M. GILHOOLY (Convener). The new dynamics of ageing programme: Current UK interdisciplinary research on assistive technologies. Gerontechnology 2010; 9(3):95; doi:10.4017/gt.2010.09.02.042.00 **Participants**: *A. ASTELL (UK), L. DAMODARAN (UK), M. GILHOOLY (UK), J. MCCANN (UK), and A. MACDONALD (UK).* **ISSUE** It is generally believed that solutions to many problems falling within the gerontechnology sphere can be solved via interdisciplinary research. However, interdisciplinary research presents both particular challenges and unique rewards for researchers. **CONTENT** The New Dynamics of Ageing programme is the largest interdisciplinary programme of ageing research currently on-going in the United Kingdom. All five research councils have provided funding for the programme. Five NDA projects which focus on assistive technologies will be described. Each presenter will, along with the findings, frankly discuss issues making interdisciplinary research in gerontechnology both easy and difficult. **STRUCTURE** Arlene Astell will discuss a three-year multidisciplinary research project using sensitively-designed technology to improve data collection and integrate information on nutrition, physical function, cognitive function and mental health to identify individuals at risk of under-nourishment and improve targeting of interventions. L. Damodaran will present findings from a large collaborative project which is exploring the relationship between the dynamics of ageing and the dynamics of digital ICTs in order to better understand how ICT can enrich quality of life and autonomy in old age. M. Gilhooly will describe a large project in which urine smell and leakage detectors are being developed, along with public toilet design and access. J. McCann will discuss findings from research on an innovative garment layering system that enhances comfort and promotes healthy exercise through the application of 3D body scanning, innovative smart textiles with embedded technology and novel garment engineering techniques. A. Macdonald will describe a project which evaluated an innovative way of communicating and understanding the complexity of older people's mobility problems using visualizations of objective dynamic movement data. An audience discussion of the pitfalls of interdisciplinary gerontechnology research will be lead by Mary Gilhooly following the presentations by NDA grant holders. **CONCLUSION** The design and nature of the projects outlined in this symposium are expected to be of considerable interest to those unfamiliar with interdisciplinary research. It is also intended that those embarking on interdisciplinary research will benefit from the presenters' willingness to be open and transparent about the advantages and disadvantages of such research.

Keywords: incontinence, toilet design, garments, biomechanical data, nutrition
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A. ASTELL, L. WILLIAMS, T. ADLAM, F. HWANG. NANA: Novel assessment of nutrition and ageing; Gerontechnology 2010;9(2):95-96; doi:10.4017/gt.2010.09.02.043.00 **Purpose** NANA is a three-year research project using sensitively-designed technology to improve data collection and integrate information on nutrition, physical function, cognitive function and mental health to identify individuals at risk of under-nourishment and improve the targeting of interventions. This research will not only improve measurement of nutrition, physical health, mental health and cognitive function but will also improve our understanding of the interactions between these factors. This will be useful for informing strategies to prevent physical and mental decline in ageing, and improvements in the medical treatment and social provision for older people. The toolkit has potential for commercial development primarily for use with older people

but also for use with other groups in the population that would benefit from comprehensive holistic assessment. **Method** This is a multi-disciplinary programme involving psychology, nutrition, engineering and software engineering. The NANA project comprises three phases: (i) user needs analysis; (ii) iterative development of an integrated measurement toolkit; and (iii) full validation of the measurement toolkit. **Results & Discussion** Communication was identified as the critical factor in the success of the project from day one, when the project kicked off with a full team meeting. From that point the management group have met fortnightly by Skype with a representative of the researchers group attending each meeting. The researcher group meets by Skype in the intervening weeks, with a Management Group representative attending these meetings. Over the first nine months there have been two further full team face-to-face meetings plus several subgroup meetings between various team members. The three phases of NANA reflect the interdisciplinary nature and approach of the project. Rather than the traditional work-package model, where each discipline works in parallel on specific components, NANA is taking a holistic approach to all aspects of the project. Thus, two researchers, representing two different disciplines, ran each focus group in the user-needs analysis. This was judged to be particularly useful for the engineers and software engineers to get a first hand feel and understanding of the needs and fears of the intended end-user groups to inform the technology and interface developments. Each focus group was also video-recorded and transcribed and then subjected to thematic analysis to inform the development of the project. To date NANA has proved to be a huge learning curve for all concerned in terms of interdisciplinary working. The key issues it has thrown up relate to (i) communication, especially finding a way for the different disciplines to speak to each other; (ii) confidence, particularly for junior members of the team to feel comfortable admitting when they do not understand or know something and (iii) respect, primarily in regard to what each member of the team, and each discipline, contributes to the project. The aim is to build cohesion and deliver a project that is greater than the sum of its individual, multidisciplinary parts.

Keywords: ageing, nutrition, cognition, measurement

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L. Damodaran, C.W. Olphert. Sustaining IT use by older people to promote autonomy and independence. Gerontechnology 2010;9(2):96-97; doi:10.4017/gt.2010.09.02.044.00 **Purpose** It is known that digital ICTs have the potential to support older people to live independently, promote social inclusion or facilitate access to commercial or government services. However, as people age they often experience a decline in their physical or cognitive abilities which can make it difficult to continue to use, or keep up with, digital tools and services. The 39 month NDA funded Sus-IT collaborative research project (which commenced on January 1, 2009) aims to explore and examine the relationship between the dynamics of ageing and the dynamics of digital ICTs, in order to better understand how ICT can support or enrich quality of life and autonomy of older people as they age. To address successfully the complex sociotechnical research questions that arise requires knowledge and expertise from multiple disciplines and perspectives, in addition to that of older people themselves. Accordingly, the Sus-IT CRP brings together the expertise of academic researchers across a range of disciplines (participatory and user-centred design, psychology, gerontology, sociology, computer and information science, human-computer interaction, interactive theatre and learning technologies) with that of practitioners, product developers, local government, assistive technology providers and disability organisations. **Method** In order to tackle the issues of diversity and dynamics, the research is using both qualitative and quantitative methods. This will allow researchers to analyse trends and draw conclusions, while the participating older people can have their individual perspectives recognised and respected. The methodology includes: (i) collection and analysis of relevant quantitative and qualitative data to understand ways in which older people can use and adapt technology to meet their continually changing needs; (ii) innovation in methods for building confidence and capacity of older people to engage meaningfully in, and bring their diverse perspectives to, research into ageing, ICT use and sustained quality of life, and to develop and articulate their understanding of their own needs in relation to technology; (iii) ethical and sensitive engagement with older people, recognising and responding to their motiva-

tions and expectations in participating; (iv) innovative design approaches; (v) sustainability through building capacity for multidisciplinary and participatory research, and allowing for enhancement and development of the networks of connected and engaged older people during and beyond the project. **Results & Discussion** This paper will describe some of the innovative methods used for data collection, and will discuss emerging findings from the initial phase of data gathering relating to the problems and barriers experienced by older people in using ICTs (n=150 approx.) and the ways in which disengagement from the digital world can constitute a significant reduction in quality of life for some older people. The opportunities and challenges presented by this large, multi-partner interdisciplinary project will also be highlighted.
Keywords: ageing, IT autonomy, independence
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M. Gilhooly, E. van den Heuvel, F. Jowitt, I. Sutherland, N. Ratcliff, A. Long, P. Gaydecki, J. Bichard. *Technologies, tools and theories for tackling ageing incontinence; Gerontechnology 2010;9(2):97;* doi:10.4017/gt.2010.09.02.045.00 **Purpose** Continence difficulties are very common; some studies show 30 to 60% of women over 40 will suffer some symptoms of urinary incontinence; about half as many men are affected[1]. Although there are treatments that can offer some level of symptom relief, many do not provide a complete "cure" and some are less suitable for older people. Thus, many older people have to cope with the constant requirement to manage their continence needs. Finding the most effective treatment for their symptoms, the best management, (especially outside the home) for their needs, and the most well designed management products, is essential for the maintenance of a good quality of life. The impact of continence difficulties is far more than the physical effort and expense of coping with the day to day management. Incontinence is a precursor to social isolation, loss of self-esteem and depression. Inability to cope with incontinence is a major reason why people move into care. This project aims to reduce the impact of continence difficulties for older people by investigating: (i) environmental barriers to continence (for example, public toilet design, provision and access); (ii) normal continence services compared with specialist services; (iii) by developing assistive devices that provide both reassurance to continence pad users and make pad use less demanding. In this paper only the work-package focussing on assistive technology will be presented. **Method** Two assistive technologies are being developed in this project: (i) an inexpensive colour change odour-indicating formula is under development to indicate the presence of the odour of urine at a just imperceptible level; (ii) a washable fabric underwear wetness sensor and alert mechanism, currently in the developmental phase. Potential user opinion is being canvassed, via focus groups, to identify desired forms for the sensor and underwear. Users will test the developed prototypes for acceptability. **Results & Discussion** The technology for the odour sensors has been developed, with 'sensitivity' currently under investigation. Prototypes will be shown and findings from user interviews described. Problems associated with development of the wetness detecting underwear include ensuring that the electrical mechanisms are not triggered by sweat, rather than urine will be outlined. Finally, challenges associated with a large interdisciplinary project of this nature will be considered, along with the fun and exciting aspects of this research.

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J. McCann, J. Bougourd. Design for ageing well: Improving the quality of life for the ageing population using a technology-enabled garment system; Gerontechnology 2010;9(2):98; doi: 10.4017/gt.2010.09.02.046.00 **Purpose** We are at the beginning of a new industrial revolution with the merging of technical textiles, wearable electronics and ICT. Such advances should be utilised to promote health and well-being, but may not be readily accepted by some older users due to badly designed user interfaces that have small controls or displays that can prevent someone with a minor impairment from using them effectively. The Design for Ageing Well project focuses on bringing emerging wearable technologies to active members of older age groups who do not suffer from restrictive medical conditions. **Method** This cross-disciplinary project has a number of aims: (i) to engage in collaborative design practice in order to produce an innovative garment layering system that enhances comfort and well-being and promotes healthy exercise for active ageing through the application of 3D body scanning, innovative smart textiles with embedded technology and novel garment engineering techniques; (ii) to evaluate the understanding, acceptance and impact of the technology-enabled garment system using the *in situ* assessment of prototypes; (iii) to enhance autonomy and independence for the active ageing by identifying and addressing key cultural, social and behavioural limitations of their everyday lives using the technology enabled garment. By identifying limitations it may be possible to maximise potential and choice. This will enhance our understanding of the theory of the dynamics of active ageing in a way that is unique and, up until now, has not been possible; (iv) to develop technology that can be incorporated into the garment layering system to allow the acquisition, processing, storage, interpretation and feedback of information from and to the user, in their environment. **Results & Discussion** This project is addressing the current lack of aesthetic and functional clothing design requirements of older wearers by meeting the size, shape and posture needs of the ageing figure, utilising textile developments in thermal regulation, moisture management and protection with embedded but practical technologies to ensure a psychological 'feel good factor'. The sets of prototype systems, designed, developed and evaluated through the user design strategy, will be launched with the support of the projects industrial advisory group. Finally, the advantages and disadvantages of interdisciplinary research in this field will be outlined.
Keywords: ageing, garments, wearable technologies, ICT, smart textiles
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A.S. Macdonald, D. Loudon, P.J. Rowe. Visualisation of biomechanical data to assist therapeutic rehabilitation. Gerontechnology 2010;9(2):98-99; doi:10.4017/gt.2010.09.02.047.00 **Purpose** The biomechanics community has, to date, had limited success in communicating complex biomechanical data and analyses outside of their field. The authors have created an innovative prototype software tool to visualise objective dynamic movement data captured from older adults undertaking activities of daily living (ADLs). Evaluation of this tool has shown it to be a successful way of communicating the complexity of older adult mobility data in an accessible manner, for non-biomechanical specialists and lay audiences[1,2]. **Method** A software tool was developed, which generates a 3D animated human 'stick figure', on which the biomechanical demands of ADLs are represented visually at the joints as a percentage of each individual's maximum capability using a continuous colour gradient from green at 0%, amber at 50%, through to red at 100% *(Figure 1).* The tool was evaluated using a qualitative methodology of interviews and focus groups, where older adults and professionals viewed a series of visualisations of dynamic movement data[3]. **Results & Discussion** Analysis of focus group discussions facilitated by the visualizations revealed new kinds of dialogues about biomechanical issues. The method of visualising and presenting the data clearly enabled people without training in biomechanics, both professionals and lay older people, to access and interpret the biomechanical information, based on their background, knowledge of a field or their personal experience. Further, the common visual medium enabled the sharing of different insights without recourse to specialist terminology or knowledge. New kinds of dialogues occurred in focus groups between older people and professionals about their experiences, based on a real understanding of where the mobility problems were occurring. New dialogues also emerged between professionals from a range of different disciplines, crucial for different aspects of the care, well-being or design of the built envi-

ronment for older people. Neither of these would have been possible using current conventions of presenting biomechanical data. The visualisations also appear to allow a deeper understanding of the issues within professions, both in healthcare and in design. These findings have led to new research with five discrete yet complementary studies covering a range of clinical applications of this method for: (i) mobility and exercise advice for the healthy older adult; (ii) falls prevention; (iii) rehabilitation of total knee replacement; (iv) enhancing early mobilisation of acute stroke patients and (v) enhancing biomechanical diagnosis and fitting of ankle foot orthoses (AFO) in late stage stroke.

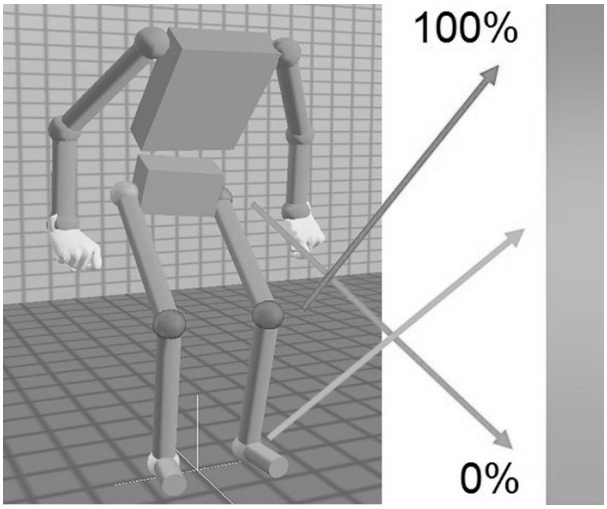

Figure 1. Still frame from visualization tool showing biomechanical demand as a percentage of each individual's maximum capability using a continuous colour gradient from green at 0%, amber at 50%, through to red at 100%

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Keywords: biomechanical data visualization, rehabilitation

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