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## Workshop

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## Background, Experiences (short CV):

Dom has researched both reading and speech perception for four decades, and has advanced these fields empirically, theoretically, and technologically. He has valuable experience of applying technology and behavioral science to real-world problems. Based on his scientific scholarship and the concomitant development of technology, he co-founded Fluent Speech, which developed multimodal speech technology, and was acquired by Sensory Inc. He also co-founded Animated Speech Corporation, now TeachTown, which developed successful products for language learning for language challenged children such as those with hearing loss and autism. Some of the commercial products of these companies are based on Dom's scholarship, research, and technological development. He is currently Research Professor at UCSC and CEO of Psyentific Mind, whose goal is to apply technology and behavioral science to extend the reach of the human mind.

## Title of workshop/seminar/tutorial:

Computer-Animated Tutors for Children with Speech and Language Challenges

## Description:

Empirical and theoretical research in cognitive science has demonstrated that many aspects of language processing (a) involve a form of pattern recognition, (b) are influenced by multiple sources of information, and (c) have the capacity to be quantitatively described by the Fuzzy Logical Model of Perception (Massaro, 1998). This same processing appears to occur in language acquisition, not just in accomplished language users.

This theoretical and empirical research was the motivation for the development of Baldi, a 3-D computer-animated tutor to teach speech and language. I review this technology and pedagogy and describe evaluation experiments that have substantiated the effectiveness of our language-training program, Experimental

tests have demonstrated that hard of hearing children improve their language learning as a direct result of Baldi's tutoring. In vocabulary lessons, the children not only improved in their receptive vocabulary but also in their productions of these words. In speech production training on specific speech segments, the application was successful in teaching correct pronunciation of the target words and also generalized to the segments in novel words.

Given the success of this technology, we have created several applications for language learning on iPhone devices. These applications include control of our animated tutor to say anything under a large variety of presentation conditions, iBaldi; vocabulary learning; phonics; reading; and applications in Arabic and Mandarin Chinese. Real-time animation and control is important in these applications because they allow anything to be said at any time. This facilitates the specialization and individualization of lessons by allowing teachers to create customized vocabulary and related lists just in time as they are needed.

1. Idea: A Theoretical and Empirical Framework for a MultiSensory Language Tutor

2. Goals:

To describe the theoretical framework and empirical evidence for the influence of multiple sources of information in language processing; how language tutoring applications can be developed within this framework; and how current applications can be used in language tutoring of children with speech and language challenges.

3. Target groups

Academics

Educators

Government Officials

Disabled people organizations and associations

Researchers

Speech Language Professionals

Technical Personnel

4. Duration

3 hours

5. Maximum number of participants

no maximum

References

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Massaro, D. W. (1998). *Perceiving Talking Faces: From Speech Perception to a Behavioral Principle*. MIT Press: Cambridge, MA.

Massaro, D. W. (2004). Symbiotic Value of an Embodied Agent in Language Learning. In R.H. Sprague, Jr.(Ed.), *Proceedings of 37th Annual Hawaii International Conference on System Sciences,(HICCS'04)(CD-ROM,10 pages)*, Los Alimitos, CA: IEEE Computer Society Press. Best paper in Emerging Technologies.

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