

Emerging Technologies Fact Sheet

Director: Yoshifumi Kitamura, Tohoku University, Japan

Chair: Hongbo Fu, City University of Hong Kong, Hong Kong

Conference: Tuesday 19 November – Friday 22 November

Exhibition: Wednesday 20 November – Friday 22 November

Fast Facts

- The Emerging Technologies program will showcase a wide array of the latest interactive technologies from all over the world, with a total number of 17 pieces displayed at SIGGRAPH Asia 2013.
- Some of the institutions contributing to this year's Emerging Technologies program include *The City University of Hong Kong, National Taiwan University of Science and Technology, National University of Singapore, The University of Pennsylvania, The University of Bristol, The University of Tokyo, Keio University, Osaka University, and Tohoku University.*
- This year the Emerging Technologies program received a total of 40 submissions, with participation from 12 countries and regions throughout the world.
- 75% of the submissions received were from the Asia Pacific region, along with some from France, Canada, Italy, Australia, and USA.

A Quote from the SIGGRAPH Asia 2013 Emerging Technologies Director and Chair:

“Research on interactive technologies is an important academic discipline to investigate a fundamental problem of the relationship between technology and human. To drive research that will in turn help our lives in future, extensive research on creating working prototypes with novel technological innovations is crucial. Through using or enjoying the demonstration of such prototypes, we can learn the progress of technology, imagine our future lives, or even conceive further sophisticated ideas. Interactive technology has been one of the most important inseparable wheels of SIGGRAPH and SIGGRAPH Asia, and the Emerging Technologies program plays a vital role in driving the development of research communities all over the world to pursue technological innovations that will have a great impact on everyday life.

This year, the Emerging Technologies program presents a broad scope of topics, reflecting both the innovation of interactive technologies and a maturation of the field as it expands to include interactive visualization and other graphics-related technologies. Be fascinated by hands-on demonstrations that expand the limits of current display technologies, and exciting new hardware that enable more sophisticated and nuanced user input, innovative interaction techniques that enable more complex interaction with application data and functionality, as well as excellent examples of haptics developed to support multi-/cross-modality scenarios.”

SIGGRAPH Asia 2013 Emerging Technologies Program

- **A Mixed-Reality Showcase for Multiple Users from Unconstrained Viewing Angles**
Che-Hao Hsu, Chun-Chiao Chiang, and Kai-Lung Hua, National Taiwan University of Science and Technology,
Wen-Huang Cheng, Academic Sinica

This novel mixed-reality showcase will demonstrate its ability to superimpose any virtual images and the real object for unconstrained viewing angles. Currently, it is a challenge providing proper virtual images for users at different viewing locations in a 360-degree showcase. There is either a geometry inconsistency that occurs in the middle of two consecutive viewing directions, or a ghost artifact appears when showing virtual information for different viewing directions due to the use of transparent material in a commercially-available mixed-reality transparent LED display. It is believed that the proposed mixed-reality showcase will have a significant promise for commercial product advertisement and museum exhibitions.

- **Garden Agua**
Wenjun Guo, Sang-Ung Yi, Minkyu Choi, and Kyung Wone Lee, Ajou University
Seungha Yoo, Hanyang University

This innovative submission was devised to realize the aspirations of people interested in levitation, the process of floating in the air against gravity without any physical contact points. Garden Agua expresses real-time three-dimensional depth received by Kinect in its instantaneous water height, and can be easily utilized as a musical instrument playable by anybody. Garden Agua is able to play a variety of music by taking advantage of the three-dimensional space and demonstrates that levitation can happen through giving life to a secondary object with new energy supplied through a body of water, which is also a medium that symbolizes life. Through this work, new life will be brought to things that cannot breathe on their own.

- **Cuddly: Enchant Your Soft Objects with a Mobile Phone**
Suzanne Low, Yuta Sugiura, Kevin Fan, and Masahiko Inami, Keio University

Cuddly is a smartphone application that can enchant soft objects to enhance interaction with various objects. Cuddly utilizes the phone's camera and light to detect the surrounding brightness. By integrating Cuddly and then compressing the object, the brightness level decreases. Utilizing the change in values, diverse entertainment applications can be further implemented.

- **Notori: Reviving a Worn-out Smartphone by Combining Traditional Wooden Toys with Mobile Apps**
Yuichiro Katsumoto, Keis-NUS CUTE Center
Masa Inakage, Keio University

Notori is a play kit that can revive a worn-out smartphone. As the performance ability of smartphones has increased exponentially, the number of devices that are serviceable but not in use is

also increasing. By combining the use of traditional wooden toys with simple mobile applications, Notori revitalizes dated smartphones and provides an attractive experience for children.

- **Concert Viewing Headphones**

Masatoshi Hamanaka and Seunghee Lee, University of Tsukuba

This piece focuses heavily on user interaction and is designed to let a user listen to as well as watch a particular part of a musical performance that he or she specifies using a set of headphones. The concert viewing headphones are equipped with a projector, an inclination sensor on the top of the headphones, and a distance sensor on the outside right speaker. These headphones have both images and sound processing functions – the image processing extracts the portion of the image indicated by the user and projects it free of distortion on walls located to the front and side of the user. The sound processing creates imaginary microphones for those performers without one so that the user can hear the sound from any performer.

- **Jointonation: Robotization of the Human Body by Vibrotactile Feedback**

*Yosuku Kurihara, Taku Hachisu, and Hiroyuki Kajimoto, The University of Electro-Communications
Katherine Kuchenbecker, University of Pennsylvania*

Jointonation is an augmented reality system that modulates haptic intonation of the human joint. To create realistic robot-like body sense, vibrotactile feedback using the vibration recording of real robot actuation, data-driven modeling based on spectral approximation, and vibrotactile rendering to the user's elbow joint as a function of elbow angular velocity are proposed. Combined with conventional visual augmented reality and sound effects, Jointonation allows the user to virtually robotize his or her body visually, aurally, and haptically.

- **Comix: Beyond: Evoking Multiple Emotions using Pseudo Body Responses Depending on the Context**

Sho Sakurai, Toki Katsumura, Takuji Narumi, Tomohiro Tanikawa, and Michitaka Hirose, The University of Tokyo

Existing HCI studies that deal with human emotion have realized the methods to evoke a single emotion by providing single sensory stimulus. In this submission, the proposed approach "Comix: beyond" tries to evoke multiple emotions by presenting combinations of sensory stimulus that resemble real bodily responses, based on the contexts in different contents such as a comic, as if the user feels those as their own real bodily responses.

- **Data-driven Suggestions for Portrait Posing**

Hongbo Fu, Xiaoguang Han, and Quoc Huy Phan, City University of Hong Kong

With the help of a consumer-level depth sensor, this innovative technique automatically produces data-driven posing suggestions, which can serve as either visual guidance or stimulate creativity for portrait photographers. This tool is also a tremendously helpful aid for unskilled photographers to create aesthetically pleasing portraits with diversity.

- **D-FLIP: Dynamic & Flexible Interactive Photoshow**
Yoshifumi Kitamura and Kazuki Takashima, Tohoku University
Chi Thanh Vi and Siriam Subramanian, University of Bristol
Gengdai Liu, OLM Digital Inc.
Yuichi Itoh, Osaka University

D-FLIP proposes a novel algorithm that dynamically displays a set of digital photos using different principles for organizing them. A variety of requirements for photo arrangements can be flexibly replaced or added through the interaction and the results are continuously and dynamically displayed.

Full information about the Emerging Technologies program can be found on <http://sa2013.siggraph.org/en/attendees/emerging-technologies.html>.

For more information about SIGGRAPH Asia 2013 program updates, please visit <http://sa2013.siggraph.org>.