

# SIGACCESS Member Profile

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Member of SIGACCESS since: 2005

Member of ACM since: 2004

## **1. How many years have you been working in this area?**

I became interested in alternative human-computer interfaces in 1994, when I tried to apply my previous knowledge of Electroencephalogram (EEG) processing to the synthesis of a “Brain-Computer Interface” (BCI).

## **2. Please describe your current and/or past research project(s):**

My research focuses on the use of digital signal and image processing to develop alternative or enhanced interfaces that may facilitate interaction for users with diverse abilities. For example, starting from the BCI concept, we have evolved into the development of a cursor control system driven by Electromyogram (EMG) signals from facial muscles, for individuals with motion impediments, from the neck down. Recently we have integrated that prototype with existing Eye Gaze Tracking (EGT) equipment, attempting to combine the best attributes of both technologies.

My group is also working in the custom pre-compensation of computer display images for users that experience a known optical distortion in their eyes. This would be particularly useful for individuals with optical distortions that cannot be easily corrected by common means, such as contact lenses and glasses.

I am also interested in the potential that synthetic spatialized or “3D” sound may have to facilitate the interaction of blind or low-vision users with graphic user interfaces.

## **3. What is your professional background?**

I received degrees (BS, MS and PhD) in Electrical Engineering, with an emphasis on digital signal processing (DSP) in my graduate degrees. In particular, my PhD dissertation dealt with the processing of multi-channel Electroencephalogram (EEG obtained directly from the cerebral cortex) signals.

**4. What technology or product would you really like to see developed? Why?**

I think Eye Gaze Tracking (EGT) technology for users with motor disabilities should, at some point, become much more widespread in use. I believe that the concept of using the direction of gaze to drive the screen cursor in a graphic user interface is very appealing, at least in principle. However it has been documented, and confirmed by the somewhat limited use of these devices, that EGT is not yet optimized for typical graphic user interfaces.

**5. What product do you think has been really successful in this area? What makes it so good?**

I believe there are two complementary sets of efforts directed to solve this issue: A number of improvements being made, mainly by EGT manufacturers, in their systems (such as simplified calibration procedures, head-tracking integration, etc.), and approaches that combine EGT input with other modalities, such as EMG or limited-vocabulary speech recognition. I look forward to the combination of some of these efforts to achieve efficient and practical EGT-based interaction

**6. Have you participated in any SIGACCESS-sponsored event (e.g. the annual ASSETS conference)?**

I have participated in the last three ASSETS conferences. In ASSETS 2004 (Atlanta, GA) my group presented a paper. In ASSETS 2005 (Baltimore, MD) I was part of the Technical program Committee, and my group presented a poster/demonstration. In ASSETS 2006 (Portland, OR) I was part of the Technical Program Committee and also the Registration Chair / Treasurer. I also presented a paper. In all three of these conferences I was a faculty advisor in the Doctoral Consortium.

**7. What else would you like to see SIGACCESS do?**

I believe that the solution to many of the challenges in the quest for Accessible Computing for all will require a very diverse pool of expertise. It seems to me that this endeavour will demand strong synergy from many varied groups: Computer Scientists, Human Factors Experts, Psychologists, Electrical and Computer Engineers, User and Advocacy Groups, etc. From the breadth of the exchanges that I have seen at the ASSETS conferences, I think SIGACCESS is already functioning as a point of convergence for all these participants. I believe this cross-fertilization should continue to be facilitated by SIGACCESS.