



**NANYANG
TECHNOLOGICAL
UNIVERSITY**

School of Mechanical and Aerospace Engineering

新加坡南洋理工大學機械與宇航工程學院 2010 年度博士研究生招生講座

時間: 2009 年 11 月 19 日 星期四 (0300pm - 0330pm)

地點: 國立臺灣大學機械系 工學院綜合大樓 742 室

報告人: 新加坡南洋理工大學 陳義明教授

The [School of Mechanical and Aerospace Engineering](http://www.ntu.edu.sg/mae) (MAE) of [Nanyang Technological University](http://www.ntu.edu.sg) of Singapore invites applications for PhD studentship for the year of 2010. With staff strength of about 150 professors, the School of MAE is probably the largest Mechanical Engineering school in the world. The School of MAE professors' expertise covers a large spectrum of research fields which include Micro Systems & Bio/Nanotechnology, Micro/Nano Fabrication, Virtual Reality/Robotics & Intelligent Systems, Systems & Engineering Management, Clean Energy, Sensors and Actuators, and Aerospace Engineering. Further information about the School can be found at the website: www.ntu.edu.sg/mae.

Applications for PhD scholarship should be submitted online through the website at <http://admissions.ntu.edu.sg/graduate/Research/Pages/default.aspx>. Basic graduate student admission requirements include:

- A Master degree in a relevant field from a reputable university
- TOEFL score of ≥ 570 (paper-based)/ ≥ 230 (computer-based)/ ≥ 88 (internet-based) is required. A minimum of IELTS score of 6.0 is required to replace TOEFL.
- Minimum GRE score of 1200/3.5
- An interview conducted by NTU professor
- Published (or in press) international journal papers will be a plus

Successful applicants will receive the following:

- Full tuition fee of S\$26,000.
- Monthly stipend of S\$2,000. For students who pass the PhD Qualifying Examination, the stipend can be increased to S\$2,500, subject to good performance in courses and research.
- The maximum period of the award is four years, subject to good performance and progress.
- Overseas conference support.

In this promotion talk, NTU Professor I-Ming Chen will give a presentation on research activities conducted in the School of MAE and research directions that have immediate opening for PhD studies. Queries regarding PhD study and life in Singapore will also be answered. You may register your interests in studying PhD in NTU, Singapore using the following link at: <http://wmae.ntu.edu.sg/public/recruitment/>. Should you have any inquiry please feel free to contact Ms Soh Meow Chng at MSOHMC@ntu.edu.sg or Prof I-Ming Chen at michen@ntu.edu.sg.

Wearable Mechatronics Systems: From Motion Capture (MOCAP) to Motion Replication (MOREP)

時間: 2009年11月19日 星期四 (0200pm - 0300pm)

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ABSTRACT

The human body motion is a very important mean of expressing a person's emotion, knowledge and experience, as well as an effective communication tool in inter-personal interaction in our real life. Thus, capturing, identifying and processing human movements in digital manner become a very important research topic in a highly connected information world. Human body motion has a uniform underlying structure of articulated multi-degree of freedom rigid bodies but contains infinite variety from individual to individual. Current development in the motion sensing technology enables 3D body motion of a real human to be captured, processed, and rendered in digital form for computer animation, biomedical, entertainment, and sports applications. The most prominent devices are camera-based motion capture systems, like VICON, Qualisys, etc. However, such motion sensing technology allows only one-way interaction from the physical space to the virtual space. It lacks the spirit of spontaneous and intuitive interaction between the real and virtual entities. In this lecture, we will present a series of works embarking on novel wearable sensors, actuator-arrays, flexible haptic devices toward personalized mechatronics systems for duplicating human body movements in physical and digital spaces with high fidelity. Notably, our new invention for body joint angle detection as well as body motion capture, Optical Linear Encoder (OLE), high performance low-cost SmartGlove based on Multi-point OLE principle, and Vibrotactile with inertia measurement unit (VIMU) will be introduced and demonstrated. Our R&D goal is to develop high fidelity body motion replication between the digital and physical spaces as a core technology for applications involving the usage of human body motion, like entertainment, medicine rehabilitation, sports engineering, etc. With the software and hardware prototype, we wish to facilitate human motion processing as a consumer level technology and not limited to studio or lab type of technology.

Speaker:

Dr. Chen received the B. S. degree from National Taiwan University in 1986, and M. S. and Ph. D. degrees from California Institute of Technology, Pasadena, CA in 1989 and 1994 respectively. He has been with the School of Mechanical and Aerospace Engineering of Nanyang Technological University (NTU) in Singapore since 1995. He is currently Director of Intelligent Systems Center in NTU, a partnership between Singapore Technology Engineering Ltd. and NTU. He was JSPS Visiting Scholar in Kyoto University, Japan in 1999, Visiting Scholar in the Department of Mechanical Engineering of MIT in 2004, and Fellow of Singapore-MIT Alliance under Manufacturing Systems and Technology (MST) Program from 2003 to 2007. He was also Adjunct Professor of Xian Jiao Tong University, China from 2002 to 2007. His research interests are in wearable sensors, human-robot interaction, reconfigurable automation, parallel kinematics machines (PKM), biomorphic underwater robots, and smart material based actuators. Dr. Chen has published more than 190 papers in refereed international journals and conferences as well as book chapters. He is now serving on the editorial boards of IEEE Transactions on Robotics, IEEE/ASME Transactions on Mechatronics, Mechanism and Machine Theory, and Robotica, and also Associate Editor-in-Chief of Frontier of Mechanical Engineering (Springer-Verlag). He was General Chairman of 2006 IEEE Conferences on Cybernetics, Intelligent Systems, and Robotics (CIS-RAM) in Thailand, and General Chairman of 2009 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM2009) in Singapore. He is a senior member of IEEE and member of ASME, and member of RoboCup Singapore National Committee.