

# **Crossover between singing and science**

Keynote presentation for PEVoC14 in Tallinn

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In this lecture the author describes how conducting scientific investigations and having a background in both science and classical voice has helped him to find answers to the questions that have arisen in his activity as a professional singer and voice teacher. Two topics will be addressed in more detail. The first of these concerns the metaphorical vocabulary used by singers and voice teachers to communicate various aspects of vocal technique. The results of acoustic investigation and perception tests shows that figuratively “placing the voice forward” may refer to various aspects of voice production, such as singing with the open pharynx and lower larynx to create the “singer’s” formant, raising the frequency of the second formant of the vocal tract by arching the tongue further forward in the mouth, and/or raising the first formant of the vocal tract by opening the mouth wider. Furthermore, voices belonging to the higher voice categories are perceived by listeners to be positioned more “forwardly.”

The second topic concerns the influence of the timbral difference of two tones on decisions about their pitch relationship. Successively presented viola tone (which has soft timbre) and trumpet tone (which has bright timbre) seem to be best in tune for both musicians and non-musicians when the frequency of oscillation of the brighter trumpet tone is about 20 cents flatter than that of the viola tone. A similar timbre induced pitch shift also occurs in the tenor voice – viola comparison. During the lecture, several sound examples and animations will be presented, and the benefits of the research results with regard to music practice will be discussed.