

IMI RESEARCH SEMINAR

DATE: 23 February 2018, Friday

TIME: *11:00 am – 12:30 pm+

VENUE: IMI Seminar Room, Research Techno Plaza, XFrontiers, Level 03-01,
50 Nanyang Drive, Singapore 637553

* Attendance is on first-come first-served basis due to limited seating.

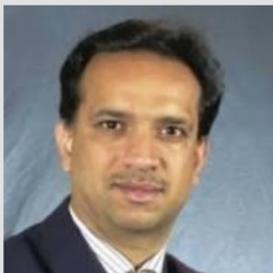
+ Lunch will be served.

11.00am – 11.50am

50 mins presentation including 10 mins Q&A

Keynote Speech

**Interactive Sound Simulation
and Rendering for VR/AR**



Prof Dinesh MANOCHA - Department of Computer Science, University of North Carolina at Chapel Hill

Extending the frontier of visual computing, sound rendering utilizes sound to communicate information to a user and offers an alternative means of visualization. By harnessing the sense of hearing, audio rendering can further enhance a user's experience in a multimodal virtual world and is required for immersive environments, computer games, engineering simulation, virtual training, and designing next generation human-computer interfaces. In this talk, we will give an overview of our recent work on sound propagation, spatial sound, and sound rendering. We describe new and fast algorithms for sound propagation based on improved wave-based techniques and fast geometric sound propagation. Our algorithms improve the state of the art in sound propagation by almost 1-2 orders of magnitude and we demonstrate that it is possible to perform interactive propagation in complex, dynamic environments by utilizing the computational capabilities of multi-core CPUs and many-core GPUs. We describe new techniques to compute personalized HRTFs and have integrated our algorithms to the VR Headsets. Finally, we will give an overview of recent work on sound simulation in real-world scenes for augmented reality applications. We highlight their demonstration to indoor and outdoor scenes.

About Prof Dinesh MANOCHA

Dinesh Manocha is currently the Phi Delta Theta/Mason Distinguished Professor of Computer Science at the University of North Carolina at Chapel Hill. In the summer of 2018, he will join University of Maryland at College Park as the Paul Chrisman Iribe Chair of Computer Science and Electrical/Computer Engineering. Manocha received his Ph.D. in Computer Science at the University of California at Berkeley in 1992. He has published more than 480 papers and some of the software systems related to collision detection, GPU-based algorithms and geometric computing developed by his group have been downloaded by more than 200,000 users and are widely used in the industry. Along with his students, Manocha has also received 15 best paper awards at the leading conferences. He has supervised 33 Ph.D. dissertations and is a fellow of ACM, AAAS, AAAI, and IEEE. Manocha received Distinguished Alumni Award from Indian Institute of Technology, Delhi. He was a co-founder of Impulsonic, which was acquired by Valve, a leading VR and gaming company.

11.50am – 12.10pm

15 mins presentation, 5 mins Q&A

**Prediction of Negative
Symptoms Schizophrenia
from Emotion-related Speech
and Facial Expressions**



Schizophrenia is a chronic and mental disorder that often develops in adolescence and runs a lifelong course. The presentation of schizophrenia is diverse and can be characterized broadly by positive (hallucinations and delusions), negative (apathy, blunting of affect and alogia) and cognitive (attention, memory and executive functioning) symptoms. Not only there are few to none effective drug treatments for the negative symptoms, they are difficult to detect and often trivialized as "laziness". Emotional impairment is known to be one of the hallmark negative symptoms of schizophrenia since a long time. This impairment is exhibited in both the patients' inability to express emotions through facial expressions and prosody as well as their failure to recognise displayed emotions of others. We believe these signals can be utilized to objectively assess the severity of negative symptoms and to differentiate between afflicted and healthy individuals. To this purpose, we recorded the audio and video of participants (both schizophrenia patients and healthy control subjects) during a semi-structured clinical interview at the Institute of Mental Health, Singapore. We extracted prosody signals from the recorded speech and facial expressions from the video using open source software openSMILE and Affectiva respectively. These signals were used as attributes in machine learning classifiers and were able to distinguish the Patients from the Controls with an accuracy of 83%.

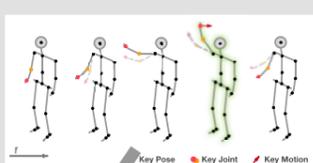
About Debsubhra CHAKRABORTY – PhD Student - August 2014 intake (IMI & IGS)

Debsubhra is currently pursuing his PhD degree with the Institute for Media Innovation, under the Interdisciplinary Graduate School at Nanyang Technological University, Singapore. He received the B. E. (Hons.) degree in Electrical Engineering from Jadavpur University, India in 2009 and M. Tech. degree in Systems and Control Engineering from IIT Bombay, India in 2011. His research interests include human social behavior understanding, speech processing, and video processing. His supervisor is Assoc Prof Justin DAUWELS, EEE and co-supervisor is Prof Nadia MAGNENAT THALMANN, IMI.

12.10pm – 12.30pm

15 mins presentation, 5 mins Q&A

**Spatio-Temporal Pattern
Discovery for Pose-based
Action Recognition**



Due to the success of pose estimation from single depth and RGB image, pose-based action recognition attracts much attention in this decade. Compared to image-based action recognition, pose-based task focuses more on the action performer itself, without considering the environment around performer. In this seminar, I will introduce a simple but efficient spatio-temporal pattern discovery method for pose-based action recognition. This method is not only able to differentiate actions from various categories, but also discover specific key patterns for each action.

About WENG Junwu – PhD Student - August 2015 intake (IMI & EEE)

Junwu is currently pursuing his PhD degree at Nanyang Technological University. He received the B.Eng degree in Information Engineering and M.Sc degree in Signal Processing both from South China University of Technology. His research interests are computer vision, action/gesture analysis, and machine learning. His supervisor is Assoc Prof YUAN Junsong, EEE.