Institution: University of Sussex

Unit of Assessment: UoA 11 Informatics

1. OVERVIEW

This UoA is coincident with the Department of Informatics, which is engaged in internationally leading research across a range of topics in computer science, artificial intelligence, computational biology and cognitive science. During the REF period, the UoA typically had 24 faculty, 22 RFs and 75 PhD students. Our research spans the theoretical and the applied, often crossing traditional disciplinary boundaries, and is organised around four interdisciplinary research groups:

- Cognitive and Language Processing Systems (CALPS) [5.8 FTE faculty at Oct 2013]
- Evolutionary and Adaptive Systems (EASY) [7.8 FTE faculty]
- Foundations of Software Systems (FoSS) [6 FTE faculty]
- Interactive Systems [7 FTE faculty]

CALPS conducts research on natural language and visualisation systems. EASY is concerned with the interfaces between the biological and the computational sciences. FoSS focuses on both practical and theoretical aspects of compilation, programming languages and pervasive computing. Interactive Systems works on the design, implementation and evaluation of interactive computer systems. This structure, in place since 2009, is a more focused set of groupings than at RAE2008 (when the Department had eight groups), better enabling the development and sustainability of the Department's main research strengths (identified as core themes in RAE2008). Each member of the Department belongs to a single research group, although the groups interact regularly.

2. RESEARCH STRATEGY

The overall research aim of the Department is to advance knowledge in computer science, informatics and allied subject areas by conducting high-quality, leading-edge basic and applied research. The main strategic research goals (SRGs) stemming from this are:

SRG1 to contribute to the foundations of computer science and related areas;
SRG2 to develop and apply computational methods in science, industry and society; and
SRG3 to pursue interdisciplinary research and help to establish computational techniques as core methodologies in other disciplines.

Our research strategy focuses on the provision of a supportive and adaptive environment that best enables achievement of these goals. It recognises that the frontiers of knowledge are continually changing in Computing Science & Informatics, researchers' interests naturally evolve, and time and resources are needed to innovate. The strategy thus balances the competing needs for stability and for flexibility in the research environment. It is implemented through support for research in and between the groups, by various seed-corn initiatives aimed at collaborations outside the Department [see Section 3, Paragraph 3], a research-income strategy that seeks engagement with a wide range of funders [see Section 4], and regular research planning at individual, group and department levels, including a regular review of structures and themes to ensure sustained creativity and quality. The four research groups directly embody the four core strategic research themes of the UoA. In the following paragraphs the work and visions of these groups will be related to the three main goals above.

Members of the CALPS group are engaged in leading fundamental computational approaches [SRG1] to formalising, extracting and representing the meaning of natural language, and the design of external representations of information and knowledge at the interface between humans and computers, as evidenced by, for example, invited talks at high-impact conferences. Building on strands under development at RAE2008, during the REF period the group developed the first data-driven approach to representing the semantics of phrases in terms of the meanings of their constituent words, and new optimal ways of processing grammars for machine translation. Allied with these developments was the establishment of a strand of applied research [SRG2] in text analytics aimed at the business community, which has resulted in 25 contracts with industry. Other highlights included the interdisciplinary [SRG3] development of methodologies for understanding and exploiting free text that enhances the utility of electronic patient records, leading to multiple

grants. The group's medium-term strategic goals involve building upon its core fundamental and applied research in natural language-processing technologies and representational systems, and continuing to develop the synergies between these strengths by promoting interdisciplinary work, including advanced visualisations for NLP technologies, and methods for the multi-perspective extraction of meaning from heterogeneous datasets such as medical records.

Building on its position from RAE2008, the EASY group continues to produce high-impact fundamental research [SRG1] in various strands of computational biology, adaptive systems and cognitive science (as evidenced by, for example, publications in *Science*, *PNAS*, etc.). The core themes of computational neuroscience and consciousness science have expanded particularly strongly during the REF period, leading to significant funding and the founding of the world-leading Sackler Centre for Consciousness Science [see Section 5, Paragraph 3]. Major interdisciplinary research foci [SRG3] in these themes include the computational neuroscience of olfaction and chemical sensing, modelling the dynamics of development and plasticity in neural circuits, and unravelling the neural basis of conscious experience. Strong strands of work continue in modelling insect navigation and on bio-inspired robotics. The group's work in evolutionary systems focuses on evolvability and applications to industrial problems [SRG2]. A strongly emerging theme supporting all these areas is the development of general GPU super-computing. Important underpinning research on information-theoretic approaches to understanding adaptive systems includes high-impact work on causal connectivity in time series (a toolkit from the group is in use by hundreds of researchers worldwide). Other strong areas of research include creative systems and the history of cognitive science. Major strategic research goals achieved since RAE2008 include the completion of seminal work on gain control in the olfactory system of locusts, and the development of an influential and radical new model of ant navigation based on view familiarity. While the group plans to continue work in all the strands mentioned above, major future strategic goals include the integration of basic consciousness-science work with clinical applications – thus extending its impact – and the exploitation of work on olfaction for artificial chemical sensors.

The Department exploited many commonalities and existing collaborations by bringing together the Foundations and the Software Systems groups, which figured in the RAE2008 submission, to form the FoSS group in 2009. The group provides an environment geared to promoting a holistic view of the development of computer-science theory and its application to computer systems. Significant fundamental research [SRG1, as evidenced by, for example, invited talks at major international conferences] includes the successful use of separation logics to develop a new tool for programme verification (Crowfoot) and, with KCL, the creation of a significant new field: the specification and verification of meta-programming and domain-specific languages. In collaboration with Imperial and QMUL, the group has solved the long-standing open problem of providing axiomatic semantics to general typed process calculi. The group has applied the theoretical foundations of provenance to the construction of a language and associated runtime for describing the provenance of data in pervasive computing systems, and provided a fundamental analysis of how trust can be used in the construction and operation of network systems [SRG1, SRG2]. Other interdisciplinary applied work [SRG2, SRG3] included the data-mining of social networks, searching for patterns that can provide corroborating evidence for authentication. The group continues to focus on the development and application of theory to pervasive computing, including work with a range of industrial collaborators [SRG2] and this will be a major strategic direction beyond the REF period.

The Interactive Systems group has three main interdisciplinary research themes: 1) technology-enhanced learning (TEL); 2) graphics, music and media technology; and 3) digital-economy (DE) services, all of which encompass SRGs1, 2 and 3. The TEL theme has grown over the course of the REF period, with research *foci* including games and video-based techniques, and technology support for disabilities. This has led to new collaborations with partners from academia and external agencies producing novel outcomes, including a new methodology for conducting participatory design with children with autism. The graphics, music and media-technology theme has built on existing strengths in the group including digital heritage, real-time graphical simulations and virtual environments, and mobile and gaming technologies. Achievements in these areas include new interactive technology at the V&A and other major international museums. Expansion into new areas, often in collaboration with industry [SRG2] – thereby increasing impact – includes motion sensing for the creative industries, which led to the development of the only game-based motion-capture suit on the market (with Animazoo UK). The DE services theme includes research

on payment systems in virtual communities, and mobile technologies (which led to successful mobile DE apps with American Express). Developing the strands outlined above, the future strategic direction for the group is centred on human creative, educational and living technologies. Major themes, which best exploit existing internal and external collaborations, will include DE research related to health and wealth creation, including ambient sensing technologies; research on interactive video-based learning; and mobile, sensor-based technologies to support disabilities.

3. PEOPLE

Staffing strategy and staff development

The Department's staffing strategy is based around appointments to the research groups described above, in order to both build on and complement existing strengths and to maintain a critical mass of researchers around our main themes. Appointments that expand collaboration within and outside the Department are encouraged. During the REF period, five faculty were permanently appointed to the Department (spread across the four groups); a technical support post was filled and numerous fixed-term appointments were made to each group. In early 2014, two additional permanent faculty members will take up posts (one in EASY, one in CALPS).

Staff development occurs at a formal departmental level and in a more informal way within the research groups. Each staff member has an annual appraisal with their line manger which is used to help to identify research goals and strategies aimed at career development. Goals and targets are set appropriately to reflect an individual's position on the career trajectory, with an overall aim of achieving and maintaining research of significant international influence. The University's Staff Development Unit supports this activity and provides a comprehensive programme of courses and activities for enhancing research and professional skills which are fully compliant with The Concordat to Support the Development of Researchers. The University's Research and Enterprise Division also runs regular training courses on research-related topics, which are often led by external specialists. Early career researchers are supported by these mechanisms as well as by guidance from colleagues in their research group, including having a senior member of staff as a mentor. All new permanent staff also have reduced teaching loads, no substantive administrative roles, and research equipment set-up funds. Further, the management of funded research projects and PhD students is factored into the Department's teaching and administration load-balancing mechanisms. As careers develop, targeted support from experienced senior colleagues is used to help individuals to attain the next level, as defined by promotion procedures. At the most senior levels, staff continue to be supported by special training opportunities provided by the University. Staff development at all levels is greatly enhanced by a strongly supportive and collaborative culture within the research groups, enabling the exchange of ideas and best practice. This culture allows privileged access to research resources, as well as the extensive national and international networks of senior colleagues [see Section 5]. The success of this approach is evidenced by the fact that more than 95% of staff have co-authored research outputs with others in the UoA.

The Department runs a rigorous internal review system for all external grant applications. An important consequence of this is that less-experienced staff rapidly develop grant-writing skills under the guidance of senior colleagues. An annual Department research away-day enhances the research environment and provides support to staff in their research through targeted activities. The Department's strategic research development fund has successfully leveraged new collaborations leading to substantial new research-grant income (e.g. EPSRC EP/H024638/1, EP/I031758/1). About six awards are made *per annum*, with preferential treatment given to junior colleagues and proposals that fulfil certain strategic goals such as enhancing collaboration. Members of the Department have also benefited from University-wide initiatives aimed at research pump-priming. In addition, the Department has a conference travel fund and awards discretionary periods of sabbatical leave to faculty to help them to develop their research and to enable new collaborations and grant proposals. Evidence of the success of our approach to career development can be seen in the career paths of staff who were entered as early-career researchers in RAE2008 (Chalmers, Philippides, Seth). All have had multiple external grant successes during the REF period and all have been promoted (the first two to Senior Lecturer, the latter to Reader, then Professor). Since 2008, in total there have been five promotions to Senior Lecturer, one to Senior RF, three to Reader, and three to Professor.

Applications for personal research fellowships are actively supported as part of our staff

development strategy as an excellent means of developing research potential. During the REF period, Seth was awarded a prestigious EPSRC Leadership Fellowship (2008–2013), Tate a health-sector-funded Personal Senior Fellowship (2013–14) through the Clinical Practice Research Datalink, and Barrett an EPSRC Fellowship (2013–16). These awards have allowed outstanding advances in their recipient's research, and have helped to develop their leadership skills.

The Department's strong international reputation is reflected in the volume of international movement of staff (incoming and outgoing) and the high number of visiting scholars from overseas, all of which enrich the research environment and build lasting international collaborations. During the REF period, three faculty appointments were from other EU countries, four members of faculty left for professorial appointments overseas, and large numbers of fixed-term Research Fellows have come from abroad (>15 countries, including from the EU, Asia and the USA) and/or moved on to post overseas (>15 countries). At any one time, the Department typically has 25 visiting scholars; more than 120 visitors came from all over the globe (28 countries) during the REF period.

The University procedures for advertising and appointing to posts have equality built in, as do the promotion and staff-development procedures. The Department also advertises and promotes relevant national initiatives and events to female researchers, such as the Microsoft Women's Leadership Open Day and the BCSWomen Lovelace Colloquium. During the REF period, the Department mentored Katy Howland in successfully applying for a Google Europe Anita Borg Scholarship (awarded in recognition of academic achievement and leadership potential). Sussex is a member of the Athena SWAN Charter for the advancement and promotion of the careers of women in STEM subjects; during the REF period, three faculty appointments in the UoA were to women. The Department implements the University's supportive policy on flexible working.

Research students

The UoA offers PhDs in Informatics and Cognitive Science. The aims of the doctoral programme are: (i) to provide students with the full breadth and depth of knowledge and skills required to be independent researchers; (ii) to prepare students for careers in academia or the commercial and public sectors. The Department typically attracts three EPSRC and MRC quota studentships annually, as well as awards through its membership of the Sussex Neuroscience initiative, which has £2M of funding for students. It also typically offers four to six of its own scholarships per year, some supported by matched funding from external partners. The primary channel for applications is driven by prospective students' interest in particular specialisms. Studentships are advertised widely, nationally and internationally. The Department also holds CASE awards and studentships allied to research grants. The UoA typically has 75 PhD students at any one time, with each permanent member of staff supervising approximately 3 students. Doctoral students are supported by a Director of Doctoral Studies and an administrator, as well as by the campus-wide Doctoral School which provides a wide range of tailored academic and professional training opportunities.

Research training of doctoral students occurs at three main levels: (1) Specific training related to students' research areas is conducted within each research group, drawing upon the on-going research activity of faculty and intensively supported by research fellows and experienced fellow students. (2) Participation in the Doctoral School's provision of transferable and professional skills training, based on individual assessments, is expected of all candidates. (3) The Department runs its own two-term research-training module for first-years which focuses on skills at a level designed specifically to bridge the gap between the necessary specificity of (1) and the generality of (2).

The primary communities for research students are their respective research groups, with frequent and timely support from supervisors, postdocs and peers. Notwithstanding this, the interdisciplinary nature of Informatics research demands and facilitates wider collegial interchanges within the Department and across campus. For example, the UoA has joint studentships with six other Departments, including the Medical School and Development Studies. Multiple regular research-seminar series draw students from across the Department, providing them with opportunities to network with senior figures in their fields, with speakers often coming from overseas. The students hold their own self-organised Department-wide weekly forum and social, and benefit from national and international networks, to which the groups belong, through the hosting of visiting researchers and regular student visits to external groups. Students receive funding to present papers at leading conferences. More than 95% of our students have refereed publications by the time they graduate.

The Department actively promotes an ethos of submission within 3-3.5 years. Students have at least one formal supervision meeting per month (usually many more), which the student minutes. All students have at least two supervisors, each with relevant expertise. In the 1st year, supervisors conduct a 6-month interim appraisal, and each year a formal annual review is held, which includes a substantial report and a *viva*-style interview. The University's Student Life Centre provides co-ordinated access to the full range of special-study, personal and financial support services.

4. INCOME, INFRASTRUCTURE AND FACILITIES

Each research group has dedicated research spaces and facilities. CALPS has two computing labs, a fully configurable interactivity lab and an empirical cognitive science lab (for eye movement, verbal and motion protocol capture). EASY has three large general computing labs with specialist hardware and software (including space for the two research centres they run – CCNR and SCCS – see Section 5 Paragraph 3), two labs with specialist robotics equipment, and general labs for psycho-physics experiments. EASY makes extensive use of (and partly funds) neurophysiological facilities in Life Sciences, the University's fMRI facilities, and EEG facilities in Psychology. FoSS has a group of flexible computing and network labs and Interactive Systems has three dedicated lab spaces with specialist facilities for computer graphics, virtual and augmented reality, motion capture, interactive-learning environments, user-centred design, music technology, and a film studio. All groups make heavy use of the University's HPC cluster, for which the Department has priority access, and in which EASY and CALPS have invested in their own (~200) nodes.

Since 2008, the Department has made substantial investments in research infrastructure. At the time of RAE2008 the Department was spread out in pockets over several widely separated buildings. Significant building and refurbishment work has been undertaken so that the research labs and offices of all four research groups are housed in the same building. All the EASY labs and offices were brought into one coherent geographical area in 2011 at a cost of £450k, including the creation of new labs for the expanded effort in consciousness science and computational neuroscience. CALPS, FoSS and Interactive Systems labs were also moved and refurbished at a cost of £200k. A major overhaul of the remainder of the main building now housing the Department is planned for late 2013. This will include rewiring, redesigning the layout and the complete refurbishment of many of our research facilities, at a cost of £2.5M. The Department invests more than £200k per year in supporting and renewing research-computing infrastructure, including substantial investment in HPC facilities (in addition to £2.4M invested by the University in HPC).

The table below shows the total award values (funder contributions) of the Department's research grants active during the REF period. Where a grant is joint with another Department, only the UoA share is given. Doctoral training awards are not included. The last column shows which research groups received awards from a particular funder (C, E, F and I refer to the four groups defined in Section 1), demonstrating that both the Department overall and each group individually have a healthy level of funding from diverse sources, covering both fundamental and applied research – the results of a deliberate strategy to enable sustainable funding through diversity. Charities include Wellcome and Leverhulme; 'Philanthropy' indicates donations from private individuals and foundations. Significant industrial funding has come from 15 companies including American Express, Animazoo, Caasbar, Cute Media, Durrants, Ordnance Survey, Red Redemption and Vero Software. The Sackler Foundation has contributed very significant philanthropic donations to fund research in consciousness science in the EASY group. 'Other' includes RCUK, the Royal Society and the NHS. Research-income levels have remained fairly even year on year and recent substantial grants (including some to start in 2014) will allow this funding pattern to continue beyond the REF period. Each group develops three-year grant application plans in order to maintain funding from the variety of sources shown in the table, and also develops new ones (e.g. industrial sponsors). As well as larger industrially-funded projects, members of the Department, from across all research groups, have performed 40 consultancies during the REF period for a wide range of industrial users, resulting in significantly increased impact for the UoA's research. Examples include Weir consulting several times for Promethian Labs and the Gorkana Group on natural language-processing technology, Chalmers consulting on protocol design for Bubblephone, Wakeman advising Waukesha Bearings on the security of computer control systems, Nowotny consulting for Cambridge Electronic Devices on dynamic clamp technology, Philippides advising Cancer Research UK on image processing and White consulting for the V&A Museum and

Funder	Total awarded	#	Groups
EPSRC	£5,650,552	22	C, E, F, I
BBSRC	£1,013,596	5	E
AHRC	£733,541	3	E, I
ESRC	£488,159	4	I, C
MRC	£45,221	1	C
EU	£1,562,649	10	E, I
TSB	£1,025,569	5	C, E, I
Charities	£615,280	4	C, E, I
Industry	£403,987	18	C, E, F, I
Philanthropy	£916,250	4	E, C
Other	£742,141	19	C, E, F, I
Total	£13,096,945	94	

Immersive Displays Ltd on virtual exhibitions and for LovethatStuff on e-tailing systems.

In addition, impact was spread by a number of spin-out companies active during the REF period. Carroll is a co-founder and co-director of iLexIR Ltd, a spin-out company between the Universities of Sussex and Cambridge specialising in language-processing technology [see Ref3b]. Vertical Slice, a successful software-usability service, was started by Interactive-Systems member Graham McAllister in 2008, who went on to found Player Research in 2012. Creative Robotics Ltd was founded by Bill Bigge (EASY) in 2012 and continues to flourish.

5. COLLABORATION OR CONTRIBUTION TO THE DISCIPLINE OR RESEARCH BASE

The Department's research strategy strongly supports interdisciplinary and collaborative work resulting in numerous partnerships at local, national and international levels. Within the department there are significant inter-group collaborations (PhD co-supervision, joint projects and papers).

CALPS: The CALPS group's strategy to engage in interdisciplinary work with applications in other disciplines has led to substantive collaborations with other units at Sussex (Brighton and Sussex Medical School (BSMS), Psychology, Geography) and external partners. Highlights include: collaboration with BSMS, UCL and CPRD on the Wellcome Trust-funded interdisciplinary research project on electronic patient records, 2009–12; partnership in the UK-wide centre for e-health research, 2012–17, funded through the MRC; and Weir's work with social scientists at the Demos think-tank on sentiment analysis of attitudes towards the EU (2012–13). Collaborations on fundamental research include Weir's EPSRC-funded research with Cambridge, Edinburgh, Oxford, York on semantics, 2012–2015, and substantive collaborations with 20 other universities, including Tubingen, Oslo, Tokyo and UCSD. >20 collaborations with industry have resulted from a strategy to increase applied work. These include TSB-funded projects with Linguamatics Ltd and Brandwatch Ltd in the area of language-processing technologies; and the TSB-funded TrialViz project on online tools for Randomised Clinical Trials with CPRD, Dataline Ltd and GSKW.

EASY: The EASY group's strategy to focus on interdisciplinary research at the interfaces of the life sciences has led to it running three thriving interdisciplinary cross-campus research centres: the long-established Centre of Computational Neuroscience and Robotics (CCNR) run jointly with Life Sciences; the Centre for Research in Cognitive Science; and the Sackler Centre for Consciousness Sciences (SCCS). The establishment of the SCCS in 2009, with over £1.5M from The Sackler Foundation, was a major new multidisciplinary collaboration (Informatics, Psychology, BSMS) which seeks to connect fundamental work in computational neuroscience to experimental medicine. EASY's many interdisciplinary research collaborations with external partners include: Nowotny's BBSRC-funded work with INRA Versailles and LORIA Nancy on the olfactory system (2008–11); Husbands' EU FET-ICT-funded collaborations with QMUL, EPFL, Paris VI and six other universities on evolvable neural systems (2008–16); Berthouze's collaborations with UCL Institute of Neurology on neuronal dynamics. Other substantive interdisciplinary collaborations have involved researchers at >40 overseas universities (including Amsterdam, Skovde, UCSD, Zurich) and >20 UK institutions. A strategy to increase collaborations with industry has resulted in work with Vero Software on optimisation and a TSB-funded KTP (with Psychology and Interactive Systems) with Leatherhead Food Research on the effects of food and drink on cognitive performance.

FoSS: Driven by a strategy to pursue interdisciplinary work with applications in society, the FoSS group had EPSRC-funded collaborations with colleagues in KCL (Management) and Sheffield Hallam (Sociology) on how trust is engendered in markets and can influence the design of pervasive computing applications, and continued collaborations with Interactive Systems and the Sociology Department at Sussex in the large EPSRC-funded 'Shyness' project on how pervasive

computing technologies impact on feelings of shyness within social settings. Other funded projects in the UbiComp area involved collaborations with many UK institutions, including Bath, Cambridge, Oxford, Imperial and UCL. Extensive collaborations on fundamental research with 20+ other universities include Reus's work with ITU Copenhagen, Oxford, QMUL and INRIA Paris on programme logics for higher-order store, and Berger's close collaborations with KCL, Imperial and QMUL on programme logics. The group have multiple strategic industrial collaborations [Sect 4].

Interactive Systems: The strategy of the Interactive Systems group to engage in inter-disciplinary research with applications in science, industry and society has resulted in more than 50 significant collaborations, including: Good's creation of an online simulation demonstrating issues in African farming, funded by the government (DIFD) in collaboration with the Institute for Development Studies; Good's ESRC/EPSRC-funded collaboration with six UK partners on learning environments; White's AHRC-funded collaborations with UCL and Poznan University on digital heritage; Bellof's EU FP7-funded interdisciplinary work (with CALPS) on the TRANSFoRm project on advanced healthcare data systems in collaboration with 22 partners; and Beloff's NASA-funded collaborations with space scientists on data visualisation with Berkeley, Calgary and UCLA. The group also have funded collaborations with BSMS, Psychology, Sociology, Media and Music. Many substantial collaborations with industry include work with CASBAR on remote computing, TSB-funded work with Animazoo on motion capture, and a TSB-funded project with American Express on the digital economy.

The Department also has a thriving artist-in-residence scheme and has been involved in numerous outreach, media and public-understanding events, including a notable EASY exhibition on insect navigation at the Royal Society Summer Exhibition 2010, which was seen by more than 50,000 people.

As well as all the industrial collaborations mentioned above, other examples of collaborations where users have informed research activity include: Wakeman and Chalmer's EPSRC-funded collaboration with stadium designers Corridor and Brighton and Hove Albion FC on wireless Internet connectivity in the challenging environment of a stadium; White's collaborations with various museums, including the British Museum and the V&A, which have strongly influenced his AHRC-funded research on digital heritage [see Ref3b]; and Seth's open-source Granger causality software package that has been downloaded >4000 times and is in widespread use internationally.

There were numerous instances of leadership in the wider community from the Department during the REF period. For instance, Boden was a member of the EU Advisory group on Creativity and IT, Cheng was elected Chair of the Cognitive Science Society 2009–11, and Carroll is Secretary of the Association for Computational Linguistics, SIGPARSE, 2008–present.

Members of the Department have chaired 16 international conferences or workshops during the REF period (as well as >15 national workshops), including Reus chair of Domains IX; Seth chair of ASSC16 2012; Wakeman Program Chair for IFIPTM 2011. Members of the Department have given 71 invited keynotes at international conferences and workshops since 2008, including Boden, who gave the 5th Turing Memorial Lecture, Bletchley Park, 2008; Berger at PEPM 2012; Carroll at 11th Int Conf on Parsing Technologies, 2009; Mackie at GALOP VI, 2011. There were 11 journal editor-ships or associate editorships, including: Seth Editor-in-Chief of *Frontiers in Consciousness Research;* Husbands Assoc Editor of *Artificial Intelligence;* 42 memberships of journal editorial boards. There were >240 memberships of organising or programme committees for international conferences and workshops, including Nowotny as a member of the CNS scientific organising committee 2010–13; Weir as Program Committee Area Chair for Syntax and Parsing, ACL 2008; and Good as Workshop and Tutorial Chair VL/HCC 2009. Members of the Department have been involved in numerous invited talks at and visits to universities overseas and in the UK; for example, Nowotny was a Distinguished Visiting Scientist at CSIRO, Canberra in 2012. Department members were external examiners to 72 PhDs at 46 different universities, including 28 at overseas universities.

International awards to members of the UoA included The International Association for Computing and Philosophy's 2013 Covey Award for Outstanding Contribution – Boden; Machine Vision Applications conference's Most Influential Paper of the Decade Award – Berthouze, 2013; and the inaugural Mathematics of Language S.-Y. Kuroda Prize for lasting advances in mathematical linguistics – Weir, 2013.