



SIGGRAPH  
ASIA2012

# **WASA 2012**

Workshop at SIGGRAPH Asia 2012

## **Program Handbook**

November 26 – 27, 2012

Fusionopolis, Singapore

1 Fusionopolis Way,

Level 13 Connexis (North Tower)

Singapore 138632

## Workshop Location

### How to get here:

#### By Taxi:

The travelling time from Changi Airport to Fusionopolis takes 30min during off peak hours. All taxis are metered and the cost is about SGD \$30. There is an additional surcharge of 25% during peak hours of 6am to 9:30am and 6pm to midnight. For more information, please refer to <http://www.taxisingapore.com/taxi-fare/>.

#### By Car:

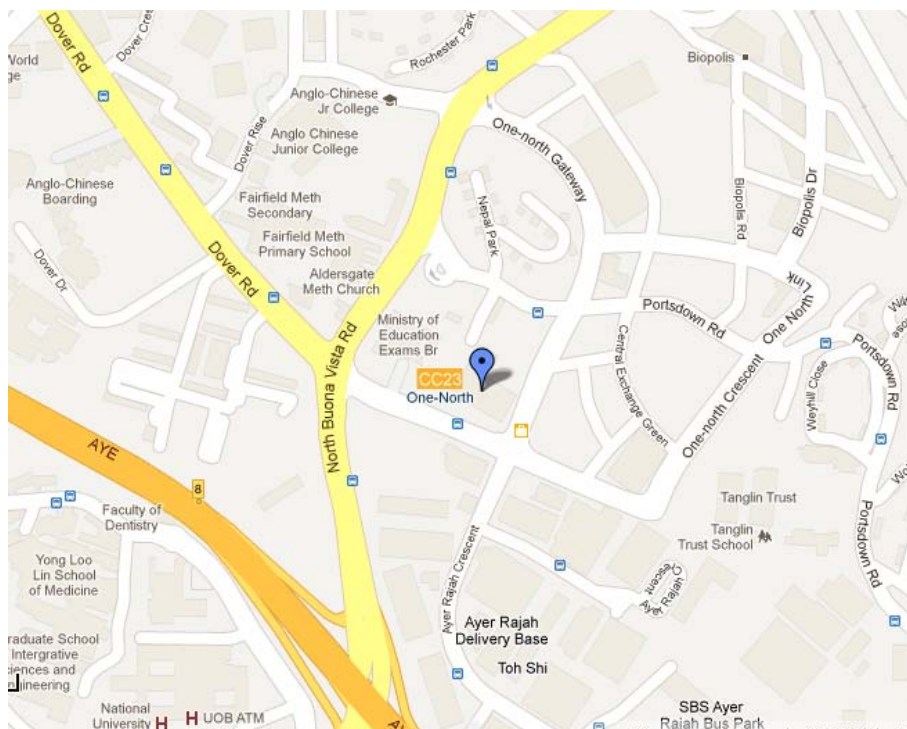
##### If travelling along AYE

Exit from AYE at exit 8 and turn into North Buona Vista Road. Turn right into Ayer Rajah Ave.

##### If travelling along PIE

Exit from PIE at exit 20A/20B and turn into Adam Road. Follow the road to Queensway and turn right into Commonwealth Ave. Turn left into North Buona Vista Road. Turn left into Ayer Rajah Ave.

Google map location: <http://goo.gl/maps/0rpN6>



**By MRT:**

Fusionopolis is situated directly at One-North MRT station along the Circle line (yellow).

*If travelling along East-West line (green)*

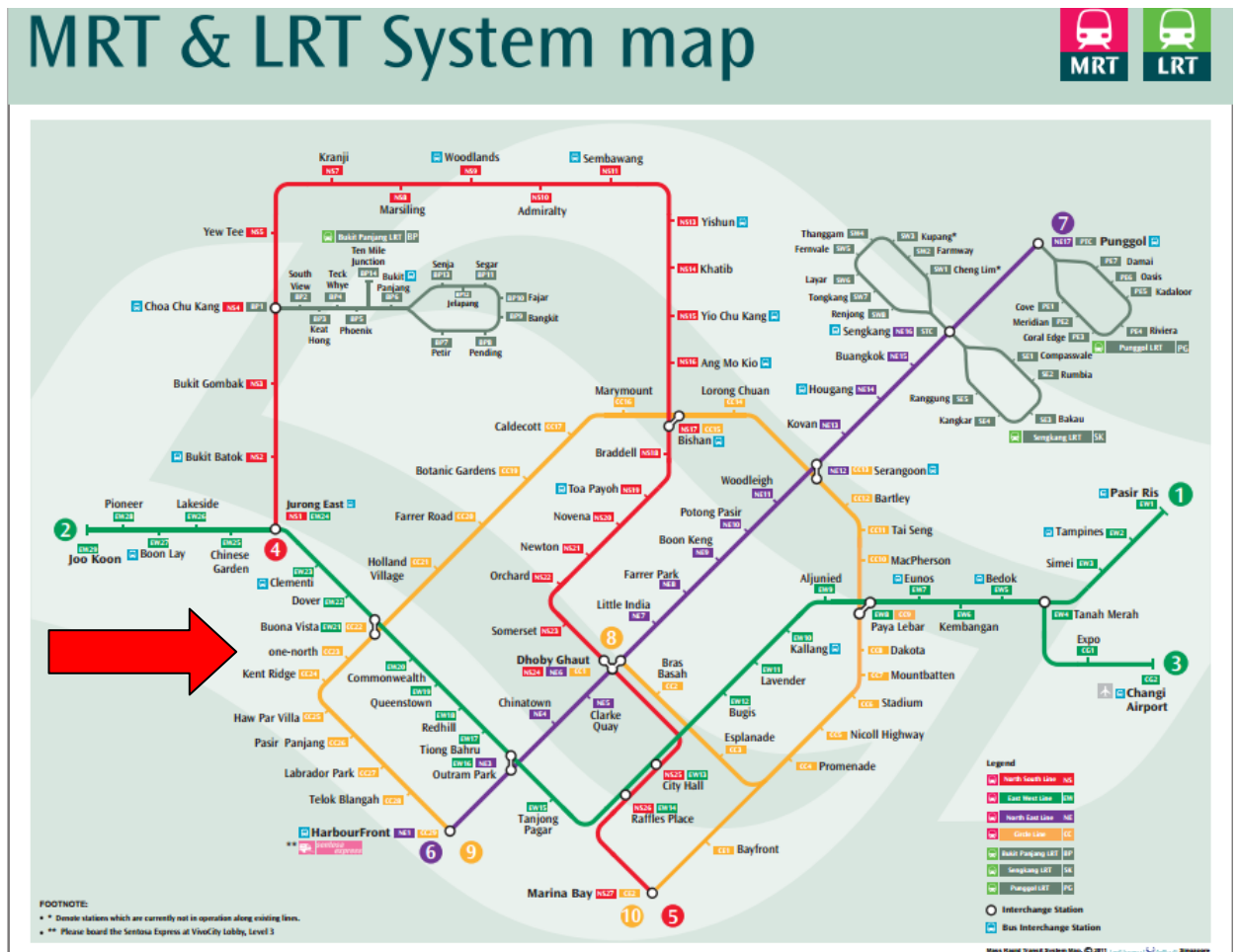
Make a transfer at Buona Vista station to the Circle line (yellow)

*If travelling along North-East line (purple)*

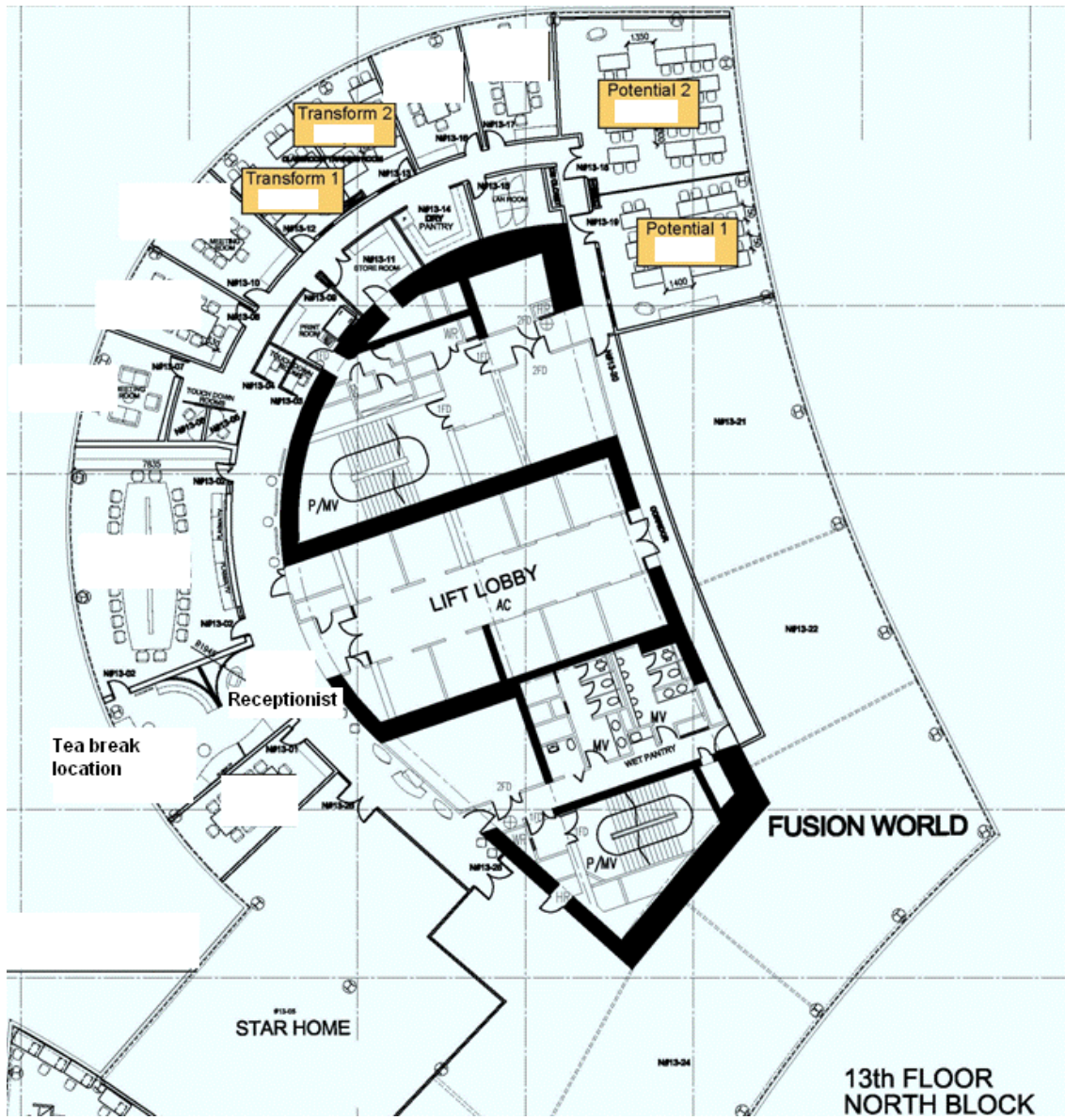
Make a transfer at Harbourfront station to Circle line (yellow)

For more information, please refer to

<http://www.smrt.com.sg/Trains/NetworkMap.aspx>



### Fusionopolis, Level 13 Connexis (North Tower)



## Useful Information

### WASA Registration

WASA Registration will be held at Level 1 lobby of North Connexis Tower, Fusionopolis for 26<sup>th</sup> Nov and 27<sup>th</sup> Nov. During the registration, you will be given the workshop goodie bag which includes a hardcopy of the program and a CD-ROM for the workshop proceedings.

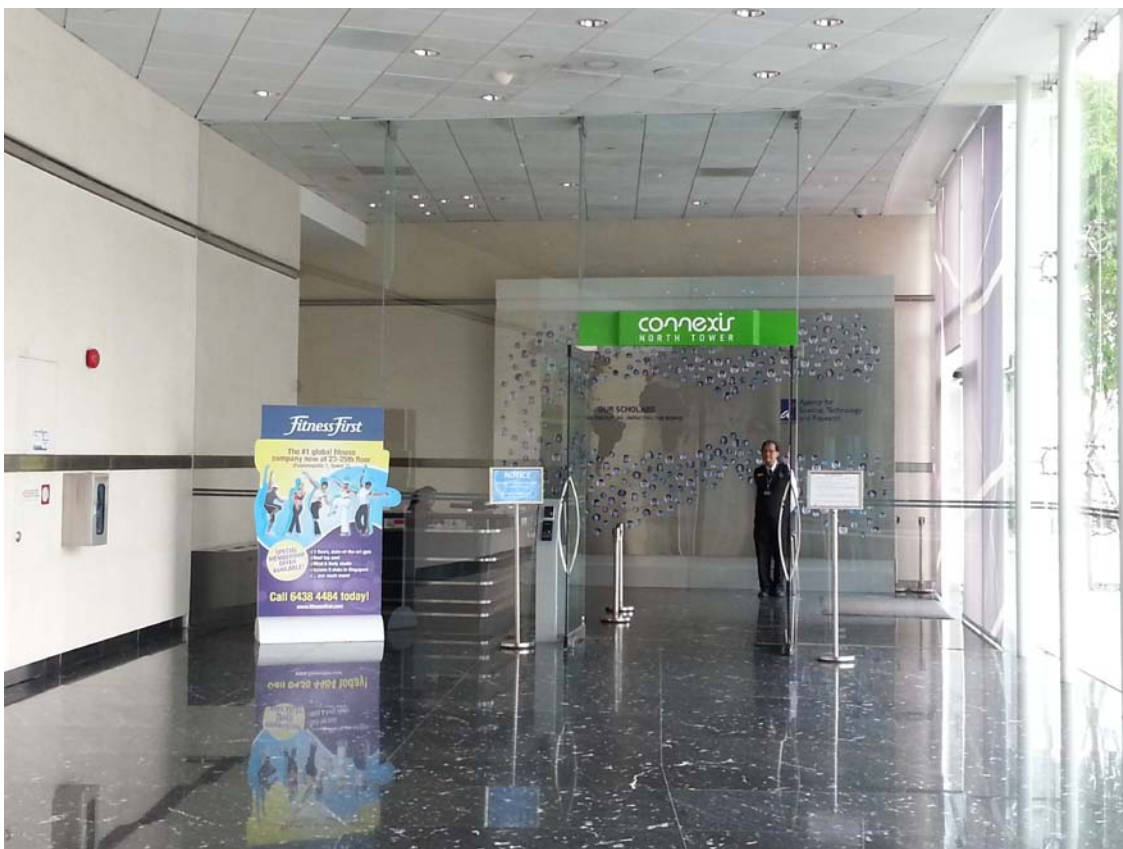


Figure: Level 1 lobby of North Connexis Tower, Fusionopolis

### Access to Internet

Wireless Internet is available from the workshop rooms, but a local mobile number is required for registration. The steps below is for laptop, but the procedure is the same for mobile phone.

1. Connect to the wireless network with SSID: **FP-GUEST**

2. Launch your browser and connect to any website. For example, [www.google.com.sg](http://www.google.com.sg). You will be shown a Web Authentication page.



**Login**

**Welcome to the Fusionopolis Wireless Network**

SCEI is pleased to provide the Wireless Internet connections. Please call ITSS helpdesk at 64191118 if you have any problem.

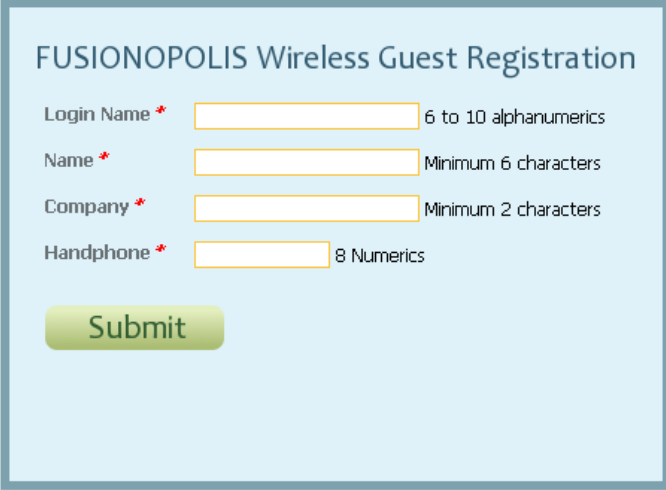
If you don't have account with us, please [Register here](#) with your mobile phone.

User Name

Password

**Submit**

3. Click on the “Register here” link. You will be shown a registration popup. Fill in the details and your local mobile phone number. Click on Submit.



**FUSIONOPOLIS Wireless Guest Registration**

Login Name \*  6 to 10 alphanumerics

Name \*  Minimum 6 characters

Company \*  Minimum 2 characters

Handphone \*  8 Numerics

**Submit**

4. A SMS will be sent to your mobile phone with the login name and the password. This credential is valid for one full day.

## **Banquet**

There will be a banquet held on **26<sup>th</sup> Nov** at **7pm**. The location of the banquet is at Penang Place Restaurant, #B1-20/24 at Fusionopolis. Penang Place Restaurant serves the authentic flavours of Penang cuisine which is a melting pot-of the local Malay, Thai, Indian and Chinese flavours. A banquet admittance coupon will be issued to you during the registration.

## **Tea breaks**

2 Tea breaks are provided each day for workshop attendees. The tea breaks will be held behind the receptionist counter at N13.

## **Lunch**

You can have lunch on your own in one of the many outlets in Fusionopolis.

### Food Court

1. Food Chain Food Court - #B1-10

### Cafes, Restaurants and Bars

1. The Soup Spoon - #B2-10
2. Amino Bar - #B1-01
3. Hungry Wich's - #B1-03
4. Eighteen Chefs Trattoria - #B1-12/13
5. Penang Place Restaurant - #B1-20/24
6. SaladStop! - #01-03
7. Ya Kun Toastwich - #01-12
8. Starbucks Coffee - #01-20
9. Pastamania - #01-21

10.Black Canyon Coffee & International Thai Cuisine - #02-01/02

11.Koryo (Korean) Restaurant - #02-10

12.Shin Nichi Japanese Restaurant - #02-20/21

13.Shin Nichi Lite - #02-22

Supermarket

1. Cold Storage - #B2-10



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## Organising Committee

### **Workshop Chair**

Prof. Dinesh Manocha, University of North Carolina, USA

### **Workshop Co-Chair**

Prof. Marianne Winslett, University of Illinois, USA

### **Technical Program Chair**

Dr. Joo-Hwee Lim, Institute for Infocomm Research, A\*STAR, Singapore

### **Technical Program Co-Chair**

Dr. Rongshan Yu, Institute for Infocomm Research, A\*STAR, Singapore

### **Treasurer**

Dr. Jing Zhang, Nanyang Technological University, Singapore

### **Publication Chair**

Dr. Jiang Wenyu, Institute for Infocomm Research, A\*STAR, Singapore

### **Local Arrangement Chair**

Mr. Chia Shue Ching, Institute for Infocomm Research, A\*STAR, Singapore

### **Organizers**

Mr Zhu Zijian, Orson, Institute for Infocomm Research, A\*STAR, Singapore

Mr Ho Chee Tat, Thomas, Institute for Infocomm Research, A\*STAR,  
Singapore

Ms Wong Lai Chun, Lily, Institute for Infocomm Research, A\*STAR,  
Singapore

Mr Wirianto, Chris, Institute for Infocomm Research, A\*STAR, Singapore

## Program Timetable

### Computer Gaming

Date: 26 Nov 2012

Location: N13, Potential 1 & Potential 2

Chair: Ruck Thawonmas, Ritsumeikan University, Japan

Co-Chair: Sung-Bae Cho, Yonsei University, Korea

Co-Chair: Philip Hingston, Edith Cowan University, Australia

Time	Title
0900 to 0950	<b>Keynote 1</b> -- Recent Game AI for Competitions by Sung-Bae Cho
0950 to 1040	<b>Keynote 2</b> -- Game Playing as Mediatonal Means for Inheriting and Sharing Culture by Mitsuyuki Inaba
1040 to 1100	Coffee Break
1100 to 1125	<b>Invited Talk 1</b> -- Summary of Virtual Museum Visit Experience in Comic Forms by Ruck Thawonmas
1125 to 1150	Prediction of Early Stage Opponents Strategy for StarCraft AI using Scouting and Machine Learning by Hyunsoo Park, Ho-Chul Cho, KwangYeol Lee, and Kyung-Joong Kim
1150 to 1215	Modeling of Bot Usage Diffusion across Social Networks in MMORPGs by Jiyoung Woo, Ah Reum Kang, and Huy Kang Kim
1215 to 1240	Survey and Research Direction on Online Game Security by Jiyoung Woo and Huy Kang Kim
1240 to 1400	Lunch Break
1400 to 1425	<b>Invited Talk 2</b> -- On the Problem at Issue of Game Preservation: From the Experiences of Game Archive

	Project in Japan by Kazufumi Fukuda, Koichi Hosoi, and Akinori Nakamura
1425 to 1450	Gamepad vs. Touchscreen: A Comparison of Action Selection Interfaces in Computer Games by Masaki Oshita and Hirotaka Ishikawa
1450 to 1515	Towards an Expression Recognition Game to Assist the Emotional Development of Children with Autism Spectrum Disorders by Natalie Harrold, Chek Tien Tan, and Daniel Rosser
1515 to 1540	Component-based Approach for Prototyping of Movie-based Physical Therapy Games by Yoshihiro Okada, Takayuki Ogata and Hiroyuki Matsuguma
1540 to 1600	Coffee Break
1600 to 1625	Dynamic Quest Plot Generation using Petri Net Planning by Young-Seol Lee and Sung-Bae Cho
1625 to 1650	3D Game Model and Texture Generation using Interactive Genetic Algorithm by DuMim Yoon and Kyung-Joong Kim
1650 to 1715	Evolving Story and Character Generation for Role-Playing Games by Umair Azfar Khan and Yoshihiro Okada
1715 to 1740	Framework for Multi-agent Planning and Coordination in DIS by Efstathios Goudoulakis, Abdennour El Rhalibi, Madjid Merabti and A. Taleb-Bendiab

## Human Robot Interaction

Date: 26 Nov 2012

Location: N13, Transform 1 & Transform 2

Chair: Tee Keng Peng, Institute for Infocomm Research, A\*Star, Singapore

Time	Title
0900 to 0950	<b>Invited Talk 1</b> -- Augmented Reality Applications in Design and Manufacturing by Prof. Andrew Nee, National University of Singapore
0950 to 1040	<b>Invited Talk 2</b> -- Computer Modeling of Intention Perception by David Pautler, Institute of High Performance Computing, A*STAR
1040 to 1100	Coffee Break
1100 to 1120	<b>Invited Talk 3</b> -- Why and how do people deceive others? A suggestion toward interactive dialog systems that encourages people to be honest by Kayo Sakamoto, Institute of High Performance Computing, A*STAR
1120 to 1140	The Nature of Dialog, Structural and Lexical Markers of Dialogic Teacher/Learner interactions by Sebastian Feller, Institute of High Performance Computing, A*STAR
1140 to 1200	Cute and Soft: Baby Steps in Designing Robots for Children with Autism by John-John Cabibihan, National University of Singapore
1200 to 1220	Developing a Robotic Platform to Play with Pre-school Autistic Children in a Classroom Environment by Alvin Wong, Institute for Infocomm Research, A*STAR
1220 to 1240	Older Adults' Attitudes toward Homes Service Robots by Jamie Ng, Institute for Infocomm Research, A*STAR
1240 to 1400	Lunch Break

1400 to 1420	Adaptive Impedance Control for Natural Human-Robot Collaboration by Yanan Li, National University of Singapore
1420 to 1440	A GIM-based Approach for Biomimetic Robot Motion Learning by Qinyuan Ren, National University of Singapore
1440 to 1500	Intuitive Interaction for Robotic Grasping by Rui Yan, Institute for Infocomm Research, A*STAR
1500 to 1520	Singularity Robust Inverse Kinematics for a Humanoid Robot with Minimum Energy Configuration and Self-Collision Avoidance by Yuanwei Chua, Institute for Infocomm Research, A*STAR
1520 to 1540	System Architecture for an Interactive Patrolling Humanoid Robot by Albertus Adiwahono, Institute for Infocomm Research, A*STAR
1540 to 1600	Coffee Break
1600 to 1620	Emotional Sentence Identification in a Story by Zhengchen Zhang, National University of Singapore
1620 to 1640	Attention-based Addressee Selection for Social Robots to Interact with Multiple Persons by Liyuan Li, Institute for Infocomm Research, A*STAR
1640 to 1700	Towards More Engaging Telepresence using Face Tracking by Yuanwei Chua, Institute for Infocomm Research, A*STAR
1700 to 1720	Force and Torque Simulation in Virtual Tennis by Louis Fong, Institute for Infocomm Research, A*STAR

## Visualization

Date: 27 Nov 2012

Location: N13, Potential 1 & Potential 2

Chair: Vijay Natarajan, Indian Institute of Science, Bangalore

Co-Chair: Lars Linsen, Jacobs University, Germany

Time	Title
0900 to 0950	<b>Invited Talk 1</b> -- Flows Maps for Flow Visualization by Holger Theisel, University of Magdeburg, Germany
0950 to 1040	<b>Invited Talk 2</b> -- Visual Analytics for Large Scale Flow Fields by Han-Wei Shen, The Ohio State University, Columbus, USA
1040 to 1100	Coffee Break
1100 to 1150	<b>Invited Talk 3</b> -- Multi-Scale Morse Theory and Data Streaming for Science Discovery: Scaling Visualization Tools from Handheld Devices to In-Situ Analytics by Valerio Pascucci, Center for Extreme Data Management Analysis and Visualization, University of Utah, USA
1150 to 1240	<b>Invited Talk 4</b> -- Big Data Visualization by Kwan-Liu Ma, University of California, Davis, USA
1240 to 1400	Lunch Break
1400 to 1450	<b>Invited Talk 5</b> -- Visual Analysis of Text Data by Huamin Qu, Hong Kong University of Science and Technology, Hong Kong
1450 to 1510	Coffee Break
1510 to 1535	Topology Exploration with Hierarchical Landscapes by Demir, Dogan - The University of Utah Beketayev, Kenes - Lawrence Berkeley National Laboratory Weber, Gunther H. - Lawrence Berkeley National

	<p>Laboratory  Bremer, Peer-Timo - Lawrence Livermore National Laboratory  Pascucci, Valerio - The University of Utah  Hamann, Bernd - University of California Davis</p>
1535 to 1600	<p>Geometry-Preserving Topological Landscapes by  Beketayev, Kenes - Lawrence Berkeley National Laboratory  Weber, Gunther H. - Lawrence Berkeley National Laboratory  Morozov, Dmitriy - Lawrence Berkeley National Laboratory  Abzhanov, Aidos - Nazarbayev University  Hamann, Bernd - University of California Davis</p>
1600 to 1625	<p>Luggage Visualization and Virtual Unpacking by  Li, Wei - Siemens Corporation, Corporate Research &amp; Technology  Paladini, Gianluca - Siemens Corporation, Corporate Research &amp; Technology</p>
1625 to 1650	<p>HeartPad: Real-Time Visual Guidance for Cardiac Ultrasound by  Ford, Steven - Norwegian University of Science and Technology  Kiss, Gabriel - Dept. of Circulation and medical imaging, St Olafs Hospital  Viola, Ivan - Institute for Informatics , University of Bergen, Norway  Bruckner, Stefan - Vienna University of Technology  Torp, Hans - Dept. of Circulation and medical imaging, St Olafs Hospital</p>



## Contents in Digital Human and Model Retrieval

Date: 27 Nov 2012

Location: N13, Transform 1 and Transform 2

Chair: Charlie C. L. Wang, The Chinese University of Hong Kong, China

Co-Chair: Caterina Rizzi, University of Bergamo, Italy

Co-Chair: Jerry Fuh, National University of Singapore, Singapore

Time	Title
0900 to 0950	<b>Invited Talk 1</b> -- Crowd modelling and Simulation, by Daniel Thalmann, Nanyang Technological University, Singapore
0950 to 1040	<b>Invited Talk 2</b> -- Modelling multiscale Human: A marie Curie European Project by Nadia Magnenat-Thalmann, MIRALab, University of Geneva and Nanyang Technological University, Singapore
1040 to 1100	Coffee Break
1100 to 1150	<b>Invited Talk 3</b> -- A flexible and efficient approach to assembly model retrieval by Shuming Gao, Zhejiang University, China
1150 to 1240	<b>Invited Talk 4</b> -- Santos: a virtual human from analysis to predictive dynamics by Anith Mathai, University of Iowa, US
1240 to 1400	Lunch Break

## Abstracts and Biography

### Recent Game AI for Competitions

**Speaker:**

Sung-Bae Cho

Yonsei University, Korea

([sbcho@yonsei.ac.kr](mailto:sbcho@yonsei.ac.kr))

**Location & Date:**

N13 Potential 1 & 2, 26<sup>th</sup> Nov 2012, 0900 to 0950

**Abstract:**

Within the CIG community, a number of competitions have in recent years been set up, to foster greater participation in the research activities and allow for easy and fair benchmarking of AI techniques in game environments. These competitions are run annually at the CIG conference, and some of them also run at CEC or WCCI. Most of these competitions are based on well-known video games such as Ms. Pac-Man, Super Mario Bros, Unreal Tournament and the racing game TORCS. The software developed for these competitions is freely available to allow for easy experimentation and benchmarking. In this talk, the competitions and their associated benchmarks and APIs are explained, and an overview is given of the state of the art with regards to the problem posed by each competition (e.g. high-performing strategies, human-like playing, or level generation).

**Speaker Biography:**

Professor Sung-Bae Cho received the Ph.D. degree in computer science from KAIST (Korea Advanced Institute of Science and Technology), Taejeon, Korea, in 1993. He was an Invited Researcher of Human Information Processing Research Laboratories at ATR (Advanced Telecommunications Research) Institute, Kyoto, Japan from 1993 to 1995, and a Visiting Scholar at University of New South Wales, Canberra, Australia in 1998. He was also a Visiting Professor at University of British

Columbia, Vancouver, Canada from 2005 to 2006. Since 1995, he has been a Professor in the Department of Computer Science, Yonsei University. His research interests include neural networks, pattern recognition, intelligent man-machine interfaces, evolutionary computation, and artificial life. He is a Senior Member of IEEE and a Member of the Korea Information Science Society, the IEEE Computer Society, the IEEE Systems, Man, and Cybernetics Society, and the Computational Intelligence Society.

## **Game Playing as Mediatlional Means for Inheriting and Sharing Culture**

**Speaker:**

Mitsuyuki Inaba  
Ritsumeikan University, Japan  
([inabam@sps.ritsumeai.ac.jp](mailto:inabam@sps.ritsumeai.ac.jp))

**Location & Date:**

N13 Potential 1 & 2, 26<sup>th</sup> Nov 2012, 0950 to 1040

**Abstract:**

The speaker introduces research on cultural learning using 3D metaverse as mediational means for co-playing and dialogue among learners. 3D metaverse is a platform for providing immersive virtual spaces with digitized objects and architectures on the Internet. An avatar enables the visitors to the 3D space to participate in embodied social interactions with other avatars. These features of the Metaverse are beneficial in implementing an environment for learners to inherit and share traditional tangible and intangible cultural heritage by situating them in social interaction, which has been difficult to realize in the conventional web-based e-Learning platform.

First, the speaker demonstrates the 3D metaverse environment constructed by their research group for cultural learning in SecondLife. It includes Japanese tangible cultural properties such as Shinto shrine and virtual museums for Kimono costume. Various intangible cultural heritages are also digitized and preserved in the environment. For example, the visitors can perform a Noh play as avatars, whose body movements are captured from a real Noh player. They can also experience practicing manners of Shinto rituals by visiting the shrine as avatars.

Second, the speaker explains the results of learning experiments based on "co-playing and dialogue" framework using the environment. Both international and Japanese students interacted in the Metaverse during

the experiments. They also exchanged questions, impressions, and interpretations on traditional culture and customs in Japan. The speaker's research group analyzed their interactions and learning processes both in real and virtual worlds quantitatively and qualitatively.

Finally, the speaker discusses advantages and limitations in cultural learning based on "co-playing and dialogue" framework from the viewpoint of inheriting and sharing traditional culture.

**Speaker Biography:**

Mitsuyuki Inaba is a professor in the college of policy science at Ritsumeikan University, Kyoto, Japan. He is the leader of e-Learning project at the Digital Humanities Center for Japanese Arts and Cultures (DH-JAC) of Ritsumeikan University. He is also the principle investigator of Metaverse Learning Project. He is an international board member of ADHO/centerNet and JADH. He has published many research articles on Metaverse Learning, Computer-Supported Collaborative Learning, Educational Technology, and Digital Archives.

## Summary of Virtual Museum Visit Experience in Comic Forms

**Speaker:**

Ruck Thawonmas

Ritsumeikan University, Japan

([ruck@ci.ritsumei.ac.jp](mailto:ruck@ci.ritsumei.ac.jp))

**Location & Date:**

N13 Potential 1 & 2, 26<sup>th</sup> Nov 2012, 1100 to 1125

**Abstract:**

In this talk I will present a system, under development at our laboratory, for automatically generating comics from visit log obtained at a metaverse museum. Metaverse, such as Second Life, is a 3D virtual world where users can act freely, such as visiting museums or chatting with others, according to their own purposes. Compared with existing approaches for representing user experiences using snapshots or video clips, the comic approach can allow users to grasp the whole story at one glance, facilitate distinguishing of important frames, and exploit varieties of comic writing techniques. In order to summarize user experience into comic's frames, detection of important experience, interesting exhibits in case of the museums, is an important task. I will describe a module for frame extraction based on the displacement amount of a user of interest at a metaverse museum. In addition, I will describe a camerawork module for representing events in a virtual museum with a comic style. The module uses four basic camera shots, i.e., internal, external, apex, and group, to compose a shot sequence of two main events happening in a museum, i.e., move and stay. I will also discuss user studies on the aforementioned modules and introduce on-going work on comic-frame layout.

**Speaker Biography:**

Professor Ruck Thawonmas received the B.Eng. degree in electrical engineering from Chulalongkorn University, Bangkok, Thailand, in 1987, the M.Eng. degree in information science from Ibaraki University, Ibaraki, Japan, in 1990, and the D.Eng. degree in information engineering from

Tohoku University, Sendai, Japan, in 1994. Before joining Ritsumeikan University, Kusatsu, Shiga, Japan, in April 2002, he had worked at various institutions: Hitachi, Ltd.; RIKEN; University of Aizu; and Kochi University of Technology. Since April 2004, he has been a Full Professor in the Department of Human and Computer Intelligence where he leads the Intelligent Computer Entertainment Laboratory. His research interests include game AI, automatic comic generation, and player-behavior analysis. His laboratory has won a number of game AI competitions: the winning controllers at the 2009 IEEE Congress on Evolutionary Computation (CEC) and the 2009 IEEE Conference on Computational Intelligence and Games (CIG) Ms. Pac-Man Competitions (screen-capture version), the winning ghost team at the 2011 IEEE CECMs. Pac-Man Versus Ghosts Competition, and the winning human bot and judge bot at the 2011 BotPrize (at the 2011 IEEE CIG).

## **On the Problem at Issue of Game Preservation: From the Experiences of Game Archive Project in Japan**

### **Speakers:**

Kazufumi Fukuda, Koichi Hosoi, and Akinori Nakamura  
Ritsumeikan University, Japan

### **Location & Date:**

N13 Potential 1 & 2, 26<sup>th</sup> Nov 2012, 1400 to 1425

### **Abstract:**

Video games are widely available on the world. On the other hand, it is said that video game preservation is in a crisis situation. The main reason is that Video game's life span is too short due to the natural decay of the materials, and the rapid obsolescence of media form. In addition, Video games consist of a combination of various media types. because it is said that video game preservation is difficult. Nowadays, old video games and their information are important for social/cultural studies.

Game Archive Project is research project for video game preservation which started in 1998. Mainly, We takes two approach for constructing of video game archives. First, We have been a exploring the effectiveness of the archive in the combination of the three methodology. They are physical archives, emulator archives and video archives. These are attempt to save the contents including the play in the game. Secondly, We are constructing a database of video games. In this talk, We will present some problems and several approaches to the problems of game preservation through the experiences of Game Archive Project.

### **Speakers Biography:**

1. Kazufumi Fukuda is an advisory fellow in Graduate School of Core Ethics and Frontier Science at Ritsumeikan University, and a director general of DiGRA JAPAN. His main research interests are in business administration, video game and digital preservation. He received his MS degree in policy science from Graduate School of Policy Science at Ritsumeikan University,



Ph.D. Degree from Ritsumeikan University in 2012. From 2001 to 2012, he has been researching in "Game Archive Project" at Ritsumeikan University.

2. Koichi Hosoi is a professor in College of Image Arts and Science at Ritsumeikan University, a president of Digital Game Research Association JAPAN(DiGRA JAPAN), a vice chairman of Art Research Center(ARC), and a board member of Ritsumeikan Center for Game Studies(RCGS). He received his Ph.D. degree of business administration from Ritsumeikan University. He started "Game Archive Project" collaborated with Nintendo, Sega and Kyoto local government in 1998.

3. Akinori Nakamura is an professor in College of Image Arts and Science at Ritsumeikan University, and a board member of Ritsumeikan Center for Game Studies(RCGS). He received his Ph.D. degree at Nagoya University.

## **Augmented Reality Applications in Design and Manufacturing**

### **Speaker:**

Prof Andrew Yeh-Ching Nee

Department of Mechanical Engineering, National University of Singapore  
([mpeneeyc@nus.edu.sg](mailto:mpeneeyc@nus.edu.sg))

### **Location & Date:**

N13 Transform 1 & 2, 26<sup>th</sup> Nov 2012, 0900 to 0950

### **Abstract:**

Virtual reality has been used successfully to simulate engineering and manufacturing operations for a number of years. Augmented reality is a natural progression from virtual reality and its ability to superimpose graphics, text, video and audio information on a real scene has made AR more intuitive than VR.

This presentation first introduces the background of manufacturing simulation applications and the initial AR developments, followed by the current hardware and software tools associated with AR. Various studies of design and manufacturing activities, such as AR-assisted collaborative design, robot path planning, plant and facility layout, equipment maintenance, CNC simulation, and assembly operations using AR tools have been developed to assist manufacturing operations. Although AR technologies have been applied successfully, there are challenges such as human factors and interactions in AR systems as well as future trends and developments which will need to be addressed.

### **Speaker Biography:**

A.Y.C. Nee is professor in the Department of Mechanical Engineering, National University of Singapore since 1989. He received his PhD and DEng from Manchester and UMIST respectively. His research interest is in CAD of tool, die, fixture and process planning, augmented reality applications in manufacturing, sustainable manufacturing. He is a Fellow of CIRP (International Academy for Production Engineering) and SME (Society of Manufacturing Engineers), both elected in 1990. He served as

the President of CIRP (2011-2012). Currently, he is the chief editor of Springer, World Scientific and Scrivener-Wiley book series on manufacturing technologies, and Asia editor of IJAMT and IJMTM, as well as editorial boards of some 20 international journals. He has published over 450 refereed journal and conference papers and 11 edited and authored books. He has received many awards and is a Fellow of the Academy of Engineering of Singapore.

## Computer Modeling of Intention Perception

**Speaker:**

Dr David Pautler

Institute of High Performance Computing, A\*STAR

([pautlerd@ihpc.a-star.edu.sg](mailto:pautlerd@ihpc.a-star.edu.sg))

**Location & Date:**

N13 Transform 1 & 2, 26<sup>th</sup> Nov 2012, 0950 to 1040

**Abstract:**

When pedestrians and drivers navigate around each other on a busy street, when we work with someone to fix something, and when we notice that someone needs help, our minds are doing intention perception. It is the ability to make good guesses about what other people are trying to do, just by watching what they do. We have developed a computational model of this cognitive process that starts from an animation of simple geometric figures and which infers the trajectory of each figure, and from that, either a physical cause or intention that might be driving the trajectory. This scientific model has potential applications in virtual characters and, when combined with computer vision techniques, in caretaker robots.

**Speaker Biography:**

David sees intention perception as the core intellectual puzzle of social cognition, and the greatest technological challenge in getting systems to achieve their promise of tight cooperation with human users. The latter is especially pressing due to our rapidly-growing population of elders and much more slowly-growing population of caregivers. He was a software engineer in both a startup and a large Internet company for nine years in California. In 2007, he led the development of an award-winning webmail service for the blind and sight-impaired. David has managed the Computational Social Cognition programme of IHPC for four years in collaboration with its director, Prof. Andrew Ortony, and with Dr. Ilya Farber. He is an alumnus of University of Illinois-Urbana Champaign, Northwestern University, and University of Hawaii-Manoa.

## **Why and how do people deceive others? A suggestion toward interactive dialog systems that encourages people to be honest**

### **Speaker:**

Dr Kayo Sakamoto

Institute of High Performance Computing, A\*STAR

([sakamotok@ihpc.a-star.edu.sg](mailto:sakamotok@ihpc.a-star.edu.sg))

### **Location & Date:**

N13 Transform 1 & 2, 26<sup>th</sup> Nov 2012, 1100 to 1120

### **Abstract:**

In this talk, I will consider the possibility to develop an interactive dialog system that prevents users from deceiving the system. The idea comes from cognitive science studies on deception, specifically, studies on how and why people deceive others. On the question of “how”, I will introduce an action plan-based taxonomy of deception, in which deceptive strategies are classified based on action goals and types of information manipulation. The taxonomy suggests that the ways people manipulate honest information depends on the type of their goal. On the question of “why”, I will introduce different factors of motivations that affect people’s decision whether to deceive others, and in what way. Finally, I suggest how an interactive dialog system can be built to lead users to communicate honestly with the system. The system will adapt itself to users’ input in order to minimize their motivation to give dishonest responses.

### **Speaker Biography:**

Kayo Sakamoto is a scientist in Institute of High Performance Computing, Singapore Agency for Science, Technology, and Research (A\*STAR). She completed her PhD on cognitive science at the Tokyo Institute of Technology. Her methodology involves techniques in computational cognition, behavioral experiments, and text mining. She has worked on verbal deception from a variety of viewpoints such as linguistic formalisms, decision science, and social psychology.

## Flows Maps for Flow Visualization

**Speaker:**

Holger Theisel

University of Magdeburg, Germany

([theisel@ovgu.de](mailto:theisel@ovgu.de))

**Location & Date:**

N13 Potential 1 & 2, 27<sup>th</sup> Nov 2012, 0900 to 0950

**Abstract:**

The visualization of flow phenomena is one of the core topics in Scientific Visualization. Modern techniques try to find visual representations of the transport of material. For this, so-called flow maps provide a simple and elegant formulation for several approaches, such as Finite Time Lyapunov Exponents (FTLE) and its relatives. Furthermore, we show that the concept of flow maps allows a completely new treatment of streak lines, time lines and other characteristic curves in a flow: they can simply be treated as the solution of an autonomous ODE system, allowing the immediate application of well-established algorithms for integration, feature extraction and visualization.

Despite their elegance and usefulness, flow maps are extremely challenging to compute because of their sheer size, the fact that they generally cannot be described in a closed form solution, and the problem that the flow map gradients grow exponentially with integration time. We present several approaches to tackle these problems: we provide a way to analyze which are the best methods to numerically compute flow maps, and we present an approach to compute FTLE without computing the gradients of the flow map.

**Speaker Biography:**

Holger Theisel received his M.S. (1994), Ph.D. (1996) and habilitation (2001) degrees from the University of Rostock (Germany) where he studied Computer Science (1989 -- 1994) and worked as a research and

teaching assistant (1995 -- 2001). He spent 12 months (1994 -- 1995) as a visiting scholar at Arizona State University (USA), and 6 months as a guest lecturer at ICIMAF Havana (Cuba). 2002 -- 2006 he was a member of the Computer Graphics group at MPI Informatik Saarbrücken (Germany). 2006 -- 2007 he was a professor for Computer Graphics at Bielefeld University (Germany). Since October 2007 he is a professor for Visual Computing at the University of Magdeburg. His research interests focus on flow and volume visualization as well as on CAGD, geometry processing, information visualization and visual analytics.

## Visual Analytics for Large Scale Flow Fields

**Speaker:**

Han-Wei Shen

The Ohio State University, Columbus, USA

([hwshen@cse.ohio-state.edu](mailto:hwshen@cse.ohio-state.edu))

**Location & Date:**

N13 Potential 1 & 2, 27<sup>th</sup> Nov 2012, 0950 to 1040

**Abstract:**

As scientists eagerly anticipate the benefit of extreme scale computing, our limited ability to process data at scale is becoming a major roadblock to accelerate science discovery. The traditional workflow of data visualization mostly treats the entire simulation output as a sequence of flat files from which visualizations are produced. As we move into the era of exascale computing, the "save the data first, think about it later" mentality needs to be completely replaced with more aggressive data reduction and data triage. To answer the questions of what data are the most essential for analysis, summaries of data need to be created to indicate the existence and nature of features, and to quantify the features' degree of interest. In this talk, I will describe our recent effort in developing efficient and effective techniques to summarize three dimensional flow fields. The first part of my talk will be focused on the use of graphs to model flow directions, estimate and balance workload for parallel flow lines computation, and analyze data access pattern to minimize the I/O overhead. In the second half of the talk I will describe how a large number of flow lines can be summarized and classified based on their geometric and statistical complexity. With our techniques, the user can interact with the data and select features of interest more effectively.

**Speaker Biography:**

Han-Wei Shen is a full professor at The Ohio State University. He received his BS degree from Department of Computer Science and Information Engineering at National Taiwan University in 1988, the MS degree in



computer science from the State University of New York at Stony Brook in 1992, and the PhD degree in computer science from the University of Utah in 1998. From 1996 to 1999, he was a research scientist at NASA Ames Research Center in Mountain View California. His primary research interests are scientific visualization and computer graphics. Professor Shen is a winner of National Science Foundation's CAREER award and US Department of Energy's Early Career Principal Investigator Award. He also won the Outstanding Teaching award twice in the Department of Computer Science and Engineering at the Ohio State University.

## **Multi-Scale Morse Theory and Data Streaming for Science Discovery: Scaling Visualization Tools from Handheld Devices to In-Situ Analytics**

### **Speaker:**

Valerio Pascucci

Director, Center for Extreme Data Management Analysis and Visualization  
Professor, School of Computing, University of Utah Faculty, Scientific  
Computing and Imaging Institute  
Laboratory Fellow, Pacific Northwest National Laboratory  
CTO, ViSUS Inc. ([visus.us](http://visus.us))  
([pascucci@sci.utah.edu](mailto:pascucci@sci.utah.edu))

### **Location & Date:**

N13 Potential 1 & 2, 27<sup>th</sup> Nov 2012, 1100 to 1150

### **Abstract:**

Advanced techniques for understanding large scale data models are a crucial ingredient for the success of the activities of any supercomputing center and data intensive scientific investigation. Developing such techniques involves a number of major challenges such as the real-time management of massive data, or the quantitative analysis of scientific features of unprecedented complexity.

In this talk, I will present the application of a discrete topological framework for the representation and analysis of large scale scientific data. Due to the combinatorial nature of this framework, we can implement the core constructs of Morse theory without the approximations and instabilities of classical numerical techniques. The inherent robustness of the combinatorial algorithms allows us to address the high complexity of the feature extraction problem for high resolution scientific data. To deal with massive amount information, we adopt a scalable approach for processing information with high performance selective queries on multiple terabytes of raw data. The use of progressive streaming techniques allows achieving interactive processing

rates on a variety of computing devices ranging from handheld devices like an iPhone/iPad, to desktop workstations, to the I/O of parallel computers.

Our system has enabled the successful quantitative analysis for several massively parallel simulations including the study turbulent hydrodynamic instabilities, porous material under stress and failure, and lifted flames that lead to clean energy production.

**Speaker Biography:**

Valerio Pascucci is the funding Director, Center for Extreme Data Management Analysis and Visualization (CEDMAV), recently established as a permanent organization at the University of Utah. Valerio is also a Faculty of the Scientific Computing and Imaging Institute, a Professor of the School of Computing, University of Utah, and a DOE Laboratory Fellow of Pacific Northwest National Laboratory (PNNL). Before joining the University of Utah, Valerio was the Data Analysis Group Leader of the Center for Applied Scientific Computing at Lawrence Livermore National Laboratory, and Adjunct Professor of Computer Science at the University of California Davis. Valerio's research interests include scientific data analysis, progressive multi-resolution techniques in scientific visualization, discrete topology, geometric compression, computer graphics, computational geometry, geometric programming, and solid modeling. Valerio is the coauthor of more than one hundred refereed journal and conference papers and has been an Associate Editor of the IEEE Transactions on Visualization and Computer Graphics.

## Big Data Visualization

**Speaker:**

Kwan-Liu Ma

University of California, Davis, USA

([ma@cs.ucdavis.edu](mailto:ma@cs.ucdavis.edu))

**Location & Date:**

N13 Potential 1 & 2, 27<sup>th</sup> Nov 2012, 1150 to 1240

**Abstract:**

We are entering a data-rich era. Advanced computing, imaging, and sensing technologies enable scientists to study natural and physical phenomena at unprecedented precision, resulting in an explosive growth of data. The size of the collected information about the Web and mobile device users is expected to be even greater. To make sense and maximize utilization of such vast amounts of data for decision making and knowledge discovery, we need a new set of tools beyond conventional data mining and statistical analysis.

Visualization has been shown very effective in understanding large, complex data, and thus become an indispensable tool for many areas of research and practice. I will present several new concepts that my research group at UC Davis has introduced to further advance the visualization technology as a powerful discovery and communication tool.

**Speaker Biography:**

Kwan-Liu Ma is a professor of computer science and the chair of the Graduate Group in Computer Science (GGCS) at the University of California, Davis. He leads the VIDi research group and directs the UC Davis Center for Visualization. Professor Ma received his PhD degree in computer science from the University of Utah in 1993. Before joining UC Davis in 1999, he was a research scientist at the ICASE/NASA Langley Research Center. He was a recipient of the PECASE award in 2000 and elected as IEEE Fellow in 2012. His research interests include visualization, high-performance computing, and user interface design. Professor Ma

was a paper chair of the IEEE Visualization Conference in 2008 and 2009, and an associate editor of IEEE TVCG over 2007-2011. Professor Ma presently serves on the editorial boards of the IEEE CG&A, the Journal of Computational Science and Discoveries, and the Journal of Visualization.

## Visual Analysis of Text Data

**Speaker:**

Huamin Qu

Hong Kong University of Science and Technology, Hong Kong

([huamin@cse.ust.hk](mailto:huamin@cse.ust.hk))

**Location & Date:**

N13 Potential 1 & 2, 27<sup>th</sup> Nov 2012, 1400 to 1450

**Abstract:**

The amount of information in text format such as emails, news articles, blogs, and Twitter data grows explosively each year. How to handle these tremendous text documents is a major challenge. Visual text analytics combines text mining and visualization techniques to provide an intuitive interface for users to digest a huge amount of text data, provide accurate analysis for fuzzy patterns and give timely feedback for time critical events.

In this talk I will present some research results of the visualization group at the Hong Kong University of Science and Technology on visual text analytics. I will specifically introduce three systems: 1) A dynamic word cloud generation system that preserves the semantic relations between words, and stabilizes word positions across multiple word clouds. A trend chart can be further coupled with dynamic word clouds to illustrate the temporal content evolution at different levels of detail. 2) A visual topic analysis system called TextFlow to help users analyze and understand topic evolution patterns such as topic splitting and merging in time-varying text data. The system tightly integrates interactive visualization with topic modelling techniques to facilitate the understanding of complex topic analysis results from multiple perspectives. 3) A visual analytics system called Whisper for tracing information diffusion in social media like Twitter. The system highlights three major characteristics of diffusion processes in social media: the temporal trend, social-spatial extent and community response of a topic of interest. Such social,

spatiotemporal processes are conveyed based on a sunflower metaphor whose seeds are often dispersed far away.

**Speaker Biography:**

Huamin Qu is an associate professor in the Department of Computer Science and Engineering at the Hong Kong University of Science and Technology. His main research interests are in visualization and computer graphics. He has co-authored more than 60 refereed papers including 19 papers in the IEEE Transactions on Visualization and Computer Graphics. He is in the steering committee of the IEEE Pacific Visualization Conferences, and serves as the program co-chair for IEEE PacificVis 2011. He is guest editor for IEEE Transactions on Visualization and Computer Graphics, IEEE Computer Graphics and Applications, and ACM Transactions on Intelligent Systems. He receives Honorable Mention for Best Paper Award at IEEE Visualization 2009 and is a winner of 2009 IBM Faculty Award. He obtained a BS in Mathematics from Xi'an Jiaotong University, China, an MS and a PhD (2004) in Computer Science from the Stony Brook University.

## Crowd modelling and Simulation

**Speaker:**

Daniel Thalmann

Nanyang Technological University, Singapore

EPFL, Switzerland

([DANIELTHALMANN@ntu.edu.sg](mailto:DANIELTHALMANN@ntu.edu.sg))

**Location & Date:**

N13 Transform 1 & 2, 27<sup>th</sup> Nov 2012, 0900 to 0950

**Abstract:**

Real-time crowds bring different challenges compared to the systems either involving small number of interacting characters (for example, the majority of contemporary computer games), or non-real-time applications (as crowds in movies, or visualizations of crowd evacuations after off-line model computations). In comparison with single-agent simulations, the main conceptual difference is the need for efficient variety management at every level, whether it is visualization, motion control, animation or behavior. As everyday experiences hint, virtual humans composing a crowd should look different, move different, react different, sound different and so forth. Even if assuming perfect simulation of a single virtual human would be possible, still creating a simulation involving multiple such humans would be a difficult and tedious task. Methods easing control of many characters are needed; however such methods should still preserve ability to control individual agents. In this talk, we will discuss the way of creating various populations, the navigation control, and techniques to accelerate the rendering.

**Speaker Biography:**

Prof. Daniel Thalmann is with the Institute for Media Innovation at the Nanyang Technological University in Singapore. He is a pioneer in research on Virtual Humans. His current research interests include Real-time Virtual Humans in Virtual Reality, crowd simulation, and 3D Interaction. Daniel Thalmann has been the Founder of The Virtual Reality Lab (VRlab) at EPFL. He is coeditor-in-chief of the Journal of Computer



Animation and Virtual Worlds, and member of the editorial board of 6 other journals. Daniel Thalmann was member of numerous Program Committees, Program Chair and CoChair of several conferences including IEEE VR, ACM VRST, and ACM VRCAI. Daniel Thalmann has published more than 500 papers in Graphics, Animation, and Virtual Reality. He is coeditor of 30 books, and coauthor of several books including 'Crowd Simulation' and 'Stepping Into Virtual Reality', published in 2007 by Springer. He received his PhD in Computer Science in 1977 from the University of Geneva and an Honorary Doctorate (Honoris Causa) from University Paul- Sabatier in Toulouse, France, in 2003. He also received the Eurographics Distinguished Career Award in 2010 and the 2012 Canadian Human Computer Communications Society Achievement Award.

## **Modelling Multiscale Human: A Marie Curie European Project**

### **Speaker:**

Nadia Magnenat-Thalmann  
MIRALab, University of Geneva  
NTU Singapore  
([thalmann@miralab.ch](mailto:thalmann@miralab.ch))

### **Location & Date:**

N13 Transform 1 & 2, 27<sup>th</sup> Nov 2012, 0950 to 1040

### **Abstract:**

Today, imaging technologies including magnetic resonance imaging (MRI) are becoming more popular in medical diagnosis. However, these imaging technologies are typically limited to patients at rest or over a limited range of motion. In this presentation, we will demonstrate how we can predict some cartilage hip deformation problem for young ballerinas while they perform extreme motions. We will show the methodology used as the selection of the protocol for acquiring images, the MRI segmentation, the cloning via scanner, the modelling of kinematic and physics based modelling and the simulation process. We will also present a case study that show pain at a very precise location while on motion. We will also show the next step of our research towards including in the simulation the multi layers as the molecular and the tissues aspects functionalities in our new Marie Curie Multiscale Human project.

### **Speaker Biography:**

Professor Nadia Magnenat Thalmann has pioneered research into virtual humans over the last 30 years. She obtained several Bachelor's and Master's degrees in various disciplines (Psychology, Biology and Biochemistry) and a PhD in Quantum Physics from the University of Geneva in 1977. From 1977 to 1989, she was a Professor at the University of Montreal in Canada.

Since 2010, she has been a Professor at the University of Geneva where she founded the interdisciplinary research group MIRALab. She has

actively participated in more than 50 European Research Projects, and coordinating many of them. She is Editor-in-Chief of The Visual Computer Journal published by Springer Verlag.

Together with her PhD students, she has published more than 500 papers and books on Virtual Humans and Social Robots with research topics such as 3D clothes, hair, body gestures and emotions modelling, and medical 3D simulation.

She has received numerous awards, among the latest ones: a Doctor Honoris Causa in Natural Sciences from the Leibniz University of Hanover in Germany and an Honorary Doctorate of the University in Ottawa. In May 2010, she received the Distinguished Career Award from Eurographics and the Achievement Award from the Canadian Human Computer Communications Society in Toronto.

In June 2012, she has received the prestigious Humboldt Research Award in Germany given to “academics whose fundamental discoveries, new theories, or insights have had a significant impact on their own discipline and who are expected to continue producing cutting-edge achievements in the future”. She can be reached at [Thalmann@miralab.ch](mailto:Thalmann@miralab.ch)

## **A flexible and efficient approach to assembly model retrieval**

### **Speaker:**

Shuming Gao

Zhejiang University, China

([smgao@cad.zju.edu.cn](mailto:smgao@cad.zju.edu.cn))

### **Location & Date:**

N13 Transform 1 & 2, 27<sup>th</sup> Nov 2012, 1100 to 1150

### **Abstract:**

In this talk, a new assembly model retrieval approach will be presented, which allows users to input flexible queries, either rough or precise, to retrieve efficiently the whole or partial assembly models they want from the product library. First, a multilevel assembly descriptor supporting various searching requirements will be introduced, which collects different levels of information in assembly models. Then, the corresponding matching and similarity assessment methods with well-balanced efficiency and discriminability will be discussed. After that, an indexing mechanism for accelerating assembly model retrieval, especially the partial retrieval, will be presented. Finally, an assembly model retrieval prototype system will be introduced, and some experimental results will be demonstrated.

### **Speaker Biography:**

Dr. Shuming Gao is a professor of the State Key Lab of CAD&CG and the School of Computer Science and Engineering, Zhejiang University. He received his Ph.D. degree from the Applied Mathematics Department of Zhejiang University in 1990, and was a visiting professor in the Design Automation Lab of Arizona State University and Fraunhofer-Institute for Production Systems and Design Technology(IPK) respectively in 2001 and 2006. He is also an adjunct professor of NUAA.

His research interests include geometric modeling, feature based CAD/CAM, collaborative design, virtual prototyping, design reuse, etc. And he has published over 100 peer-reviewed journal and conference

papers on these topics. Currently he serves as an associate editor of ASME Trans. Of JCISE. He ever served as: co-chair of ACDDE 2011 CDM workshop; co-chair of program committee of International Conference on Manufacturing Automation 2010; the chair of organization committee of IEEE CAD/Graphics2009; the member of program committees of ACM SPM(08-11), CAD11, IEEE SMI(09), PLM(06-09), CSCWD(05-11), and CAD/Graphics(01-11), etc.

## **Santos: a virtual human from analysis to predictive dynamics**

### **Speaker:**

Anith Mathai

University of Iowa, Iowa City, USA

([anith-mathai@uiowa.edu](mailto:anith-mathai@uiowa.edu))

### **Location & Date:**

N13 Transform 1 & 2, 27<sup>th</sup> Nov 2012, 1150 to 1240

### **Abstract:**

Santos is a digital human that was developed at the University of Iowa's Virtual Soldier Research program. The Santos digital human model is a biomechanically accurate model with over 107 degrees of freedom representing a human skeleton. The avatar representing Santos is high polygon model, which adds to the realism. The anthropometry (size and shape) of the avatar can be varied to represent real human subjects. The Santos human environment was developed in house and built on top of a state of the art rendering engine and contains different avatars, scenes and models. The 3D environment allows users to manipulate objects and model Santos' human like interaction with the objects. Santos can also predict human motion using accurate physics based modeling techniques. The entire virtual soldier research project represents over 25 million dollars in research funding over the last ten years and is supported by a team of over thirty inter-disciplinary graduate students, professional staff and students.

In this talk I will present the history of Santos and the challenges in making one of the world's most advanced digital human models. The talk will begin with the basics of creating a scientifically accurate digital human and will expand it on to the patented method of applying physics to generate and study motion of the human avatar, called predictive dynamics. I will also be speaking about different methods of interaction with the avatar to study and analyze the environment virtually. Additionally I will also explain the use of motion capture techniques from Hollywood and the scientific community to help drive Santos. I will finish

the talk of with some of the challenges faced in the digital human modeling community

**Speaker Biography:**

Anith Mathai is a Research Associate at the Virtual Soldier Research (VSR) program at the University of Iowa. He has been with the program since its inception in 2003 and now heads the physiology and virtual reality divisions for VSR. Anith Mathai received his MSc degree in Biomedical Engineering from the University of Iowa in 2005 and Bachelor's degree in Mechanical Engineering in 2001 from the Vellore Institute of Technology in Vellore, India. Before joining VSR as a graduate student in 2003, he worked as a banking assistant at the Hong Kong and Shanghai Bank in Coimbatore, India. Anith Mathai has co-authored a text book chapter, 14 conference papers, 2 journal papers and 4 posters and finished 21 triathlons.