

Institution: Glyndŵr University

**Unit of Assessment: 11
Computer Science and Informatics**

a. Context

The University's vision is to 'become indispensable as a significant, relevant and expert partner in regional and national economic and social development'. That is reflected in the research activity related to UoA11. The focus is on applied and near to market research the results of which can be applied for economic, social and cultural benefit the majority of the research undertaken is of an applied nature and often includes industrial partners. Researchers engage with collaborators and clients in the UK, Europe and in other countries (such as Nigeria, China).

Non-academic collaborators and clients are usually commercial manufacturing and service industry companies (such as AQR Ltd, Motor Design Ltd, BSH Electrodomecos S.A.) and there are also non-commercial collaborators and sponsors (such as public interest company RCP21).

Research users benefit through the licensing or assignment of IP arising from collaborative and commercial research projects.

b. Approach to impact

Engagement with non-academic research users to enable fruitful research relationships is effected through a variety of means.

Academic staff engage in relevant professional and business networks and maintain contacts with external business liaison intermediaries such as Welsh Government business advisors and the KTP regional advisor (e.g. Excell: British Standards Institution; Earnshaw: proposal reviewer for the European Commission Framework 7 (FP7) Information and Communication Technologies (ICT) programme; Picking: BCS Health in Wales specialist group; Cordeiro de Amorim: visiting research fellowship at Birkbeck). The University's Internet Technologies and Applications (ITA) biennial conference is now in its 5th cycle, bringing delegates from more than 40 countries including New Zealand, USA, Brazil, Germany, Spain and Russia (www.ita13.org); ITA provides opportunities for the development of research collaborations. An Erasmus mobility partnership with Hochschule Darmstadt has led to substantive research collaboration investigating novel timing mechanisms to enhance the efficiency of particle accelerator operations, in collaboration with the GSI Helmholtz Centre for Heavy Ion Research, Germany. Advisory roles and consultancies create and reinforce relationships which can and do lead to more substantive research collaborations. Mechanisms supporting such engagement include Knowledge Transfer Partnerships (for example, with Thinking Group Ltd, 2009-11, Trackyou Ltd, 2010-12) and, in Wales, the Welsh Government's A4B programme ('Care in Business' knowledge exchange network ref. HE09KEP1010).

The University's 'corporate' partnerships also create opportunities, for example through the University of Wales Prince of Wales Innovation Scholarships scheme (part funded by ERDF; an innovative £11.4 million initiative, managed by the University of Wales's Global Academy programme, linking companies in Wales with higher education providers, including Massachusetts institute of Technology). Glyndŵr staff were selected on the basis of their expertise to supervise two research students based in the SME Geolang Ltd, in the areas of cybersecurity and human-computer interaction. This work has led to opportunities for further

research collaboration (for example a bid to the High Performance Computing Wales programme is in preparation).

University and departmental Business Development support staff also create opportunities for the development of new relationships and support existing relationships through speculative marketing activities and through their contacts with business support intermediaries.

The overall aim of those activities is to enable the creation and enrichment of relationships which form the basis of effective research partnerships, increasing the likelihood of successful research projects which produce benefits for the research users.

c. Strategy and plans

The University aims to underpin future impact by appointing staff who can make a particular contribution to developing and strengthening research based external relationships. Exemplars include Earnshaw (human-computer interaction) and Liu (computer networking/telecommunications).

The focus in terms of project-based research income is to seek opportunities for applied and close-to-market research. Staff in UoA11 have attracted funding through Research Council grants, EU Framework Programme (and other EU schemes), Knowledge Transfer Partnerships and commercial research contracts, complemented by consultancy income. As capacity and reputation has grown, opportunities for research collaboration are increasing. Staff are now approached more often as experts within their respective domains and are invited increasingly to join as partners in cooperative joint grant bids. The strategy is to continue to grow this research capacity and performance through further grant funding, re-investment in people and facilities and the further development of national and international partnerships (using the Erasmus student and staff mobility programme to support the development of new links, for example).

The University's Creative Industries Building, which was completed in 2011 provides a focal point for creative industries activity, promoting greater interdisciplinary collaboration and research. The centre provides a hub for the development of a creative industries 'digital media culture and also provides a stimulus to the development of private and spin-out businesses associated with the creative industries. Resources include the computer networking research lab, a fully-functioning usability observation laboratory, recording studios, high-specification 3D printers and scanners, specialist laser cutting equipment, gesture interaction research equipment and an immersive augmented reality 'dome'. Current research is using this equipment in wide-ranging domains such as eHealth, education and creative industries.

Engagement with the public – for example through the Professorial lecture series and the Wrexham Science Festival – helps staff generate awareness of the University's expertise and capacity (<http://www.wrexhamsf.com/>, <http://glyndwr.ticketsolve.com/shows/upcoming/tags/talks>). Researchers in UoA11 engage actively with the scientific community. Publication of research outputs in peer reviewed international journals is encouraged and contributes to applications for promotion to Reader or Professor. The University has set up a Repository and staff are encouraged to submit their publications to maximise their impact / increase citations, contributing to awareness of the University's expertise and capacity. Researchers are supported to present their research at national and international conferences. Details of CARDS research are included on the University website (<http://www.glyndwr.ac.uk/en/Ourresearch/Researchcentres/CreativeandAppliedResearchfortheDigitalSociety/>). The organisation of conferences also serves to promote expertise and

capacity (e.g. 'Internet Technologies and Applications', <http://ita13.org/>).

Dissemination is also evident through interaction with media organizations, such as regular press releases and BBC TV, radio and newspaper interviews.

Engagement with industry will continue to be supported through mechanisms such as the Welsh Government A4B programme and TSB initiatives.

The University's IP policy makes provision for the creators of IP to share in any net surplus generated through its commercialisation; there are also financial incentives to encourage academic consultancy.

d. Relationship to case studies

The Impact Case Studies describe outcomes enabled by the focus on applied and near to market research complemented by effective external engagement.

Software Integration and Visualisation for Complex Electrical Motor Design Programming, Simulation and Modelling

The Computing Department at Glyndŵr University has been conducting specialist research into the implementation of algorithmic principles in connected and restricted environments for around a decade. These specialist areas include applications where processing power or storage are severely limited and where requirements are complex and/or software interoperability is a particular problem. The work is led by Professor Grout, a specialist algorithmic designer. Effective liaison between the University's KTP Manager and the KTP Regional Adviser led to Grout being invited to act as Academic Supervisor in a proposed KTP project in collaboration with a software company, Motor Design Ltd (MDL). MDL supply software solutions across the world. The bid was successful and became KTP 6756, 2008-2010.

EASYLINE+: Low Cost Advanced White Goods for a Longer Independent Life of Elderly People

Research enabling the impact described in this case study was based on the researchers' expertise in the fields of human computer interaction and networking. This expertise led to Glyndŵr University researchers being invited to join the FP6 funded EasyLine+ project (FP6 Contract Number 045515, 2007-2010), with BSH Electrodomesticos Espana S.A. (a subsidiary of Siemens) as the lead industrial partner. The overall aim of the EasyLine+ project was to develop a range of intelligent kitchen appliances, for use in particular by elderly or disabled people. Glyndŵr's specialist role was to develop the device interfaces, especially those allowing remote control. Researchers in UoA11 had developed relationships through Erasmus student and staff mobility with Universidad de Zaragoza (the lead partner) and through networking at the Internet Technologies and Applications conference creating the link with BSH Electrodomesticos Espana S.A.