Greg P. Kochanski

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Technical Specialty

- Mathematical modeling of complex systems: such as language, speech, and biomechanics. Experiment design and implementation in speech and physics; wide variety of experimental techniques.

- Eight papers with more than 50 citations, at least 748 citations in total (post-1994, Science Citation Index). Nine conference papers since 1/1/2001, and 15 in refereed journals since 1/1/1997.

- More than 30 U. S. Patents granted.

Research Experience

- **Oxford University**, 6/2003-present   NEW BRUNSWICK, NJ
  Research Fellow, Oxford University Phonetics Laboratory. Prosodic differences across dialects of British English.

- **Rutgers University**, 9/2002-6/2003   NEW BRUNSWICK, NJ
  Visiting scholar, Laboratory for Surface Modification.

- **Bell Laboratories/Lucent Technologies**, 5/1987-9/2002   MURRAY HILL, NJ
  Member of Technical Staff.

- **Physical Modeling of Articulators for Speech**, 1996-present: Modeling of speech and intonation, using novel physics-based models of speech generation. Powerful, flexible description of intonation, and the first quantitative understanding of how one can emphasize a word in Chinese. Because of physical basis, much of the model should apply across all languages.

- **Speech** 2001-2002: Use of speech recognition for data security. Developed acoustic reverse Turing test to protect speech interfaces against automated attacks. Microphone arrays for acoustic measurements inside the human body. Designed speech synthesizers. Computational linguistics.

- **Astrophysics**, 1994-1999: Observational astrophysics, using strong gravitational lensing as a probe of the mass distribution in clusters of galaxies. Also, precise measures of galaxy variability from archival images.

- **Classifiers 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.

- **Condensed Matter Physics**, 1987-1994: Scanning tunneling microscope (STM) studies of Si and Al surfaces, studying atomic, electronic structure, and step interactions. Design and construction of STM with highly interactive computer/ hardware interfaces. Investigations of conductivity and chemistry of C_{60}-metal compounds.

Education

- **Massachusetts Institute of Technology**, 1982-1987   CAMBRIDGE, MA
  Ph.D. thesis: "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 Experience

- **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.

Other Skills

C++, Python, Perl, Java, C, circuit design, nonlinear optimization, statistical analysis, multithreaded/multiprocessor programming, image processing, network protocols. Managed technicians. Group leader.