

## **COMMUNICATING WITH SOUND: AN ETHOLOGICAL PERSPECTIVE**

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### **ABSTRACT**

Due to the high density and importance of speech in most workplaces, practical sonification systems should be designed to complement and synergize with, rather than compete with, language. The multiple-message, high-dimensional channel of voice quality (such as prosody in speech, and similar communication systems in animals) is held out as one way of achieving such synergy. Systems that exploit the vocal channel can run, and be interpreted, in parallel with speech and require little training to learn. I will present some examples of biological sounds, full of acoustic parameters ready for appropriate interpretation by humans, and with an available bandwidth more than adequate for many practical sonification applications. These span the biological spectrum from frogs to dogs and birds. I will briefly discuss the principles underlying vertebrate vocal production and how they can be modelled in silico. While pitch can be useful, timbre is argued to be more flexible and multidimensional for sonification purposes. The example of formant frequencies as cues to individuality and size, and variability as an indication of urgency, are given as examples. Temporal cues, particularly rhythm, provide a rich and structured multidimensional channel that can be easily implemented vocally. Physical models of vocal production systems, of animals, real or imagined, provided a rich framework for exploration in sonification. And they are fun.