lives, and support translation of assisted living technologies into care or home environments.

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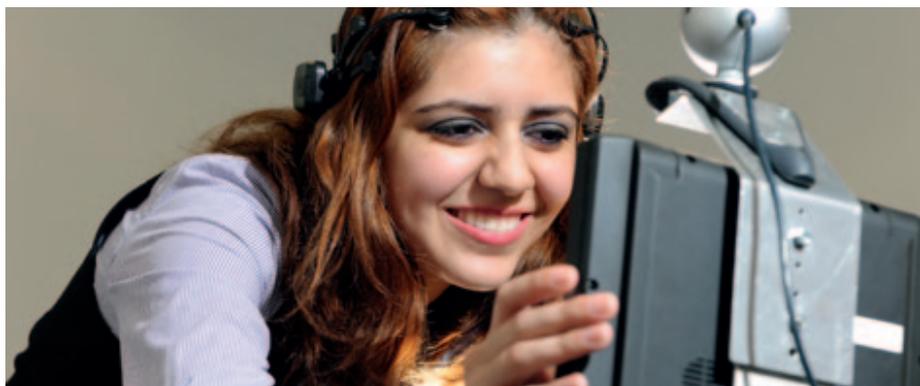
Ageing and Assisted Living Network

The Ageing and Assisted Living Network is a cross-disciplinary network of researchers from our Faculty of Science and Engineering which was established to promote innovative and multidisciplinary research in ageing and assisted living. Our Network brings together researchers with expertise in biology, psychology, social and health science, computing and engineering to carry out research from the cellular level through to the population level and into practice. Our Network aims to bring together teams of experts to:

- facilitate high quality interdisciplinary research;
- increase the social, cultural and economic impact of research;
- foster external collaborations with providers of health, social care, companies, charities and the public; and
- promote the translation of assisted living technology into practice/care environments.

An elderly faller undergoing Wii balance training

Ageing and Assisted Living Research

Below are just some examples of ongoing and emerging research projects related to ageing or assisted living:

The intelligent wheelchair Robochair – user accessibility study

Gill Green, Anita Steinberg, Jo Jackson (Health and Human Sciences) and Huosheng Hu (Computer Science and Electronic Engineering)

The concept of an intelligent, highly versatile RoboChair has been developed by Professor Huosheng Hu and his Robotics Research Group. RoboChair has the potential to transform the lives of people with severe mobility problems and funding from the Colchester Catalyst Charity is supporting an initial user acceptability study to help make sure the RoboChair prototype meets the requirements of end users as effectively as possible.

Using the Nintendo Wii to improve balance and quality-of-life in recurrent elderly fallers

Matt Taylor, Murray Griffin (Biological Sciences), Teshk Shawis and Rebecca Impson (Colchester Hospital University NHS Foundation Trust)

The consequence of falling can be physically and psychologically debilitating. Researchers at Essex have evaluated the use of the Nintendo Wii™ as a potential adjunct to standard NHS falls training. Initial findings suggested that improvements were greater when using the Wii compared to traditional training. Researchers are now carrying out a small random control trial using pre- and post-intervention measures to evaluate the utility of the Wii as a rehabilitation tool.

The development of new inhibitors to age-related neurodegenerative diseases

Jody Mason, Neil Kad (Biological Sciences)

Alzheimer's disease is a progressive, degenerative disease of the brain. One of the hallmarks of the disease is the accumulation of amyloid proteins into plaques between nerve cells in the brain, which is thought to contribute to nerve cell damage. Currently no drug therapies exist to control the formation of these amyloid plaques. Researchers at our University aim to combat this problem by designing, screening and selecting peptide drugs that can slow down, or even prevent, this process from occurring. This research could lead to a more effective treatment for Alzheimer's disease and other neurodegenerative diseases, such as Parkinson's disease.

The use of precision tinted lenses by migraine patients to assist in prevention of headache, photophobia and functional disability

Arnold Wilkins, Sheina Orbell (Psychology), Jonathan Scales (Health and Human Sciences)

About seven million people in the UK experience migraine, resulting in an estimated 25 million days lost from work or school each year. The condition also poses a financial burden in terms of analgesic prescribing to the NHS and undermines psychological, social and functional wellbeing. Recent findings suggest that tinted spectacle lenses may help to prevent migraine and therefore have important implications for assisted living amongst migraineurs. The study aims to evaluate the efficacy of these lenses as a treatment for migraineurs in a randomised controlled trial.

A preliminary exploration of the possibility of reducing tremors in Parkinson's disease patients via entrainment and brain computer interfaces

Riccardo Poli, Fransisco Sepulveda (Computer Science and Electronic Engineering), Debi Roberson (Psychology), Suffolk Working Age Parkinson's Group (SWAP)

Tremor is common in Parkinson's disease (PD) and particularly affects the quality of life of patients. Several pharmacological treatments for tremor are efficacious but a large proportion of PD patients suffer from drug-resistant tremor. Non-drug treatments, such as relaxation techniques and neurofeedback, can also help reduce tremor in some PD patients. Entrainment is a technique sometimes used to induce relaxation and has been shown to be an effective therapeutic tool for stress, anxiety, pain and migraine. The group aim to explore the use of audio-visual entrainment in order to reduce tremor in patients with PD. The study will also explore whether there are psychological effects of the intervention, even where objective reduction in tremor remains extremely small.

Ageing and Assisted Living Network: summary of expertise

Researcher	Department/School	Research interests
Lifelong Health and Healthy Ageing		
Jo Barton	Biological Sciences	Green exercise; measurement of physical activity and sedentary behaviour in the elderly
Valerie Gladwell	Biological Sciences	Green exercise; workplace health/wellbeing; measurement of physical activity and sedentary behaviour in the elderly
Murray Griffin	Biological Sciences	Green exercise
Sheina Orbell	Psychology	Social psychological aspects of preventive health behaviour
Jules Pretty	Biological Sciences	Green exercise; green care
Gavin Sandercock	Biological Sciences	Child fitness; obesity; cardiac health
Debi Roberson	Psychology	Work, health and wellbeing
Netta Weinstein	Psychology	Environmental behaviours
Age-related Disease: Cause, Cure, Care		
Selwa Alsam	Biological Sciences	Hospital acquired infections in the elderly
Nelson Fernandez	Biological Sciences	Rheumatoid arthritis
Catherine Jones	Psychology	Temporal processing in Parkinson's disease
Neil Kad	Biological Sciences	Alzheimer's disease; Parkinson's disease
Mary Kennedy	HHS*	Dementia care
Elena Klenova	Biological Sciences	Cellular ageing at the molecular level; breast and prostate cancer
Berthold Lausen	Mathematical Sciences	Health informatics
Peter Martin	HHS	Dementia care
Jody Mason	Biological Sciences	Alzheimer's disease; Parkinson's disease
Metodi Metodiev	Biological Sciences	Breast and prostate cancer
Sheina Orbell	Biological Sciences	Social psychological aspects of the physical health and health care of older people
Silke Paulmann	Psychology	Emotional communication in normal and abnormal ageing
Mark Rakobowchuk	Biological Sciences	Cardiac and vascular disease
Gill Green	HHS	Experience and impact of chronic illness
Gavin Sandercock	Biological Sciences	Cardiac rehabilitation
Jo Jackson/Louise Marsland	HHS	Trial of pilates for urinary incontinence
Assisted Living		
Luca Citi	CSEE **	Brain-computer interfaces; neural prostheses; physiological signal processing; computational intelligence for health-related problems
Adrian Clark	CSEE	Image and video analysis, motion detection, person tracking; body-mounted computer systems
Martin Colley	CSEE	Intelligent environments; embedded systems
John Quiang Gan	CSEE	Intelligent systems and robotics; brain-computer interfaces
Micheal Gardner	CSEE	Virtual reality systems; mixed-reality environments; user-centred design; human-computer interaction; socio-technical systems; pervasive computing evaluation
Gill Green, Anita Steinberg, Jo Jackson	HHS	Accessibility study for the Robochair robotic wheelchair
Murray Griffin	HHS	Using the Nintendo Wii to improve balance and quality-of-life in recurrent elderly fallers
Dongbing Gu	CSEE	Intelligent systems and robotics; robotic assistive technology; distributed information processing in wireless sensor networks
Hani Hagras	CSEE	Computational intelligence; intelligent environments; ambient intelligence; intelligent buildings; ubiquitous and pervasive computing; intelligent autonomous systems; intelligent autonomous robots
Huosheng Hu	CSEE	Healthcare robotics; telecare; telehealth; tele-rehabilitation
Riccardo Poli	CSEE	Brain-computer interfaces
Simon Lucas	CSEE	Human centred robotics; development of bespoke exer-gaming software for rehabilitation of elderly fallers
Klaus McDonald-Maier	CSEE	Embedded systems; advanced computer architectures; application of AI for real world problems and robot control
Martin Reed	CSEE	Network security; multimedia internet applications; multi-dimensional signal processing algorithms
Ricardo Russo	Psychology	Telehealth; use of technology to measure physical activity and sedentary behaviour in the elderly
Paul Scott	CSEE	Machine learning; applied artificial intelligence
John Stevens	HHS	Development of smartphone apps for dementia patients
Francisco Sepulveda	CSEE	Brain-computer interfaces; myoelectric operation of artificial limbs and robotic devices; neurorehabilitation; intelligent systems
Matthew Taylor	Biological Sciences	Using the Nintendo Wii to improve balance and quality-of-life in recurrent elderly fallers; biomechanics; elderly gait
Arnold Wilkins	Psychology	Assisted living for migraine sufferers
Kun Yang	CSEE	Communication networks in assisted living; use of technology to measure physical activity and sedentary behaviour in the elderly

*Health and Human Sciences   **Computer Science and Electronic Engineering

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Partners

Our Network has key partnerships with a number of external organisations and we will continue to build new links and partnerships to increase the impact of our research. We work closely with the University's Research and Enterprise Office (REO) to encourage collaboration and involvement from industry, the NHS, voluntary groups and charities. Consultancy contracts may be negotiated with individual academic staff, or through the REO.

Contacts

Professor Gill Green
Ageing and Assisted Living Network Academic Lead (Assisted Living)
T   +44 (0)1206 874144
E   gillgr@essex.ac.uk

Dr Jody Mason
Ageing and Assisted Living Network Academic Lead (Ageing)
T   +44 (0)1206 873010
E   jmason@essex.ac.uk

Dr Beverley Wilkinson
Ageing and Assisted Living Network Coordinator (Network Development and Support)
T   +44 (0)1206 874756
E   bwilk@essex.ac.uk

Dr Doreen Tembo
Ageing and Assisted Living Network Coordinator (External Communications/End User Engagement)
T   +44 (0) 1206 874856
E   dtembo@essex.ac.uk

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