Institution: Queen Margaret University
Unit of Assessment: UoA 28 Modern Languages and Linguistics

a. Overview

The **Clinical Audiology, Speech and Language Research Centre (CASL)** is the main organisational hub for this unit of assessment under the directorship of Prof SCOBBIE. CASL was launched in 2011 as an expansion of the pre-existing Speech Science Research Centre, which was directed by Professor William Hardcastle until his retirement in 2009. Research Centre status is awarded by QMU on the basis of demonstrated and focused research excellence which helps channel resources to an internally and externally identifiable unit. The centre is closely associated with the Division of Speech and Hearing Sciences, a multidisciplinary grouping of speech scientists, linguists, speech and language therapists, audiologists and psychologists, which falls into two subject areas: (a) linguistics, phonetics and speech and language therapy, and (b) audiological science and rehabilitation. It is the first of these which features most prominently in this submission, for though CASL has a broader scope than its predecessor it retains an emphasis on niche excellence in articulatory phonetics and in the clinical applications of speech science. Collaborative research has also been supported in social and genetic factors in language deficits, in prosody in normal and disordered speech, and in bilingualism and other areas.

Externally-funded and established members of staff, PhD students, and visitors are physically located either in our laboratories or in a contiguous area of staff accommodation. The CASL team, working together with colleagues from other divisions at QMU (mostly psychology and health sciences), are the major components of QMU's research theme of **Speech & Communication** (led by SCOBBIE).

b. Research Strategy

In pursuit of research excellence our overall guiding principle is that **research should lead to greater understanding of issues relevant to clinical need.** To that end, we aim to blend and balance basic/normative and applied/clinical research. We pursue a range of theoretical linguistics research: in one dimension there is a focus on the fields of **phonetics and phonology**; cross-cutting this is a focus on **individual variation**, particularly in **acquisition** and **social variation**. These theoretical interests are partnered by work aiming for **methodological innovations** prompted by technological advances and new theoretical questions. Our most identifiable long-term niche is in **the development and innovative application of speech science technologies**.

We aim to enhance research in these fields through international leadership as follows:

- Our **methodological** research in this niche focuses on the development of new and enhanced instrumentation, analytic techniques and experimental methods for the collection, measurement and analysis of speech articulation, speech sounds, and the vocal-tract.
- Our **theoretical** research is broader and covers not just speech production processes and linguistic phonetic theory but also areas of speech disorder, child language acquisition, sociolinguistics, individual variation, psycholinguistics, and phonology.
- Our **applied** research focuses on the diagnosis, treatment and modelling of speech, language and hearing disorders, with particular interests around the effective use of visual biofeedback in therapy and the role of genetic, social and educational factors in linguistic deficits.

Our goals are to bring together talented and enthusiastic researchers in an environment where they can benefit from and add to our niche expertise and to grow and support research in complementary areas where opportunities, enthusiasm, collaborations, expertise, professional relevance and chances of impact suggest a potential for success. Our key research strategies and associated operational approaches are:

1. ***To continue to develop, enhance and disseminate methodological expertise in articulatory phonetics and to build and lead a growing community of researchers in articulatory phonetics, throughout the UK and internationally.***

Our goal is to make articulatory analysis techniques easy to use and widely available. Such research has generally been the preserve of a small number of highly-specialised laboratories, at high expense, with dedicated technical support staff, and often using bespoke software in MATLAB

or similar software environments. Expertise has resided in one institution or, worse, project. Our strategy is based on the success of PRAAT acoustic analysis software. We enabled the creation of and helped develop a single, commercially-supported software solution (Articulate Assistant Advanced) for articulatory data analysis that is able to support EPG, EMA, UTI, MRI, video, acoustic or other physical waveforms. We want staff in humanities and social sciences contexts to be able to collect and use articulatory data alongside a large community of similar users.

2. To exploit methodological expertise to address fundamental theoretical issues.
Our strategy is to exploit articulatory instrumentation to examine topics in which acoustic or impressionistic analysis of speech sounds may be insufficient. In this way, we can both develop new methods, and broaden theoretical understanding.

Instrumental phonetic analysis of articulation enables a researcher to examine one or many elements of the speech production process, either independent of, or in synchrony with, the audible vocalisations produced by a speaker. This ability to phonetically analyse silence, or masked articulations, opens up theoretical avenues that we can explore in a variety of ways. Our research has highlighted important phenomena such as **covert contrast**, **inaudible disfluencies**, hidden articulations and **gestural intrusions** in disordered speech, subtle **sociolinguistic variation in tongue shape**, the interpretation of real time **visual biofeedback**, **mimicry** of socially-stratified articulatory variants, the role of **secondary articulations** and **masked gestures** in **linguistic systems** and **sound change**, silent aspects of connected speech and **turn taking**, silent **pre-speech preparation, partial resyllabification** in external sandhi, **vocalisations** of consonants, the development of **coarticulation**, and **vocal settings**. We can also characterise the phonological and phonetic systems of different **languages** from a new perspective.

3. To develop new areas to broaden our portfolio of research.
Other areas of importance which feature in the REF outputs include a number of studies exploring **social** vs. **genetic** factors in linguistic deficits, the acoustic analysis of speech segments and **prosody**, and **methodologies** for capturing **naturalistic, varied speech samples**. We aim to develop new areas, to bring on new researchers and to incorporate impactful activity, knowledge exchange, applied research and descriptive replications into our **portfolio of research and research related activity**. For example, we are expanding some new areas through PhD bursaries (e.g. communication needs in disadvantaged children) and MSc dissertation projects (e.g. phonation / prosody interaction). (See also para 6 and section c.II.) In addition, we explore a range of clinical populations and topics in speech, hearing and language.

4. To strengthen interdisciplinary links within QMU.
We have continued to develop links between CASL projects and others at QMU (especially in rehabilitation sciences and psychology) to capitalise on potential synergies, especially in relation to methodologies, theoretical developments or routes to impact.

5. To introduce a masters-level capacity in research.
Previously, we had only undergraduate and doctoral programmes. Three M-level programmes were introduced during the period and M-level student research is steadily increasing (section c.II).

6. To re-launch the research centre to give a broader remit, and appoint an advisory board.
CASL was launched in 2011 with a broader remit encompassing audiology, language and other aspects of communication. The advisory board has business, educational and healthcare backgrounds, which help shape our routes to impact as well as applied research and KE.

7. To increase quality (rather than quantity) of outputs and grant applications.
20 staff (15.6FTE) submitted to the Linguistics UoA in RAE 2008, reflecting a policy of maximising inclusion. In REF, we report 13 staff (10.7FTE, 8f, 5m), returning 38 outputs (1 double-weighted). Four are Research Fellows who are intellectual leads of their own externally-funded projects. We have also introduced more rigorous internal peer review before grant applications are submitted.

8. Encourage more PhD students to come to QMU.

We continue to enhance our profile and attract interest from potential students (section c.II).

9. The future: establishing CASL as an international leader within our niche area(s).

Actions to support our goal of a leadership role include a successful joint bid to host the key conference in our field, ICPhS2015 (http://www.icphs2015.info/). This will promote the external profile of phonetics in Scotland for a generation, cementing the firm research relationships we have built with the other universities involved, particularly Glasgow and Edinburgh. We have also independently organised and hosted niche conferences such as the EPG Symposium (2008) or Ultrafest 6 (2013), bringing together key players. Such events help us shape the research agenda and to demonstrate our coherent approach to topics, technical prowess and theoretical breadth.

We provide training and support internationally and have been able to host around a dozen visits by PhD students and funded post-doctoral fellows (Leverhulme, British Academy) during the census period. We have run pilot studies and hosted visits from individuals interested in starting up or improving their laboratories, and given trouble-shooting sessions with external /overseas AAA users via real-time desktop sharing. Our own PhD students benefit from such visits not just from networking, but from assisting practically. We help our post doctoral students and current doctoral students to visit other institutions too, to participate in external seminar groups (especially at Edinburgh University), and to publish. We host advanced students from other UK institutions (e.g. York, in Dec 2013), preparing them as future leaders in articulatory research. (See also c.II.)

The key to our **future** strategy for research excellence is to expand in size, enhance our quality, and enable wider uptake of advances in methodologies. We will focus internally on the intersection of **speech planning and production** with **individual and social variation** in sound systems. We intend to continue to secure external funding from a range of sources to support both research and impact, but a key focus in 2013-14 is preparation of a bid for an **ESRC Research Centre** in the 2014 competition (2015-2020). QMU is supporting this through additional staff resource. Even if unsuccessful, the process of application will result in an extensive, strategically coherent, and well planned set of research plans. In addition, we have applications for external support under review at various stages with the EU (Marie Curie post-doctoral and COST network), BA & ESRC.

c. People, including:

I. Staffing strategy and staff development

In spite of challenges imposed by the demands of vocational programme delivery, a strategic approach to staff development has aimed to sustain high levels of research activity and quality. Professional body accreditation requirements include time-consuming clinical skills teaching and assessment as well as extended periods of teaching (51-week registration for PG programmes). Many clinically-qualified staff are both part-time and have significant professional commitments, and it is difficult to operate a sabbatical system to support research where staff have clinical specialisms which are essential curriculum components. Management enhances research activity by balancing teaching and administrative activity: it relies on an annual Performance Enhancement Review, backed up by short-term workload adjustments to support staff research activity and conference attendance. We encourage internal collaboration between staff, students, and externally-funded researchers, supported by mentorship and seminars.

The subject area which feeds into this UoA had 12 established staff members (8.3FTE) during most of the census period, with a 1.0FTE member joining in October 2013 (see below). In addition, we currently employ 9 contract researchers (5.5FTE). A number of staff within both groups are primarily focused on clinical and knowledge exchange activities rather than research. Research leadership is primarily provided by 1 professor and 3 readers. All have been promoted to these roles through peer review (the most recent being WOOD, to reader in 2012). In addition, we secured internal strategic funding to offer WRENCH a 0.2FTE professorial role for an initial period of 12 months to benefit from his research leadership and international profile in planning future strategy (e.g. the bid for an ESRC Centre). This is also formal recognition of his level of expertise and his ongoing contribution to QMU as an external researcher. A statistician (RUSH), located within QMU's School of Health Sciences, is also closely associated with the group and provides essential input to research planning and analysis. Practical short-term support for researchers from

QMU has included bridging funds and grant extension for staff on externally-funded fixed-term contracts, support for maternity leave, and ring-fencing of internal job advertisements for staff at risk of redundancy due to fixed-term contracts. Specific examples include: QMU guaranteeing support at 0.4FTE for 3 years for CLELAND's application to the ESRC's future research leader scheme (submitted October 2013, cf. REF3a); QMU offering a temporary 6 month job-share between a reader and a researcher while the latter was awaiting further external funding (2011); securing a permanent increase from a 1.0FTE lectureship to a 1.4FTE lectureship(s) on a 0.8/0.6 job share by an existing lecturer and their spouse who had reached the end of external funding (2011). Most recently (2013), we secured a new permanent full time specialist clinical lecturer with the explicit intention that this appointment would reduce teaching load for research-active staff. CASL staff gave ~150 conference presentations in the census period. The broader research theme of Speech and Communication produced 135 publications archived on the QMU eResearch repository. Both dissemination types enhance our research capacity and the visibility of staff.

These examples of QMU's flexible and imaginative support for externally-funded researchers, leading in some cases to permanent posts at QMU, demonstrate why, in 2010, QMU was one of the first UK HEIs to be recognised for achieving HR excellence in research under the Concordat to Support the Career Development of Researchers. In 2012, we were one of just 10 universities in the UK to have our 2-year reviews and future plans approved. QMU also endorses the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers. We also have a strong commitment to equality and diversity, social responsibility, inclusion and participation in all elements of staff planning, including research and REF implementation. We received a Bronze Athena SWAN Award in 2013 for our commitment to assisting the recruitment and retention of women in science. We have embedded excellence in relation to the Fixed Term Employees (Prevention of Less Favourable Treatment) Regulations (2002) and Joint Negotiating Committee for Higher Education Staff (JNCHES) guidance on the use of fixed-term contracts. Contract researchers are encouraged to gain institutional experience, meaningful teaching and supervisory experience and media and staff management training. For example, contract researchers from the group sit on the Research Strategy Committee and regularly contribute to review and strategic planning processes within the institution (e.g. Enhancement Led Institutional Review and a recent University Sustainability Project).

c. II. Research students

QMU has invested internal funds in a number of **PhD bursaries** as a strategic response to the low numbers of PhD students, as noted in RAE 2008. We currently have 5 bursary recipients (a **re-investment** of approximately £225k from **RAE 2008 income**) in the following areas:

- High functioning, late diagnosed dyslexia;
- Specific language impairment and social disadvantage;
- Articulatory intervention in children with cleft palate and speech sound disorder;
- Stammering in conversation and the fluent speech of people who stammer;
- Reaction time from an articulatory perspective.

In addition, 3 of the 5 reported PhD graduates 2008-2013 were bursary students. Additional studentships have been provided by a Marie Curie scheme, the Down's Syndrome Association, and Oticon (an Audiology company). Bursaries include an element of training/experience in teaching for career development and are crucial to attracting students to QMU.

In addition to the 5 PhD graduates from Speech and Hearing Sciences, **staff supervised 4 PhD students registered at Edinburgh University,** who completed in the census period, and currently supervise 1 other external and 9 QM-registered students. Moreover, **2 other QMU PhD students submitted before the end of 2013** and are awaiting examination (1 a bursary student, one self-funded). Note also the PhD completion by CLELAND (2010), who was QMU's first **PhD by publication** (not included in the quantified figures). Like many of our graduates, she has obtained postdoctoral funding for her research; others have pursued a clinical career. Like ZHARKOVA, she is returned to REF as she is now an independent post-doctoral researcher. We believe our small cohort of PhD graduates have a relatively bigger impact in the field than normal and note the effort and resources that are put into this aspect of our research culture. A significant number of our PhD graduates publish, get post-doctoral fellowship funding, become grant-holders on research grants,

and get positions as lecturers. The profile of students and graduates during the census period is fully **international**, representing Finland, Germany, Saudi Arabia, Slovenia, Canada and the UK.

Before the census period, we had no Masters programmes. Introduction of such programmes had three strategic purposes: to help bridge the gap between vocational student programmes and our small PhD programme; to generate fee income; and to support staff research activity, especially in newly-emerging areas. In 2010, we introduced pre-registration MSc/PGDip programmes in Speech and Language Therapy and in Audiology, followed in 2011 by a post-registration MSc aimed at qualified clinicians. The first cohorts of students completed pre-registration PGDip programmes in September 2012. Four students continued to complete the research dissertation (not a requirement for professional registration) in 2013 and a further 16 students are currently undertaking Masters research projects. Ten further students plan to take the research dissertation module after a period of deferral. QMU is almost unique in the UK in offering pre-registration programmes which can lead, via a truly research-based thesis, to an MSc. We expect, in time, that some of these MSc graduates will return to study for PhD, either here or elsewhere. One PGDip graduate went straight to PhD at QMU and one is employed as a part-time Research Assistant here.

Experienced staff in the institution, and from this UoA, contribute to the institutional **doctoral training programme** and the probationary viva/proposal to enable progress past Year 1. Within CASL, specialist training is typically in small groups or 1-to-1. It can draw on our own reviews and overviews: for example the five overviews published 2008-2013 in handbooks of **phonetic theory**, **sociophonetics**, **laboratory phonology** and **vowel disorders**. These works are regularly cited, suggesting a more global contribution to advanced level education (cf. also section e).

Three students have co-chaired the QMU Doctoral Students Association (Roxburgh, Fitzsimons, Heyde). Roxburgh is now a “researcher in residence” for schools science outreach. These and others have collaborated in conference organisation, reviewed for journals, presented research at other institutions and international conferences, published papers, collaborated with professional organisations over research, KE and impact, helped supervise undergraduate research and taught. Professional Doctorate students are also a relevant part of the mix: we supervise 3 professional doctorate students undertaking research in applied and professionally-relevant areas. In the census period, PhD student/alumni highlights include peer-reviewed papers by de Leuuw (4), Finlayson (1), Mackie (1), CLELAND and/or Timmins (12), Gordeeva (2), and ZHARKOVA (8).

d. Income, infrastructure and facilities

QMU allocates funding to **build and maintain infrastructure**, and **matches or supplements part-funded projects** from charitable and other bodies which do not meet full economic costing criteria. It also supports applications to externally fund research visitors (see formally funded fellowships, below) and houses visitors (from the UK, Brazil, Portugal, Spain, France, and Germany). In 2007-2008, QMU moved to a £105 million, 35 acre **new campus** in Musselburgh. Accommodation and technical infrastructure were provided for research projects, teaching, research training and clinical research. Investment in local infrastructure, including specialist equipment, has helped us to bid competitively for externally-funded research grants without needing to add the cost of equipment and infrastructure to each application. Infrastructure items 1-7 were purchased on this basis. Other items were purchased from externally-funded research grants. A new rolling 10 year capital renewal plan, implemented in 2012, ensures continuity.

Key elements of local research infrastructure, with dates of renewal or upgrade

1. Sound-treated recording studio, direct-to-disk data acoustic recordings (updated 2011)
2. Sound- treated recording studio with direct-to-disk data capture for acoustic + ultrasound (and other articulatory multichannel) recordings (updated 2010)
3. 100Mbps fast Ethernet & 1TB mirrored optical data storage(~2009), extended to 1.5TB (2013)
4. 6 large widescreen workstations for articulatory data analysis (2010)
5. 4 video-based ultrasound scanners and 1 high-speed ultrasonix sonixRP system (2005)
6. 2 ultrasound Headsets, externally-funded (updated and replaced at various times)
7. Approximately 20TB of portable and PC storage for storage-hungry ultrasound data
8. 10 software licenses for AAA data analysis (UTI, EPG, MRI, EMA modules)

9. Audiological research equipment including sound-proofed booths (updated/extended 2013)
10. Eva2 airflow system (2012)
11. 2 research EPG (multichannel AAA) + Clinical EPG system (running AA) (updated 2013)

Corpora as infrastructure. Archival and curation support is provided by QMU, at eDATA http://edata.qmu.ac.uk/ and elsewhere. Examples created during the census period include:

1. DoubleTalk – the world's first dual EMA corpus, of 6 conversational partners (ESPF project) http://eresearch.qmu.ac.uk/3219/ SCOBBIE et al (2013) at http://espf.ppls.ed.ac.uk/
2. MRI/UTI 12-speaker phonetician corpus (ULTRAX project) http://eresearch.qmu.ac.uk/2477/ CLELAND et al (2011)
3. Articulatory DEAP corpus of 60 children age 6-11 (ULTRAX project, on-going)
4. ECB08 (http://eresearch.qmu.ac.uk/2011/) and WCB11 (on-going) corpora (31 socially stratified adolescents), (from 2 SCOBBIE/ LAWSON ESRC projects) → various publications
5. Coarticulation-oriented dataset of 15 adults and 15 pre-adolescents (ZHARKOVA's ESRC project RES-000-22-4075) http://edata.qmu.ac.uk/14/ → various publications
6. Coarticulation-oriented dataset, of children aged 3-13 (ZHARKOVA's ESRC project ES/K002597/1, on-going) http://www.qmu.ac.uk/casl/ChildCoarticulation/home.htm

Internal funding and projects with income allocated to external collaborators. Benefits (in addition to QMU income, REF4) include infrastructure, networking and staff. Key examples are:

Project: funder, collaborators, funding, dates	**QMU role:** benefits to group
Voice, Stress and Personality QMU Multidisciplinary Research Fund. (£1000). 2009.	**QMU funding**: speech science & psychology collaboration.
High speed ultrasound SHEFC / SRIF-3 (Strategic Research Infrastructure) Grant. (£121,369). 2006-08.	**QMU funding**: high speed UTI, hardware and AAA UTI software.
EdSST (Edinburgh Speech Science and Technology) Marie Curie**.** Early Stage Research Training scheme. Main partner University of Edinburgh (UoE). 2006-10.	**PhD supervision**: 5 PhD bursaries, 1 at QMU, all joint supervised.
ULTRAX "Real-time tongue tracking for speech therapy using ultrasound". EPSRC Healthcare Partnership Co-P.I.s SCOBBIE and Renals (Held at UoE). (£586,154 total). 2011-14.	**Project**: UTI enhancement, impactful activity, new child speech corpora, new MRI collaboration, materials for Seeing Speech.
Seeing Speech: online Ultrasound Tongue Imaging resource for Phonetics, Linguistics, and Speech Therapy teaching. Carnegie Trust. Scottish consortium (Glasgow, QMU, Strathclyde, Edinburgh and Aberdeen). P.I. Stuart-Smith (Glasgow). (£38,682 total). 2011–13.	**Project**: Scotland wide collaboration, open access multi-media resource for teaching of phonetics. QMU labs collected UTI speech material and used ULTRAX MRI corpus material.
ESPF "Edinburgh Speech Production Facility". EPSRC EP/E016359/1 Co-P.I. SCOBBIE & Turk (Edinburgh). (£102,986 fEC to QMU, ~£600k fEC to UoE). 2007-10.	**Project**: Joint research facility, DoubleTalk corpus (cf. above), EMA module for AAA, discourse research.
British Academy Postdoctoral Fellowship. Dr **Patrycja Strycharczuk**. (£260,377 fEC) 2013-16.	**Project**: laboratory phonology & articulatory research.
British Academy Visiting Scholar Fellowship. Dr **Adam Baker**, Afghanistan. (£6,132). 2011.	**Mentoring**: biomechanical tongue model, MRI data.
Leverhulme Visiting Research Fellowship. Dr **Tony Buhr**. (~£25k). 2010–11.	**Mentoring**: disfluency, use of DoubleTalk corpus.
Irish Health Research Board. P.I. Prof **Fiona Gibbon**, UCC. HRA_POR/2012/68. (€291,420). 2012–15.	**Collaboration**: Clinical sociolinguistic project, networking.
British Academy Research Grant. P.I. Dr **Vesna Stojanovik**, Reading. (£123,665). 2011-14.	**Collaboration**: Down's / William's Syndromes, prosody networking.
NIDRR award. P.I. Prof **James Mahshie**, George Washington University, USA. (~ $600,000). 2012-2015.	**Collaboration**: Voice & prosody in children with cochlear implants.

e. Collaboration and contribution to the discipline or research base

We maintain and develop links with some key **institutions**, through joint **research projects** (see section d), joint **publication**, **visits** and **workshops**. Priority collaborators are:

1. Articulate Instruments Ltd. housed on campus
2. CSTR (Centre for Speech Technology Research), University of Edinburgh
3. Linguistics and English Language, University of Edinburgh
4. GIPSA-lab (Grenoble Images Parole Signal Automatique), Grenoble, France
5. IPS (Institute for Phonetic Sciences), Ludwig Maximilian University, Munich
6. GULP (Glasgow University Laboratory of Phonetics), Glasgow University
7. Education, Communication and Language Sciences, Newcastle University
8. Speech and Hearing Science, George Washington University, USA

We also develop networking through formal institutional involvement and projects. For example:

1. SCOBBIE sits on the board of the Scottish Graduate School of Social Sciences, which oversees the Scottish ESRC Doctoral Training Programme and other activities (2010-2013)
2. WOOD attends the Scottish AHP Research Forum
3. Seeing Speech project (a consortium of 5 Scottish universities, see above)
4. Collaborative Scottish group organising ICPhS 2015 (see above and below)

We contribute to the research community through **institutional actions**, **invited participation at and organisation of conferences**, seminars and departmental **talks**, doctoral **examination**, and through high-level **teaching and training**. For invited talks, SCOBBIE in particular but also BECK, WRENCH, LICKLEY and others present varied and collaborative work by a range of colleagues to represent key **CASL research projects**. Staff contribute in standard ways: peer-reviewing for conferences, journals, publishers and research grant awarding bodies; departmental seminars; reports on professorial appointments, tenure and promotion. Highlights include:

1) **Winning the bid** to host **ICPhS 2015**, as part of a Scottish consortium. This is the first time this conference will be in the UK for 40 years, with ~1,000 delegates, and a budget of ~ £325k.
2) Hosting international conferences (a,e) or running sessions at conferences (b-d).
   a) 5th International **EPG** Symposium, Edinburgh, 2008
   b) Symposium on **instrumental analysis of child speech**, IASCL, Edinburgh, 2008
   c) Special session on **clinical use of ultrasound**, ICPLA, Cork, 2012
   d) Special session on **voice analysis**, ICPLA, Cork, 2012
   e) Ultrafest VI with associated high-level **UTI workshops**, Edinburgh, 2013
3) Associate editorships: **Language and Speech** 2007-12, **Laboratory Phonology** 2010-13
4) Invited keynote talks (delivered personally by UoA staff, also for to items below)
   a) 3rd Intnl Conf on the Linguistics of Contemporary English. SOAS/UCL, London, July 2009
   b) 7th National Conference, AISV, Lecce, Italy, January 2011
   c) 14th Australasian Intnl Conf on Speech Science & Technology, Macquarie U, Dec 2012
   d) II Escola de Prosódia, Vittoria, Brazil, October 2012
5) Invited presentations at workshops / seminars (in addition to #2b-d) (* = not externally-funded)
   a) 2008, **Consonant Clusters** and Structural Complexity, Munich, Germany
   b) 2008, 4th International **EPG** Symposium, Edinburgh
   c) 2009, **UTI** 2nd EICEFALA conference, Belo Horizonte, Brazil
   d) 2009, **UTI** for **Pharyngeals and Pharyngealisation**, Newcastle
   e) 2010, Ceremonial lecture for opening of the **Ultrasound Laboratory**, Bozen/Bolzano, Italy
   f) 2010,* **Articulation & Discourse** special session at ASA Meeting, Cancun, Mexico
   g) 2012, Workshop, **psycholinguistics** in **phonological development**, Leiden, Netherlands.
   h) 2012, ASHA workshop on **Vocal Profile Analysis**, George Washington University
6) Other invited & funded international departmental talks in: 2008 **Norway**; 2009 **Brazil**; 2010 **Germany, Japan**; 2011 **France**; 2012 **Australia**; 2013 **Germany**
7) PhD exams for: **Newcastle** (3); **York** (2); **UCL** (3); **Edinburgh**; **Glasgow**; **Aix-en-Provence**
8) Doctoral or high-level training (in ultrasound tongue imaging unless indicated otherwise)
   a) 2009 and 2010, Multi-day courses in Vocal Profile Analysis, **York** and **Glasgow**
   b) 2010, Lecture at winter-school in language acquisition (EMLAR) VI, Utrecht, **Netherlands**
   c) 2011, Lecture at BBfor2 Summer School in Forensic Speech Analysis, **York**
   d) 2013, Week-long course at LOT Summer School, Groningen, **Netherlands**
   e) 2013, Multi-day course in Universidade Federal de Santa Maria, **Brazil**