



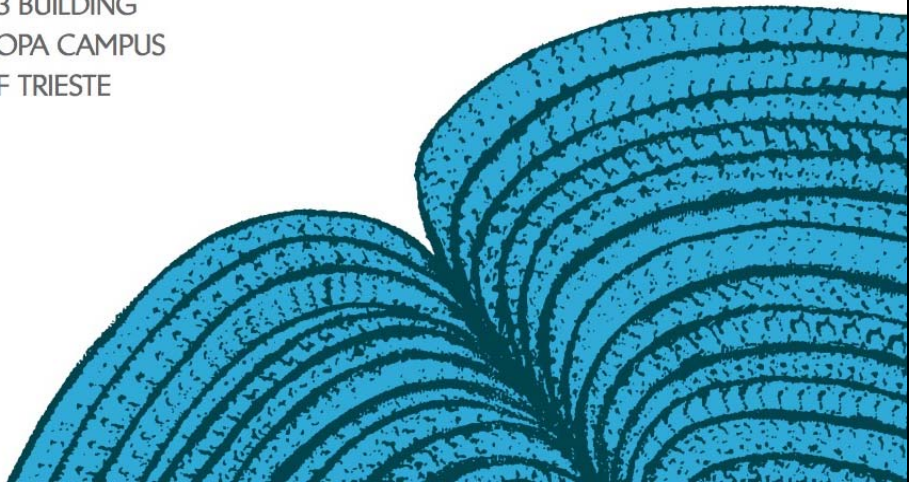
# THE TWENTY-FOURTH KANIZSA LECTURE

W. TECUMSEH FITCH

“THE BIOLOGY OF SPEECH - 50 YEARS OF PROGRESS”

FRIDAY 4 NOVEMBER 2016, 4.30 PM

MAIN HALL, H3 BUILDING  
PIAZZALE EUROPA CAMPUS  
UNIVERSITY OF TRIESTE



#

# The Biology of Speech

## 50 Years of Progress

W Tecumseh Fitch

Department of Cognitive Biology, University of Vienna, Austria

Keywords: biology, language, perception, evolutionary, categorization

The notion that there is a "special" biology of speech, unique to humans, is one of the seminal ideas in psychology. It dates back at least to the work at Haskins Laboratories and the classic 1967 paper by Alvin Liberman and colleagues "Perception of the Speech Code," in which the motor theory of speech perception was advanced, arguing that speech perception and production are intimately intertwined. In this lecture I will provide a broad overview and update concerning the key questions raised by this rich research tradition, asking "how 'special' is speech, at both the production and perceptual levels?" Starting with production, I will show that all of the basic peripheral "machinery" necessary for human speech (lungs, larynx and vocal tract) is widely shared with other mammals, and even unusual features of humans relative to other primates (such as our descended larynx) can be found in other species. From a broad comparative perspective, then, there is little special about the human speech apparatus, and what is crucial is our ability to control this apparatus to reproduce novel sounds from our speech environment. Turning to perception, comparative data also show that many of the perceptual phenomena originally thought to demonstrate that "speech is special" are in fact shared with a wide variety of other species, from primates to birds and rodents (categorical perception of phonemes, formant perception, hemispheric lateralization, etc). These data do not support the idea that accurate perception of human speech requires a human-like vocal anatomy, or even a capacity for vocal learning. In general then the modern picture is one where human speech builds upon a pre-existing set of mechanisms that were present long before language evolved. This is welcome news because it means that both the neural bases and the evolution of these mechanisms can be studied using a rigorous comparative approach.

# The Kanizsa Lectures

- 1993 IRVIN ROCK "The Legacy of Gestalt Psychology"
- 1994 KEN NAKAYAMA "Visual Surface Representation: A Missing Link Between Early and High Level Vision"
- 1995 VILAYANUR S. RAMACHANDRAN "A Critique of Pure Vision"
- 1996 PHILIP N. JOHNSON-LAIRD "Illusions in Reasoning"
- 1997 ALAN GILCHRIST "Visual Structure and Surface Color"
- 1998 HEINRICH H. BÜLTHOFF "Perception and Action: Controlling the Loop Using Virtual Realities"
- 1999 RICHARD L. GREGORY "The Phenomenal Science and Art of Perception"
- 2000 STEPHEN E. PALMER "Rethinking Perceptual Organization"
- 2001 ENNIO MINGOLLA "The Units of Vision"
- 2002 PATRICK CAVANAGH "Art and the Language of Vision"
- 2003 MICHAEL KUBOVY "Regular Patterns in Visual, Auditory and Aesthetic Perception"
- 2004 ELIZABETH S. SPELKE "What Makes Humans Smart"
- 2005 ALAN M. LESLIE "How the Brain Thinks About the Mind"
- 2006 MELVYN A. GOODALE "Visual Duplicity: Action without Perception in the Human Visual System"
- 2007 LOTHAR SPILLMANN "Perceptual Research for Beginners. A Journey Through the Vision Sciences"
- 2008 ANNE CUTLER "Native Listening"
- 2009 JAN J. KOENDERINK "Mind into Space"
- 2010 JOHAN WAGEMANS "The Kanizsa Triangle as a Cornerstone of Vision Science"
- 2011 JAMES R. POMERANTZ "The Perception of Visual Configurations and Their Parts: A Theory of Basic Gestalts"
- 2012 ALFONSO CARAMAZZA "Objects, Actions, Words, and Brain"
- 2013 DEJAN TODOROVIĆ "Reality and Illusions: Effects of Context and Vantage Point in Visual Perception"
- 2014 BARBARA GILLAM "Grouping and Occlusion in Perception and Art"
- 2015 VITTORIO GALLESE "The Multimodal Nature of Visual Perception: Facts and Speculations"
- 2016 TECUMSEH FITCH "The Biology of Speech - 50 Years of Progress"