



## Graduate Technology Alliance

*Bringing together business students, scientists, engineers, and others interested in innovation and technology commercialization.*

# THE 2005 TECHNOLOGY EXPO

## AUG. 30<sup>TH</sup> , 5:30 TO 7:30 PM

### About the Expo

The Graduate Technology Alliance and the Entrepreneurial & Venture Mgmt. Association are excited to bring you speakers who have developed technologies with commercial potential. This is an opportunity to get in on the ground floor of a technology or biotech startup and put your graduate school knowledge to work. These technologies need your know-how in business, law, development, and science to bring it to market. Listen to the presentations and, if you hear something you like, work with the presenter and Dr. Kathleen Allen to put together a feasibility analysis, business plan, and possibly a company.

For more information, please visit our website at:

[http://www.marshall.usc.edu/Clubs/EVMA.cfm?doc\\_id=4736](http://www.marshall.usc.edu/Clubs/EVMA.cfm?doc_id=4736)

### Agenda

5:30 to 5:40	Registration
5:40 to 5:45	Introduction
5:45 to 6:00	Leslie Liu : AudioPeer (Audio Conferencing Tool)
6:00 to 6:15	Dr. Shahram Ghandeharizadeh : H2O & C2P2 (Mobile Television)
6:15 to 6:30	Greg Placencia : OmniGrasp (Haptic Technology)
6:30 to 6:45	Dr. Dale Kiefer : EASy Software (Geographical Information System)
6:45 to 7:00	Tomas Pereira and Andy Gardner : ICT Graphics Lab (Computer Animation)
7:00 onwards	Breakout Session



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### **Tomas Pereira and Andy Gardner : ICT Graphics Lab (Computer Animation)**

Project Description: The Graphics Lab, at the USC Institute for Creative Technologies, develops methods to digitize light reflectance properties of objects. Objects, and different parts of the same object, reflect light in many different ways: diffuse, shiny and translucent, for example. The Graphics Lab is developing ways to capture the reflective properties of an object by scanning them with a variety of light sources and analyzing the reflectance components to determine which parts are matte, which are shiny, and how sharp the reflection is at each point. The reflectance information obtained will further enhance the realistic feel of CG objects in a virtual environment.

This technology will enable film producers, game developers and other visual effects experts to place photorealistic objects in real or virtual scenes, relight them and place the camera angle anywhere they wish after the shot has been captured. The flexibility of this technique allows producers to film in digital backlots at any location even if the actor is not in the location of the final shot.

The Graphics Lab has collaborated with Hollywood film producers and visual effects supervisors to create realistic lighting for computer graphics characters. The most recent work can be seen in last summer's blockbuster Spider-Man 2.



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### **Shahram Ghandeharizadeh : H2O & C2P2 (Mobile Television)**

Project Description: Advances in technology, both in the area of storage and wireless communications, have now made it feasible to envision on-demand delivery of audio and video clips among stationary and mobile devices. One application is in-vehicle entertainment systems. To elaborate, increasingly, automobiles are equipped with fold-down screens, wireless head-sets, and DVD players. Currently, the list of titles available to passengers is dictated by those DVDs in the vehicle. Using our technology, passengers may select from a library of titles for immediate display. Challenges facing our technology are availability of content and viability of a business model.

Speaker: Shahram Ghandeharizadeh received his Ph.D. degree in computer science from the University of Wisconsin, Madison, in 1990. Since then, he has been on the faculty at the University of Southern California. In 1992, Dr. Ghandeharizadeh received the National Science Foundation Young Investigator's Award for his research on the physical design of parallel database systems. During the mid 1990s, he led a team of graduate students to develop Mitra, a scalable continuous media server. In 1997, Matsushita, the parent company of Panasonic, licensed Mitra for research and development purposes. The concepts presented here are extensions of Mitra to a wireless environment. Dr. Ghandeharizadeh serves as an executive member of ACM SIGMOD, the premier forum in the area of databases. He also serves on the board of councilors of the Kodaikanal International High School in India.



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### **Dale Kiefer : EASy Software (Geographical Information System)**

Project Description: Current commercial geographic information system software falls short of meeting the needs of a significant fraction of customers involved in environmental monitoring and resource management. These products, which allow the creation of maps via computers, are often difficult to use, somewhat outdated in their architecture, and not easily adapted to represent and analyze certain types of information. System Science Applications has developed a new, dynamic Geographic Information System, called EASy, for Environmental Analysis System, to address these needs. In collaboration with marine scientists from the University of Southern California the software has been used to develop a broad range of applications ranging from the tracking of fish to operations of marine fish farms. EASy provides an integrated graphical and computational software system in which diverse types of information can be placed within a 4 dimensional context: time, latitude, longitude, and altitude or depth. EASy is simple to use, runs on PCs under the Windows operating system, is inexpensive, and is powerful. System Science Applications distributed a beta version of EASy to over 10 environmental groups involved in oceanography and coastal management, and all have found the product invaluable and superior to the existing GIS products. We believe that EASy has excellent commercial potential and can become a dominant product in the relatively new and rapidly growing area of GIS.

Speaker: Dale Kiefer, Ph.D. Biological Oceanography, Scripps Institution of Oceanography and B.S. Biology, Yale University. Dr. Kiefer, after working as a researcher for the Scripps Marine Life Research Group and Visibility Laboratory, joined the faculty at the University of Southern California and is now a full professor in the Department of Biological Sciences. He is also Chief Scientist of System Science Applications, the developer of the EASy GIS. He has earned an international reputation for his research in biological oceanography and remote sensing of the ocean. His research has been funded by numerous government agencies including the National Science Foundation, the National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration, and the Office of Naval Research. Dr. Kiefer also works actively on SSA's many applied oceanographic projects utilizing his particular expertise in at-sea data acquisition and bio-optical algorithm development for implementation within the EASy GIS software. A particular specialty involves the application of remote sensing to monitoring and managing marine resources. He has published over 50 papers, which most often explore the fields of marine microbiology and optics. He has also obtained 3 United States patents for inventions in optical instrumentation and wave damping floats.



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### **Leslie Liu : AudioPeer (Audio Conferencing Tool)**

Project Description: AudioPeer is a multi-user audio conferencing tool that is designed to provide a collaborative platform for education, social activities and cooperative work. Supporting large-scale audio conferencing is a challenging job: the end-to-end delay among speakers needs to be relatively low (around 200 to 300 ms) and at the same time, the system must also be scalable to accommodate a large number of participants. These two requirements are usually conflicting in a distributed system and radical new solutions are needed. We designed our proprietary protocol called ACTIVE (patent pending) to provide a scalable and yet low latency audio streaming platform. The ACTIVE protocol distinguishes active speakers from passive listeners and continuously optimizes the end-to-end delay among current speakers. By running the ACTIVE protocol, AudioPeer is able to support large-scale audio groups while at the same time, achieving low latency among active speakers. AudioPeer is currently implemented as an ActiveX component and has been tested in two pioneering courses during Fall 2004 and Spring 2005. AudioPeer is in its final testing stage for the first release version. For more information, please visit the AudioPeer official website at <http://audiopeer.usc.edu>.

Speaker: Mr. Leslie Liu is currently a senior Ph.D. student working at the Integrated Media Systems Center (IMSC). Mr. Liu earned his BS on computer science from Hunan University in 1999 and MSCS from U.S.C in 2002. His research interests include distributed system design, large-scale multimedia streaming architecture analysis, low-latency voice streaming and massive online gaming platforms. His work at IMSC involves research and implementation of high definition video streaming applications and low latency multi-user audio conferencing systems.



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### **Greg Placencia : OmniGrasp (Haptic Technology)**

Project Description: Touch-based i.e. “haptic” interaction has rapidly changed from a novel to an essential means of interaction. Numerous applications for force-feedback in dexterous task simulations require independent control at the fingertip level rather than at the wrist, as joysticks and master arms do. Accordingly, many haptics devices have been devised that attempt to create the feeling of grasping an object by fingers and hand. The most sophisticated of these is the CyberGrasp system, commercialized by Immersion Corporation, which is capable of providing force feedback to all five fingers independently. Unfortunately, the CyberGrasp suffers from several key design limitations, foremost of which is being restricted to transmitting unidirectional force to the fingertips and its prohibitive cost (\$40,000 +). The OmniGrasp has been designed to overcome the design limitations of the CyberGrasp by transmitting force bidirectionally to all finger segments (phalanges) and palm – as opposed to finger-tips alone. Furthermore the system has sought to use simple, low cost components to make the OmniGrasp a high fidelity, low cost alternative to the CyberGrasp. Though still in the prototype stage, several components of the OmniGrasp are in the process of being licensed, as a pending investment.

Speaker: Greg Placencia is a PhD candidate in the Daniel J. Epstein Department of Industrial and Systems Engineering in the Viterbi School of Engineering at USC. His background is in Computer Science including Computational Linguistics and Automated Learning Methods. He has specialized in Human Factors in Engineering for the past 5 years and has been doing research for the past year in Haptic (touch-based) Interaction. Greg is also the author of two books in spirituality.