



Electrical Engineering Colloquium
IEEE Signal Processing Society – Dallas Chapter

“Arts, Media, and Engineering (AME) Research”

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As the electronic networked world is becoming an integral aspect of everyday life, our means of acquiring information have gone well beyond our interactions with the natural world. However most development of electronic media technology focuses more on information processing and transmission and less on the creation of experiences that promote intellectual growth. Historically, the arts have been crucial in allowing civilizations to experience truths about their state. However, at this point most media-related art is not organically connected to the tools established by the digital culture. Most media content makes use of forms that have their origins in the pre-digital age. It is clear that the fast evolution of technology and its effects on society have produced a discontinuum between development of media technology and media content and consequently a discontinuum between our means of acquiring information and our means of acquiring knowledge. The result is that our society is highly informed, has access to lots of data, but suffers from a lack of deep experiences and true knowledge. In today's world we create through digital means, images, and sounds and we communicate through digital networked media (like cell phones or the internet). These digital media draw their strength and functionality from computational models. However, a common perception is that the expert creators of digital media technologies (the engineers) are not trained specifically in the creation of content. Similarly the creators of content (the artists) are not trained well in the creation and exploration of digital technologies and do not have a fundamental understanding of the computational models driving these technologies. As the discontinuum between our media technologies and media content becomes increasingly clear we are forced to accept that we are a society that excels with information processing but is unable to reflect on its experiences and thus achieve knowledge of its state. At Arizona State University we created a new program called Arts, Media and Engineering (AME). AME focuses on the integrated, parallel development of digital media technologies and digital media content. AME faculty and graduate students combine understanding of computation and computational modeling with the ability to apply this understanding at every level of the digital media communication process: from the creation of tools, to the creation of content, to the analysis of the social implications. To achieve this hybrid training and research we integrate expertise and resources from Electrical Engineering, Computer Science and Engineering, Music, Dance, Visual Arts, Theatre, Psychology, Anthropology, Sociology, Life Sciences, Bioengineering, Architecture and Environmental Design, and Education.

To achieve the computer mediation of experiences our research efforts focus on all aspects of digital mediation (sensing, information modeling and feedback) in the context of the communication of an experience. Research projects include:

- Distributed, Context-Aware Sensing and Modeling: Analysis and capture of motion, auditory event detection and spatial localization, spatio-temporal analysis of video/image, networked heterogeneous sensing
- Information representation, retrieval and feedback: distributed visual coding/representation, extraction of movement lexical, ontological indexing of multimodal data, storage and archival for fast access, immersive audio and visual environments, autonomous robot actuators and controllers
- Experiential construction: electronic experiences from limited data, generative models for mediated arts experiences, applications of these generative models to a broad spectrum of areas (rehabilitation, biofeedback, security, transcoding of knowledge, staging of the sciences).

In addition to the above interdisciplinary research projects, we have formed hybrid curricula that will integrate training in engineering and arts and access to knowledge from the social and life sciences. These allow students to develop strong computational skills and apply them to the creation of computer mediation of experiences with a wide range of applications.

Andreas Spanias is Professor in the Department of Electrical Engineering Fulton School of Engineering and associate director of the ASU Arts, Media, and Engineering (AME) program at Arizona State University (ASU). His research interests are in the areas of adaptive signal processing and speech processing. He has lead research projects funded by Intel, Motorola, and the National Science Foundation. He and his student team developed the computer simulation software Java-DSP (J-DSP – ISBN 0-9724984-0-0) which is used in the ASU DSP courses. He is involved extensively in IEEE scientific activities. He is member of the DSP Committee of the IEEE Circuits and Systems society, and has served as a member in the technical committee on Statistical Signal and Array Processing of the IEEE Signal Processing society (SPS). He has also served as Associate Editor of the IEEE Transactions on Signal Processing and as General Co-chair of the 1999 International Conference on Acoustics Speech and Signal Processing (ICASSP-99) in Phoenix. He served as the IEEE Signal Processing Vice-President for Conferences and the Chair of the Conference Board. He served as a member of the IEEE Signal Processing Executive Committee and as Associate Editor of the IEEE Signal Processing Letters. He is currently serving as a member of the IEEE SPS Publications Board and as a member-at-large of the IEEE SPS Conference Board. He has been Chair of the IEEE Communications and Signal Processing Chapter in Phoenix, and is a member of Eta Kappa Nu, and Sigma Xi. Andreas Spanias is co-recipient of the 2002 IEEE Donald G. Fink paper prize award and was elected Fellow of the IEEE. He is appointed Distinguished lecturer of the IEEE SPS for 2004.

For more information on the Dallas Chapter of the IEEE Signal Processing Society, refer to <http://www.utdallas.edu/~kehtar/ieee-sp/ieee-sp-index.htm>.