THE PHONETICS LABORATORY, UNIVERSITY OF CAMBRIDGE

The phonetics laboratory of the University of Cambridge was set up by John Trim, who was appointed to a lectureship in phonetics in 1958. He subsequently became Director of the Department of Linguistics which was established in the mid 1960s, incorporating the phonetics laboratory. The laboratory was briefly housed near the centre of Cambridge, before, in the 1960s, moving to the Sidgwick Site just west of the city centre. The site was being developed for University use, and was gaining some architecturally cutting-edge buildings which attracted the regular attention of architecture students… and of course of builders carrying out remedial work.

In contrast, the phonetics laboratory, and indeed initially the Linguistics Department, was housed in a former sports pavilion – a survivor from the site's previous incarnation as a College playing field. It was here that I had my first contact with laboratory phonetics as a student in the mid 1970s, spending many an hour slaving over a hot Sonagraph (five minutes per 2.4 second spectrogram – 125 times real time). Those of us who knew it had considerable affection for the 'Old Pavilion'. The south-facing veranda on a sunny summer's day (one could almost imagine the sound of bat on ball) more than made up for having to move buckets around to catch the drips from the leaky roof on rainy days. However our bucolic idyll was rudely interrupted in 1992 when, in a moment which will be familiar to those who know Douglas Adams's *Hitchhiker's Guide to the Galaxy*, we received notice of imminent demolition – not of the Earth to make way for a hyperspace bypass, but of the Pavilion for the new Law Faculty building.

In 1993 the laboratory moved to its present location, ingeniously created by making use of 'dead space' in the adjacent 'Raised Faculty Building', where it continues to enjoy accommodation which is considerably more functional, if less quaint, than its former home. The laboratory's suite of rooms comprises general laboratory space, three offices, and a sound-isolated room used for recording and perceptual testing. Three or four other rooms nearby in the building are used by phonetics research students, research associates, and research fellows.

The Raised Faculty Building, Sidgwick Site. The phonetics laboratory is on the middle floor, behind the larger windows with the arborial reflections.

The laboratory currently has a server-based network of eight Silicon Graphics unix workstations, a server-based network of Macs, and a number of Windows PCs, both in the laboratory and in the other rooms. Software includes Xwaves, Praat, and Wavesurfer for acoustic analysis, HLsyn for 'quasi-articulatory' synthesis, and MatLab and common statistical packages. Although the bulk of the laboratory's work is in acoustic analysis, synthesis, and perceptual testing, we also have an Articulate Instruments WinEPG electropalatography system, an audiometer for work involving hearing impairment, and (in prospect at least) an aerometer system. The laboratory is used by phoneticians from undergraduate level upwards.

The interior of the phonetics laboratory

Articulate Instruments electro-palatography system.
A speaker's individual acrylic palate is seen at the top left.

The occupants of two of the offices within the laboratory are the Linguistics Department's phonetics lecturers, Sarah Hawkins (Professor of Phonetic Sciences) and Francis Nolan (myself – Professor of Phonetics). The third office belongs to the linchpin of the laboratory, our long-serving and endlessly patient technician and systems manager, Geoff Potter. The research interests of Sarah Hawkins and myself, though overlapping, have distinct centres of gravity. She is particularly interested in speech perception, fine phonetic detail, and the role the latter plays in speech understanding. Her recent research addresses subtle differences in acoustic-phonetic fine detail that systematically reflect distinctions in linguistic structure, and how listeners use these subtle cues to understand natural and synthetic speech. She used her prestigious Leverhulme Major Research Fellowship (2003-2006) to extend the neuropsychological and computational directions of her work on multi-modal representation of speech and meaning in memory. Currently she coordinates *Sound to Sense* (S2S), a Marie Curie Research Training Network involving 13 institutions in 10 countries. This aims to bring together research on fine phonetic detail with computer modelling of human and machine speech recognition. One of Sarah's PhD students, Marco Piccolino Boniforti, works in the S2S framework, and another, Katharine Barden, is working on perceptual adaptation to the phonetic detail of individual speakers. Rachel Baker, who has recently submitted her dissertation (supervised by Rachel Smith, who recently left the Department for a post in Glasgow), also studied the role of fine phonetic detail and (specifically) its relation to morphological structure.

My own current interests lie in linguistic phonetics, particularly in the area of prosody, on the one hand, and in speaker characteristics on the other. I hold two grants in the area of speaker characteristics funded by the Economic and Social Research Council: *Dynamic Variability in Speech* (DyViS) has collected a database of 100 dialectally-homogenous speakers to explore detailed variation and acoustic individuality; and *Voice Similarity and the Effect of the Telephone* (VoiceSim) exploits the DyViS database to discover what determines perceived differences between speakers and how earwitnesses might be affected by hearing voices over the phone. My PhD students are working on speech rhythm (in Korean – Hae-Sung Jeon; and French and Swiss German – Ruth Galloway); and on Cypriot Greek phonetics (vowel lenition – Eftychia Eftychiou; and geminates – Spyros Armostis).

Other phoneticians in the Department are carrying out their own research and/or contributing to the work mentioned above. Kirsty McDougall, Gea de Jong, and Toby Hudson constitute the DyViS and VoiceSim teams. Mark Jones, in his British Academy Postdoctoral Fellowship, is exploring how phonetic variation is constrained by the system of contrasts operative in a particular language, and has looked *inter alia* at variation in /t/ and /r/ in English, fricatives in Welsh, and other sounds in languages including Polish, Slovene, Sardinian, Corsican, and southern Italian dialects. Antje Heinrich, who holds a postdoctoral fellowship funded through the Medical Research Council, works on hearing impairment in the elderly, and aims to integrate knowledge about cognitive mechanisms and theories of speech understanding with the use of phonetic detail in speech perception.

On parade: some members of the phonetics laboratory, University of Cambridge.
Front row: Sarah Hawkins, Francis Nolan, Kirsty McDougall;
middle row: Katharine Barden, Spyros Armostis, Geoff Potter, Mark Jones, Rachel Baker;
back row: Toby Hudson, Caroline Williams, Gea de Jong, Naomi Hilton, Eftychia Eftychiou.

This article can only be a very brief summary of what goes on. More detail can be found on the website of the phonetics laboratory at http://www.ling.cam.ac.uk/phonetics/, and in the links leading from it. There you should be able to discover (browser permitting), by hovering your cursor over the faces, who's who in the photograph above.

Finally it should be observed that the phonetics laboratory does not exist in a vacuum. Speech and language research in Cambridge is very much a case of 'distributed processing'. Individuals in the laboratory collaborate with and attend seminars in other institutions involved in phonetic and linguistic research, notably the Linguistics Department of which it is a part, the Research Centre for English and Applied Linguistics, the Experimental Psychology Department, the MRC Cognition and Brain Sciences Unit, from time to time the Engineering Department and the Computer Laboratory, and even (in the area of forensic phonetics) the Institute of Criminology. Although, in terms of size, the phonetics laboratory in Cambridge may be the equivalent of Douglas Adams's soon-to-be-demolished 'minor planet in the western spiral arm of the galaxy' it plays – we dare to hope – one of the star roles in this intellectual firmament.

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