CLINICAL IMAGING RESEARCH CENTRE
SINGAPORE

A joint venture between the Agency for Science, Technology And Research (A*STAR) and the National University of Singapore (NUS)

The A*Star-NUS Clinical Imaging Research Centre (CIRC)
presents a seminar
on

"Virtual Reality technology"

Speaker: Luis Serra
Chief Technology Officer
Universitat Pompeu Fabra, Barcelona

Date : **Tuesday, 22 Jan 2013**

Time : **3.00pm – 4.00pm**

Venue : **CIRC Conference Room**
14 Medical Drive #B1-01
S(117599)

Abstract

The presentation will cover the Virtual Reality technology developed by Luis Serra and his team for surgery planning and image-guided navigation, and the efforts to bring it to the market. This activity was carried out in Singapore starting in the mid-nineties at the Institute of Systems Science, and resulting in the spin-off company Volume Interactions Pte. Ltd. (VI) in 2000. The company was acquired in 2002 by the Italian multinational Bracco.

VI developed and commercialized solutions to address initially the neurosurgical market, with the Dextroscope planning workstation, and the Dextrobeam educational platform. These products were sold in Europe, USA and Asia. VI also developed a navigation system which featured Augmented Reality technology to overlay the surgical plan over the patient real images, and was clinically tested in NNI and Europe with promising results. This system served as a stepping stone to enter into partnerships with neuronavigation market leaders Medtronic and BrainLAB to bring the surgical plans created in the Dextroscope into the Operating Room. In the end, unable to create a sustainable market for surgical planning, in 2008 Bracco decided to close its commercial operations.

Although the initial focus was on neurosurgery there was also a significant effort to find radiological (both diagnostic and
interventional) and cardiology applications.

VI had at some point over 60 employees, and offices in Singapore, Shanghai, London and New York. With around 40 installations worldwide, over 3,500 cases benefited from its planning, included three sucessful craniopagus Siamese twin separations. The technology and its clinical generated over 140 publications, as well as 40 patents filed.

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About the speaker

Luis Serra hails from Barcelona, Spain, and has a PhD and MSc in Electrical Engineering (1987) from the School of Information Technology Systems, University of Bradford (UK) and a degree in Telecommunications Engineering from the Universitat Politècnica de Catalunya (1982).

He joined the Institute of Systems Science in Singapore in 1988 (later the Kent Ridge Digital Labs), as a researcher, where he developed 3D interfaces for the manipulation of 3D medical imaging data in collaboration with clinicians at the Johns Hopkins University. In 2000 he co-founded Volume Interactions Pte Ltd, a spin-off company setup to commercialize the Dextroscope technology developed by his team, getting investment from Life Sciences Investments (Singapore). Volume Interactions applied the Dextroscope technology to radiology and neurosurgery, creating products for pre-operative planning and image-guided surgery. The company was bought by the Bracco Group in 2002, had operations in Europe, China and the USA, and employed 60 people. Luis served as President & Chief Technology Officer and was responsible for the company's strategy, relationship with hospitals and clinicians and the Intellectual Property portfolio, managing its
40 patent family portfolio (being himself co-inventor in 18 of them, of which three granted).

He returned to Barcelona in 2010 to join the Universitat Pompeu Fabra where he served as Chief Technology Officer of the research group “Center for Computational and Simulation Technologies in Biomedicine”.

Some representative journal publications:

- Kockro, Reisch, Serra, Goh, Lee, Stadie, Image-guided Neurosurgery with three-dimensional multimodal imaging data on a stereoscopic monitor, NEUROSURGERY, Vol 72, Supplement 1, VIRTUAL REALITY AND ROBOTICS IN NEUROSURGERY, pp A78–A88 (January 2013)

- Barbarito, Carotenuto, Serra, Cámara, Fernández-Armenta, Berruezo, Frangi, A software application for three-dimensional visualization and quantification of scars and conducting channels based on pre-procedure CE-MRI in patients with ventricular tachycardia, International Journal of Computer Assisted Radiology and Surgery (2012), Vol. 7 (1): 41-43.

- Stadie, Kockro, Serra, Fischer, Schwandt, Grunert, Reisch, Neurosurgical craniotomy localization using a virtual reality planning system versus intraoperative image-guided navigation, International Journal of Computer Assisted Radiology and Surgery. (September 2011);
6(5):565-72

- Kockro, Ralf A., Tsai, Yeo Tseng, Ng, Ivan, Hwang, Peter, Zhu, Chuangui, Agusanto, Kusuma, Hong, Liang Xiao, Serra, Luis. DEX-Ray:

Augmented Reality Neurosurgical Navigation With A Handheld Video Probe, NEUROSURGERY, Vol. 65, No. 4, pp. 795-808 (October 2009)

- Kockro, Axel Stadie, Eike Schwandt, Robert Reisch, Cleopatra Charalampaki, Ivan Ng, Tseng Tsai Yeo, Peter Hwang, Luis Serra, Axel Perneczky. A Collaborative Virtual Reality Environment For Neurosurgical Planning And Training Neurosurgery, NEUROSURGERY, Vol. 61, No. 5, pp. 379-391 (November 2007)

- Kockro, Serra, Yeo, Chan, Sitoh, Chua, Ng, Lee, Lee, Nowinski, Planning And Simulation Of Neurosurgery In A Virtual Reality Environment, NEUROSURGERY, Vol. 46, No. 1, pp. 118-137 (January 2000)

- Serra, Nowinski, Poston, Chua, Ng, Lee, Chua and Pillay. The Brain Bench: virtual tools for neurosurgery, Journal of Medical Image Analysis, Vol 1, No. 4. pp. 317-329.

- Poston & Serra., Dextrous Virtual Work, Communications of the ACM, Vol. 29, No. 5, pp. 37-45 (May 1996)

Patents granted.

- A Method of Rendering A Graphics Image, Gim Guan Chua, L Serra, H Ng [U.S. Patent 7,289,131]

- System and Method for Displaying and Comparing 3D Models, L Serra [U.S. Patent 7,408,546]

- Methods and Systems For Interaction with Three-Dimensional Computer Models, L Serra, CK Lee, H Ng [U.S. Patent 7,477,232]

--- Admission is free and all are welcome ---