

# **ISCA Distinguished Lecturers Program Announcement for 2016**

## **Purpose**

ISCA started the Distinguished Lecturers Program in 2006. The purpose is to send Distinguished Lecturers to travel to different parts of the world to give lectures to help promote research activities on speech science and technologies.

## **Distinguished Lecturers for 2016**

1. Distinguished Lecturers have been selected for 2015-2016:
  - (1) Prof. Hiroya Fujisaki, Professor Emeritus, University of Tokyo, Japan
  - (2) Professor Valerie Hazan, Professor of Speech Sciences, and Head of the Department of Speech Hearing and Phonetic Sciences, University College London, UK
2. Detailed lecture topics are described from next page.

Prof. Hiroya Fujisaki, Professor Emeritus, University of Tokyo, Japan

[http://homepage3.nifty.com/hiroya\\_fujisaki/](http://homepage3.nifty.com/hiroya_fujisaki/)



**Proposed talks.** Hiroya Fujisaki's main research interests are processing of language both by humans and machines. His approach is interdisciplinary, with special emphasis on mathematical modeling based on physiology, physics or psychology of the underlying mechanisms and processes. Possible lecture topics include the following:

### **Lecture 1: Use of Language in Human Communication – A Model**

When we use language for information exchange, most of us are not aware of the fact that what is produced in the receiver's mind as a result of communication is not the same as what was originally in the sender's mind. This can be clearly and quantitatively demonstrated by the method of experimental psychology and mathematical formulation of experimental results, and indicates the limitations inherent to human communication by language.

### **Lecture 2: Problems and Prospects of Spoken Language Processing**

Instead of the conventional distinction between "Speech" and "Language", Fujisaki advocates the use of "Spoken Language" and "Written Language", on the ground that speech contains certain linguistic information that is not in the written language. He also made clear that what has been traditionally called "Natural Language Processing" is actually "Written Language Processing", and defined the field of "Spoken Language Processing," dealing with both the aspects of speech as a signal and its aspects as a code. This talk describes the rationale that led to this conceptual turn, and shows the progresses, unsolved problems, and future prospects of the field.

### **Lecture 3: Processes of Information Manifestation by Speech (Linguistic, Paralinguistic and Nonlinguistic), and the Role of Prosody**

The information contained in speech can be classified into three categories: Linguistic, Paralinguistic, and Nonlinguistic. Paralinguistic information (such as information concerning intention and attitude of the speaker) is consciously added in order to supplement or to modify linguistic information, while nonlinguistic information (such as information on the physical states - gender, age, health, etc. - and the mental states - mood, emotion, etc.- of the speaker) mostly comes into speech unconsciously, though conscious simulation is possible as in the case of acting. This talk explains the rationale, shows various stages of speech production where these three categories of information comes in, and indicates that message planning and utterance planning are two separate stages; rules of syntax work in the former, while rules of prosody work in the latter.

### **Lecture 4: Physiology, Physics and Mathematics in the Process of Fundamental Frequency Contour Generation**

The contour of the fundamental frequency of speech (henceforth F0 contour), is an important carrier of

prosodic information, and various attempts have been made to approximate the curve mathematically. Most of them, however, are only phenomenological and are not related to the underlying information and the mechanisms/processes. This talk explains the physiology and physics of the mechanisms and processes involved in controlling F0, and shows the mathematical behavior of F0 as a consequence of the combined activities of various laryngeal and extra-laryngeal muscles that are activated by linguistic, paralinguistic and nonlinguistic information. This formulation is commonly called as the Fujisaki model (of tone, accent and intonation).

### **Lecture 5: Applications of the (so-called) Fujisaki Model of Tone, Accent and Intonation, to Phonetics, Phonology, and Speech Technology.**

The Fujisaki model has been shown to be capable of producing very good approximations to naturally observed F0 contours of both non-tone languages and tone languages, from a set of linguistically meaningful commands. Therefore the model has been used for speech synthesis of many languages, producing highly natural prosody for about 20 languages so far studied. The model also makes clear the difference in the constraints on the polarity and timing of tone commands among different tone languages, thus leading to a novel way of typological classification of some tone languages. These results are shown with demonstrations.

### **Lecture 6: Topics in Speech Perception – especially on Mechanisms and Processes underlying the so-called Categorical Perception**

The higher discriminability of a pair of speech stimuli observed across category boundaries than elsewhere is called Categorical Perception, and has been used as an evidence for the motor theory of speech perception. The basic belief in the related studies was that discrimination is the basis for identification. Analysis of the cognitive processes involved in the measurement of discriminability of a pair of stimuli, however, made clear that identification of individual stimulus occurs first, and discrimination is based on the results of their noisy retention by various short-term memories. By introducing a model for the process of both identification and discrimination and assuming the mathematical characteristics of various types of noise involved, the relationship between the two has been explained quite accurately.

### **Lecture 7: Principles and Design of a System for Academic Information Retrieval based on Human-Machine Dialogue**

This talk describes the outcome of a successful Japanese national project conducted under the “Research-for-the-Future” program. The system is based on the following three original principles: (1) Use of “Key Concepts” in information retrieval (including processing of polysemy, homonymy, and unknown words), (b) Dialogue Management based on both User and System Modeling (by introducing a novel type of interacting automaton), and (c) Optimization of Retrieval Performance through Relevance Score Estimation. The advantages of these novel principles have been demonstrated by a pilot system.

(2) Professor Valerie Hazan, Professor of Speech Sciences, and Head of the Department of Speech Hearing and Phonetic Sciences, UCL (University College London), UK, <http://valeriehazan.com/wp/>



**Proposed talks:** Valerie's research interests include: speech communication in adverse conditions, speech perception-production interaction, speech development in typically-developing children and children with hearing loss, speech communication in bilinguals and second-language learners. She also has a strong interest in individual differences in perception and production, and in the development of corpora of spontaneous speech interactions for speech analysis. Possible lecture topics include:

### **Lecture 1: Speech communication in adverse conditions**

Most of our communication occurs in what may be considered 'adverse' conditions. Barriers to efficient communication may be acoustic, such as the presence of noise, other voices or reverberation, or may be linguistic, such as the lack of shared language knowledge (in L2 speakers or young children). In this talk, I will review research on communication in adverse conditions and discuss the strategies that speakers use to overcome the effects of these adverse conditions in speech communication.

### **Lecture 2: Speech perception and production across the lifespan**

Although the focus of much research into speech development has been to establish when 'adult-like' performance is reached (with young adult speakers taken as a 'norm'), I will argue in this talk that our speech perception and production abilities are undergoing constant change across the lifespan as a result of physical changes, increasing exposure to language variation, and cognitive changes at various periods of our lives. I will review recent research on speech development across the lifespan and also consider methodological issues that we need to face when carrying out such research.

### **Lecture 3: Speech communication in second-language learners and bilinguals**

The majority of the world's population is multilingual. Speaking more than one language can lead to cognitive benefits, as seen by recent findings of increased executive function in bilingual children. However, it can have a cost too, as even highly proficient second-language speakers may show increased cognitive effort and experience greater difficulty than monolinguals when listening to speech in noise. In this talk, I will review recent research in speech sciences investigating these costs and benefits. I will also discuss the use of measures of cognitive load in studies of second language perception.

### **Lecture 4: Individual variation in speech perception and production**

It has been known since the early days of experimental testing of speech perception that individuals vary widely in (a) their overall performance and (b) the weighting that they give to different types of acoustic or linguistic information used to identify sounds or words. This is the case even within a 'homogeneous' participant group as determined by factors such as age range and language background. However, little

attention has been given to trying to elucidate the causes of these individual differences; many decades on from these early studies, we still have little understanding of what makes a ‘good listener’. In this talk, I will review recent research and will also consider the inter-relation between individual variability in speech perception and the variability also seen in speech production.

### **Lecture 5: Development of speech perception and production in children with hearing loss**

The move towards early cochlear implantation and the availability of high-quality digital aids have led to great changes for children with hearing loss who choose an oral mode of education. In this talk, I will review recent research into speech perception and production development in children with hearing loss.

### **Lecture 6: Analysing spontaneous speech: benefits and pitfalls**

In the ‘real world’, speech is typically produced while interacting with other people and therefore has communicative intent. However, most speech research has been carried out on recordings of words or sentences read by a speaker in a laboratory setting. In recent years, there has been a move towards using more ‘ecologically-valid’ forms of speech. Such corpora may involve spontaneous conversations between speakers, or pairs of speakers carrying a problem-solving task together. In this talk, I will review methods used to produce such corpora and the issues involved in carrying out acoustic-phonetic analyses of large quantities of spontaneous speech.

Above 2 Distinguished Lecturers are available in April 1st 2016 to Dec 31th 2017.

### **Regions Covered by the Program**

ISCA Board has identified the following regions as under-represented in ISCA programs and covered by this program: Africa, China, India, Eastern Europe, Latin America, South and West Asia.

### **Distinguished Lecturers Tours**

Distinguished Lecturers Tours are arranged by ISCA upon invitation only. The local hosts should be responsible for making and funding the local arrangements including accommodation and meals, and ISCA will pay travel costs. A Distinguished Lecturer Tour is realizable when at least three lectures, preferably in at least two different cities in the regions defined above, can be arranged.

### **To Arrange a Distinguished Lecturer Tour**

The local hosts wishing to arrange a Distinguished Lecturer Tour should contact Satoshi Nakamura (s-nakamura@is.naist.jp), the chair of the ISCA Geographical Outreach Committee. It may be helpful but not necessary if the local hosts can contact the Distinguished Lecturers directly for detailed arrangements such as travel schedule and lecture titles. But the final decision will be made by the ISCA Geographical Outreach Committee considering the travel funds available.

### **More Details**

More details of this Program can be found at ISCA website, ([http://www.isca-speech.org/iscaweb/index.php?option=com\\_content&view=article&id=62&Itemid=7](http://www.isca-speech.org/iscaweb/index.php?option=com_content&view=article&id=62&Itemid=7))