Greg P. Kochanski

Oxford University Phonetics Laboratory +44 1865 270446

41 Wellington Square, `greg.kochanski@phon.ox.ac.uk`

Oxford OX1 2JF `gpk@alum.mit.edu`

England

Technical
Specialty

◇ Phonetics and Cognition.

◇ Mathematical modeling of complex systems such as language, speech, and biomechanics.

◇ Psycholingistics and experiment design. Large scale statistical analyses.

◇ Experiment design and implementation in speech and physics. wide variety of experimental techniques.

◇ Thirty-five papers with more than 15 citations and at least 2700 citations in total (Web of Science).

◇ More than 30 U. S. and/or E. U. Patents granted.

◇ Initiates and pushes novel projects.

Research

◇ **University of Oxford**, 6/2003-present Oxford, UK
Senior Research Fellow, Oxford University Phonetics Laboratory. I have been Principal Investigator on four externally funded research projects, co-Investigator on another four. See the *Research Funding* section, below, for details.

Research Topics: Exemplar Theory and statistical measures of rhythm. Linguistic studies of intonational phonology and Advanced Tongue Root. Acoustic properties associated with accent and prominence. Acoustic measures of phonological distance. MRI imaging studies of speech articulators; new image processing techniques. Models of motor control for the tongue. Psycholinguistics, mathematical models of speech, models of prosody and intonation of different dialects of English. Signal processing for noise reduction in MRI scanners.

◇ **Rutgers University**, 9/2002–6/2003 New Brunswick, NJ
Visiting scholar. Also consulting scientist for University of California, San Diego, Dept. of Mechanical and Aerospace Engineering.

◇ **Bell Laboratories/Lucent Technologies**, 5/1987–9/2002 Murray Hill, NJ
Member of Technical Staff.

· **Modeling of Articulatory Dynamics for Speech**, 1999 – 2002: Modeling of speech and intonation, using novel physiologically-based models of speech generation. This led to a flexible description of intonation, and the first quantitative understanding of how one can emphasize a word in Chinese.

Greg P. Kochanski

- **Speech** 2001–2002: Developed acoustic reverse Turing test to protect speech interfaces against automated attacks (applying speech recognition for data security). Arrays of microphones and signal processing techniques for improved speech data acquisition. Designed speech synthesizers. Statistical language models.
- **Astrophysics**, 1994–1999: Observational astrophysics, using strong gravitational lensing as a probe of the mass distribution in clusters of galaxies. Developed optimal techniques for combining images from telescopes of different resolution, which was then used to provide precise measurements of galaxy variability from an ad-hoc database spanning 10 years and several telescopes.
- **Machine Learning Systems and Human Interfaces**, 1995–1996: Developed techniques for automatic fruit and vegetable identification and classification, based on multiscale measurement of texture. Human interface studies: optimal keyboard designs for two-way pagers.
- **Nanomaterials and Field Emission**, 1993–1999: Studies of field-emission from diamond and carbon nanotubes. Led team of 2–6 researchers. Achieved record current densities for diamond emitters, and high performance carbon nanotube emitters. Design of structures for field emission displays and microwave amplifiers.
- **Condensed Matter Physics**, 1987–1994: Scanning tunneling microscope (STM) studies of Si and Al surfaces, studying atomic, electronic structure, and interactions between steps on crystal surfaces. Design and construction of STM with highly interactive computer/ hardware interfaces. Investigations of conductivity and chemistry of C_{60}-metal compounds.

Education ◇ **University of Oxford (Oxford Learning Institute)**, 2008–9 Oxford, UK
"Developing Academic Practice" seminar/workshops: "Lecturing" (1h), "Class Teaching" (3h), "Tutorial Teaching" (1h)

◇ **Massachusetts Institute of Technology**, 1982–1987 Cambridge, MA
Ph.D. Physics:: "Magnetic Trapping and Cooling of Atomic Hydrogen". Modeling and measurement of spatial, momentum, and spin distributions, along with chemical reaction rates. Built and modeled a novel low-temperature hydrogen maser.

◇ **1978–1982** S.B. Physics. First place, Mechanical Engineering Design Contest. Computer science and Engineering courses.

Teaching ◇ **Graduate Supervision** Co-supervision of two D.Phil students; one awaiting viva; the other started 1/2011.

◇ **Speech Production Data Blitz** 7-8 May 2011, University of Illinois (Urbana-Champaign). Workshop on data analysis techniques, co-taught with Harald Baayen.

◇ **Statistics Practicals** 2009, 2010 Oxford, UK
Practical linguistic data analysis course using SPSS and/or R.

◇ **ACTL**, 2009 London, UK
Lecture and tutorial session "Getting Good Data", for Advanced Core Training in

Linguistics, a collaborative Graduate program between Cambridge, Oxford, University College London, the University of Essex, Queen Mary University of London, and SOAS.

◇ **Statistics Practicals** 2009-2010, 2010-2011   Oxford, UK
Practical linguistic data analysis course using SPSS.

◇ **University of Oxford**, 2008-2009, 2009-2010   Oxford, UK
Tutorial course for Paper XII, "Psycholinguistics".

◇ **University of Oxford**, 2008-2009, 2009-2010   Oxford, UK
Tutorials for Paper XIII, "General Linguistics".

◇ **University of Oxford**, Hilary Term 2004, 2005, 2006   Oxford, UK
"Mathematical Models of Speech and Language". (`http://kochanski.org/gpk/teaching/0401Oxford`).

◇ **University of Oxford** 2008-2009, 2009-1010 Statistics Tutorials

◇ **Montclair State University**, Summer 2002   Montclair, NJ
Developed and taught a new graduate course in the Linguistics department: "Mathematical Models of Language Phenomena".

◇ **ICSLP2002**, 9/15/2002   Denver, CO
Prosody and Prosodic Modeling; Three-hour tutorial at The Seventh International Conference on Spoken Language Processing.

◇ **Bell Laboratories**, various years   Murray Hill, NJ
Five summer students, pre- and post-graduate.

Research Funding

◇ UK Economics and Social Research Council award RES-062-23-2566, *Word joins in real-life speech: a large corpus-based study*, 2010–2013. Co-I.

◇ British Council: "Alliance : Franco-British Research Partnership Programme", *AMENNPRO: Automated Metrics for the Evaluation of Non-Native Prosody* 2010–2012. Co-I.

◇ **UK JISC (Joint Information Systems Committee) and US NSF (National Science Foundation)**: "Digging into Data: Mining a Year of Speech", 2010–2011, Co-I.

◇ UK Economics and Social Research Council award RES-062-23-1172, *Testing theories of speech production with neologisms*, 2008–2011. Principal investigator. (£400k.)

◇ UK Economics and Social Research Council award RES-062-23-1323, *Comparing dialects using statistical measures of rhythm*, 2008–2010. Principal investigator. (£340k.)

◇ Helped write successful John Fell fund research proposal *Surveying naturally-occurring speech in the British National Corpus*, 2008.

◇ UK Economics and Social Research Council award RES-000-23-1094, *Articulation and Coarticulation in the Lower Vocal Tract*, 2005–2008. Principal investigator. (£350k.) This project was evaluated by the ESRC and rated "Outstanding".

◇ Co-I on UK Arts and Humanities Research Council grant, *ICT Tools for Searching Annotation and Analysis of Audio-Visual Media*, 2005–2006.

<div align="center">*Greg P. Kochanski*</div>

- ◇ Oxford University Research Development Fund award RDF/1*181, *Using Iterative Mimicry to Probe the Mental Representation of Intonation*, 2004–2005. Principal investigator.

- ◇ Research support at Bell Laboratories, 1987–2002.

- ◇ Cerro Tololo Inter-American Observatory telescope time grant, *Deep Lens Survey*, 1Q 2002.

- ◇ Hubble Space Telescope telescope time grant, *UV Extinction in Dusty Elipticals*, approved 1999 (cycle 9).

Other   Chair of 2 appointment committees (member of four more).

Montclair State University Linguistics Department Advisory Board, (Montclair, NJ) 2002, 2003.

Member, Economic and Social Research Council Peer Review College, 2010-. (Occasional reviews before 2010.)

Reviewer for three European national research councils, at least six international scientific journals, and two conferences.

External examiner for Ph.D. thesis at INRS (Université du Quebec) in the field of speech signal processing. (2008)

Fluent programmer in Python, C, C++, (and others). Multithreaded code.

Managed technicians and post-doctoral researchers.

Community theatre experience. Pilot, 500 hours flight time. Rock climbing.