The Auditory System and Human Sound-Localization Behavior

John van Opstal
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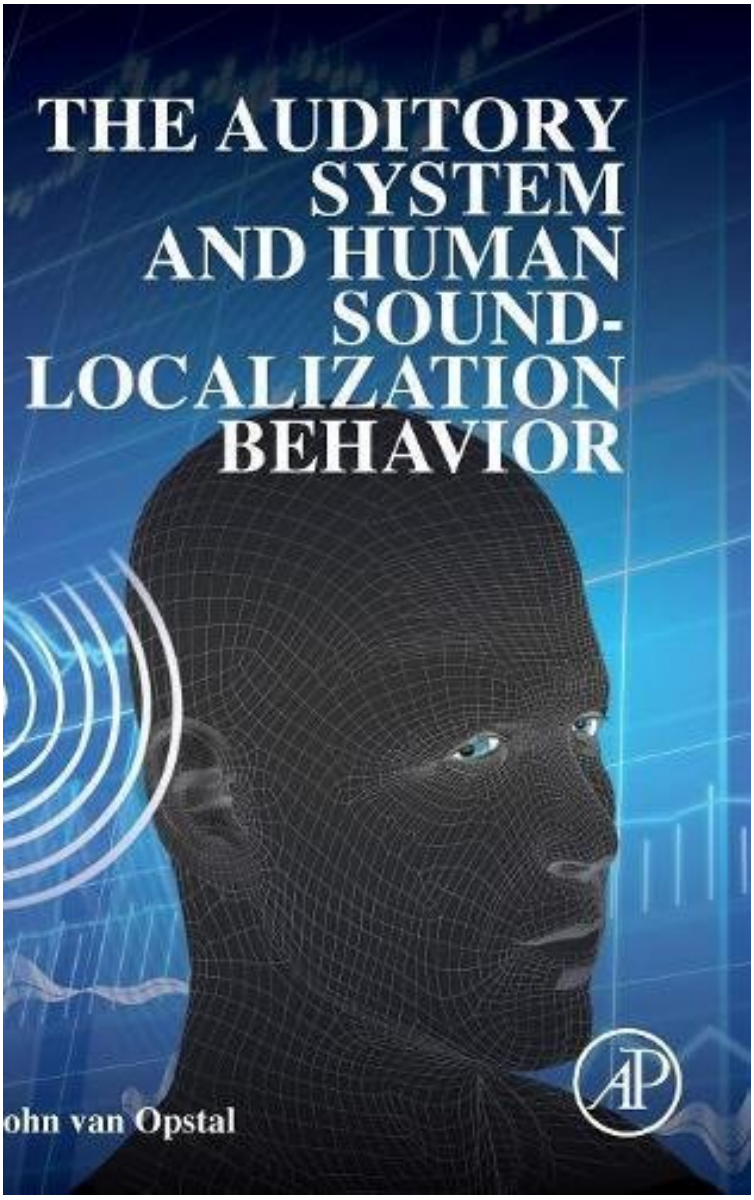

#4018749 in Books John van Opstal 2016-05-02Original language:EnglishPDF # 1 9.02 x .94 x 5.98l, 1.99 #File Name: 0128015292436 pagesThe Auditory System and Human Sound Localization Behavior | File size: 66.Mb

John van Opstal : The Auditory System and Human Sound-Localization Behavior before purchasing it in order to gage whether or not it would be worth my time, and all praised The Auditory System and Human Sound-Localization Behavior:

0 of 0 people found the following review helpful. The fascinating neural and sensory machinery that controls our orienting behaviour.By CustomerThis monograph provides an excellent introduction to the interesting and surprising links that exist between our auditory and gaze-control system. Why do we move our gaze when we explore the world? How did this behaviour shape our sound-localisation capabilities? How does audition help vision to make sense of the world and select relevant objects? The book provides a comprehensive overview of the auditory system (from our current understanding of the micromechanics within the cochlea, to the neural encoding of sound in the central nervous system, and of the gaze-control system (the neural processes to control fast eye-head movements), it covers the physical (acoustics, hydromechanics), mathematical (differential equations, Fourier analysis), and theoretical tools (linear and nonlinear systems analysis, signal-detection theory, Bayesian statistics) needed to study and model these systems, while providing numerous examples along the way. At the end of each chapter, exercises help the student to grasp the different concepts and theoretical techniques. This book is highly recommended for neuroscientists, (bio)physicists, bio-engineers, roboticians, (neuro-)informatics students, psychophysicists, and for everyone else with a basic physics and math background, wishing to learn more about the fascinating machinery underlying sensorimotor integration in the human brain.

The Auditory System and Human Sound-Localization Behavior provides a comprehensive account of the full action-perception cycle underlying spatial hearing. It highlights the interesting properties of the auditory system, such as its organization in azimuth and elevation coordinates. Readers will appreciate that sound localization is inherently a neuro-computational process (it needs to process on implicit and independent acoustic cues). The localization problem of which sound location gave rise to a particular sensory acoustic input cannot be uniquely solved, and therefore requires some clever strategies to cope with everyday situations. The reader is guided through the full interdisciplinary repertoire of the natural sciences: not only neurobiology, but also physics and mathematics, and current theories on sensorimotor integration (e.g. Bayesian approaches to deal with uncertain information) and neural encoding.Quantitative, model-driven approaches to the full action-perception cycle of sound-localization behavior and eye-head gaze controlComprehensive introduction to acoustics, systems analysis, computational models, and neurophysiology of the auditory systemFull account of gaze-control paradigms that probe the acoustic action-perception cycle, including multisensory integration, auditory plasticity, and hearing impaired

About the AuthorDr. Van Opstal is a professor of Biophysics, studying sound localization behaviour of human and non-human primates, and in patients. He regards sound localization as an action-perception problem, and probes the system with fast, saccadic eye-head gaze-control paradigms, to study the very earliest correlates of the underlying neurocomputational mechanisms.