

# Proceedings

## 14th International Conference on Mechatronics and Machine Vision in Practice (M2VIP2007)

Xiamen University, 3 - 5 December 2007

Edited by R S Bradbeer and Kenneth Ku

14th International Conference on Mechatronics  
and Machine Vision in Practice (M2VIP2007)



IEEE Catalogue Number: 07EX1851  
ISBN: 1-4244-1357-5



© 2007 IEEE. Personal use of this material is permitted. However, permission to reprint/republish this material for advertising or promotional purpose or for creating new collective works for resale or redistribution to servers or lists, or to reuse any copyrighted component of this work in other works must be obtained from the IEEE.

All rights reserved.

IEEE Catalogue Number: 07EX1851

ISBN: 1-4244-1358-3

Library of Congress: 2007928630

# Conference schedule

Xiamen University, Xiamen, China

<b>Sunday 2 December</b>		
During the day	Welcome at airport	Student helpers to assist with transport to XMU campus
6.30 pm	<b>Pre-Registration Reception</b> Café in Jianwen Building (建文楼咖啡厅)	Drinks and snacks provided
7.30 pm	<b>Registration</b> Jianwen Building (建文楼大厅)	
8.30 pm	Finish	
<b>Monday 3 December</b>		
8.30 am	<b>Registration</b> Jianwen Building (建文楼大厅)	
9.30 am	<b>Opening Ceremony</b> SongEn Building , Room 220 (颂恩楼 220) Chair: Dr Tong Feng  President, XMU Chair, Steering Committee/Conference Chair Chair, LOC Chair, IPC	
10.00 am	<b>Keynote address 1</b> SongEn Building , Room 220 (颂恩楼 220) Chair: Dr Robin Bradbeer  <a href="#">Prof Peter Brett</a> Aston University, UK <i>Moving on from surgical robotics to robotic micro-tools in surgery</i>	
11.00 am	<b>MA-1 Vision1</b> SongEn Building , Room 220 (颂恩楼 220) Chair: Prof John Billingsley	<b>MA-2 Control I</b> KeLi Building , No.2 Conference Room (克捷 2号会议室) Chair: Dr L F Yeung
	<a href="#">015 A novel method for camera calibration using vanishing points</a> B. W. He and Y. F. Li, Fuzhou University, China	<a href="#">006 Process Control for the Tea Baking</a> Zhenyao Zheng, Jiyang Dong and Zhong Chen, Xiamen University, China
	<a href="#">041 Real-time Infrared imaging system based on FPGA</a> Yi Liang Wu and Hui Hang Chen, Xiamen University, China	<a href="#">008 Improvement of Tracking Performance of Servomechanical System by an Accurate Four-Parameter Friction Modelling and Compensation</a> Si-Lu Chen, Kok Kiong Tan, and Sunan Huang, National University of Singapore
	<a href="#">047 Multi-focus Image Fusing Based on Nonnegative Matrix Factorization</a> Le Xu, Ji-yang Dong, Cong-bo Cai, and Zhong Chen, Xiamen University, China	<a href="#">022 Evaluation of the Dynamic Properties of a Voice Coil Motor (VCM)</a> Yusaku Fujii and Seiji Hashimoto, Gunma University, Japan
12.15 pm	<b>Lunch</b> XMU Conference Centre Dining Hall (会议中心餐厅一楼), first floor	
1.15 pm	<b>MP-1 Vision 2</b> KeLi Building , No.2 Conference Room (克捷 2号会议室) Chair: Prof Xu, X M	<b>MP-2 Control II</b> SongEn Building , Room 220 (颂恩楼 220) Chair: Dr Tong, Feng
	<a href="#">048 Analysis of Dynamic Images in Machine Vision and Its Application Study in Motion Control</a> Dong Xia, Wang Kedian, Xi'an Jiaotong University, China	<a href="#">023 High-Precision Control of Linear Actuators with Nonlinear Friction</a> Seiji Hashimoto, Yusaku Fujii, and Masayuki Kigure, Gunma University, Japan
	<a href="#">050 Intelligent Spectral Design and Colorimetric Parameter Analysis for Light-emitting Diodes</a>	<a href="#">029 dSPACE-based PID Controller for A Linear Motor Driven Inverted Pendulum</a>

	Yijun Lu, Yulin Gao, Huanting Chen, Zhong Chen, Xiamen University, China	Ronghua Ma, Huixing Zhou, Peng Sun, Shulin Hou, China Agricultural University, Beijing, China
	<i>055 Comparison of Local Descriptors for Image Registration of Geometrically-Complex 3D Scenes</i> Danny Cheng, Shane Xie, and Enrico Hammerle, The University of Auckland, New Zealand	<i>030 Precise Position Detection Technique for Permanent Magnet Linear Synchronous Motors</i> Yufei You, Huixing Zhou, Peng Sun and Shulin Hou, China Agricultural University, Beijing, China
	<i>062 A High-precision Vision Measurement Method Based on Dimension Characteristics of Sequential Partial Images</i> Zhisheng Zhang, Boxia He, Min Dai, and Jinfei Shi, Southeast University, Nanjing, China	<i>040 SLAM for Mobile Robots Using Laser Range Finder and Monocular Vision</i> Sheng Fu, Hui-ying Liu, Lu-fang Gao and Yu-xian Gai, Harbin Institute of Technology, China
2.55 pm	<b>Coffee</b> KeLi Building , nearby the No.2 Conference Room (克立楼 2 号会议室)	
3.15 pm	<b>MP-3 Underwater applications 1</b> KeLi Building , No.2 Conference Room (克立楼 2 号会议室) Chair: Dr Robin Bradbeer	
	<i>001 Signal Detection Based on Mathematical Morphology in Oceanic Reverberation</i> Zhi-qiang Wang Liang An and Ji-ren Lu, Southeast University, China.	
	<i>002 Calculating the Waveguide Invariant by Passive Sonar Lofargram Image</i> Liang An, Zhi-qiang Wang, Ji-ren Lu, Southeast University, Nanjing, China	
	<i>019 Identification of overlapped ultrasonic NDE echoes with adaptive deconvolution</i> Tong Feng, Xu Xiao-Mei, S. K. Tso, and B. L. Luk, Xiamen University, China	
	<i>020 Noncooperative Detection and Parameter Estimation of Underwater Acoustic DSSS-BPSK Signal</i> Xiao-yan Wang, Zhi-feng Zhu, Shi-liang Fang, Southeast University, Nanjing, China	
4.55 pm	Finish	
6.30 pm	<b>Seafood dinner</b> LiYuMen Shifu (鲤鱼门食府) Transport will pick up from JianWen Building Hall (建文楼)	
9.30 pm	Finish	
<b>Tuesday 4 December</b>		
9.30 am	<b>TA-1 Vision 3</b> KeLi Building , No.1 Conference Room (克立楼 1 号会议室) Chair: Prof Y T Do	<b>TA-2 Control 3</b> KeLi Building , No.2 Conference Room (克立楼 2 号会议室) Chair: Dr L F Yeung
	<i>063 A Camera Calibration Technique Based on Planar Geometry Feature</i> Aihua Chen and Bingwei He, Fuzhou University, China,	<i>051 Designing and modelling of a modern artificial fluid wave generation system with flexible mechatronic control</i> Mahmood Ghanbari, Yousef Hojjat, Mohammad Dadkhah, and Mehرداد Bagherinia, Tarbiat Modares University, Tehran, Iran
	<i>072 Contour Detection based on Gabor filter and directional DoG filter</i> Lu Min, and Zheng Ling Xiang, Xiamen University, China	<i>052 Electrostatic Rotation of Plexiglas Disc Supported on Air Bearing</i> Yousef Hojjat, Mohammad Dadkhah, Mehdi Modabberifar, Mahmood Ghanbari, Tarbiat Modares University, Tehran, Iran
	<i>073 Application of Digital Image Processing Technique in Cored Wire Manufacturing</i>	<i>053 Real-time tracking of a moving contacting load using the distributive tactile sensing</i>

	Chen Lumin, Zhang Cunying, and Liu Jie, ZhengZhou University of Light Industry, China	<i>method.</i> P. N. Brett, X. Ma, D. J. Holding, M. T. Elliott and I. Petra, Aston University, UK
	068 <i>The use of machine vision for assessment of fodder quality</i> Mark T Dunn and John Billingsley, University of Southern Queensland, Australia	060 <i>Global Localization of Multirobot Formations Using Ceiling Vision SLAM Strategy</i> Haoyao Chen, Dong Sun, and Jie Yang, University of Science and Technology of China, Hefei, China
11.10 am	<b>Coffee</b> KeLi Building , nearby the No.1 Conference Room (克立楼 1号会议室附近)	
11.20 am	<b>TA-3 Vision 4</b> KeLi Building , No.1 Conference Room (克立 楼 1号会议室) Chair: Prof John Billingsley	<b>TA-4 Miscellaneous applications 1</b> (KeLi Building , No.2 Conference Room (克立 楼 2号会议室) Chair: Dr Frank Nickols
	078 <i>Vision Based Gesture by Structural Features</i> Yufeng Chen, Fengxia Li, Minfu Lu, Beijing Institute of Technology, China	012 <i>Embedded Speech Recognition System for Intelligent Robot</i> Qingyang Hong, Caihong Zhang, Xiaoyang Chen, and Yan Chen, Xiamen University, China
	082 <i>Omnidirectional Vision System Developed for a Home Service Robot</i> Yongtae Do, Gilsu Kim, and Jongman Kim, Daegu University, Korea	013 <i>Identification of the High SNR Frequency Band for Bearing Fault Signature Enhancement</i> I. Soltani Bozchalooi, and Ming Liang, University of Ottawa, Canada
	090 <i>A Real Time Vision System for Defect Inspection in a Cast Extrusion Manufacturing Process</i> P. Gamage and S.Q. Xie, University of Auckland, New Zealand	066 <i>Facilitating Inspection of Underwater Environment based on Temporal Filtering</i> W.M. Tsang, R.S. Bradbeer, L.F. Yeung, and K. Lam, City University of Hong Kong, Hong Kong
12.35 pm	<b>Lunch</b> DaFeng Yuan, Second floor (大丰园二楼)	
1.45 pm	<b>Keynote address 2</b> KeLi Building , No.2 Conference Room (克立楼 2号会议室) Chair: Prof Peter Brett  Prof John Billingsley University of Southern Queensland, Australia <i>Vision applications in agriculture</i>	
2.45 pm	<b>Coffee</b> KeLi Building , nearby the No.2 Conference Room (克立楼 2号会议室附近)	
3.05 pm	<b>Visit to XMU laboratories</b> Depart from: KeLi Building main Entrance  a) The Pen-Tung Sah Micro-Electro-Mechanical Systems Research Centre of Xiamen University (MEMSC) b) The State Key Laboratory of Marine Environmental Science(MEL) c) The Key Laboratory of Underwater Acoustic Communication and Marine Information Technology(UAC)	
4.45 pm	Finish	
6.30 pm	<b>Banquet</b> XMU Conference Centre Dining Hall , Second first floor (厦大教工餐厅二楼)	
9.30 pm	Finish	
<b>Wednesday 5 December</b>		
9.30 am	<b>WA-1 Miscellaneous Applications 2</b> KeLi Building , No.1 Conference Room (克立 楼 1号会议室) Chair: Dr W M Tsang	<b>WA-2 Underwater applications 2</b> KeLi Building , No.2 Conference Room (克立 楼 2号会议室) Chair: Dr Tong Feng
	083 <i>Automated Soil Hardness Testing Machine</i> Kumarapelige N. Sanathkumara and Samuel N.	031 <i>The Study on Clustering Algorithm of the Underwater Acoustic Sensor Networks</i>

	<p>Cubero, University of Southern Queensland, Australia</p> <p>094 <i>An Integrated ZigBee Automation System: An Energy Saving Solution</i> KF Tsang, WC Lee, KL Lam, HY Tung and Kai Xuan, City University of Hong Kong</p> <p>067 <i>Establishment of a three dimensional, real-time marine environment monitoring system, DataBuoy I, in the Hoi Ha Wan Marine Park, Hong Kong, with connection to the internet.</i> Robin S Bradbeer, Paul Hodgson, Katherine Lam and Kenneth K. K. Ku, City University of Hong Kong, Hong Kong</p>	<p>Xia Li, Shi-liang Fang, and Yong-chun Zhang, Southeast University, Nanjing, China</p> <p>039 <i>A Remote Acoustic Monitoring System for Offshore Aquaculture Fish Cage</i> Xiaomei Xu and Xiaokang Zhang, Xiamen University, China</p> <p>043 <i>Performance Comparison of Time Synchronization Algorithms for OFDM Underwater Communication System</i> Wei Wei, Hu Xiaoyi, Wang Deqing, Xu Ru and Sun Haixin, Xiamen University, China</p>
10.45 am	<p><b>Coffee</b> KeLi Building , nearby the No.1 Conference Room (克立楼 1号会议室附近)</p>	
11.00 am	<p><b>Keynote address 3</b> KeLi Building , No.1 Conference Room (克立楼 1号会议室) Chair: Prof X M Xu</p> <p>Prof Huang Jianguo Northwestern Polytechnical University, Xi'an, China <i>The development of underwater communications</i></p>	
12.00 pm	<p><b>Lunch</b> XMU Conference Centre Dinning Hall (会议中心餐厅一楼) , first floor</p>	
1.00 pm	<p><b>WA-3 Control 4</b> SongEn Building , Room 220 (颂恩楼 220) Chair: Dr S Xie</p> <p>077 <i>An Approach for Fuzzy-PI Control of Mobile Robot with Wheels</i> Xiaodong Zhang, Yunxia Wang, and Wenhui Dai, Xi'an Jiaotong University, China</p> <p>088 <i>Research on Fault Diagnosis of Temperature Control System in Aircraft Electronic Equipment Cabin</i> Zheng Yongan and Shi Zhongke, Northwestern Polytechnical University, Xi'an, China</p> <p>089 <i>A Study on Dynamic Errors of High Speed Press Mechanism with Clearance</i> Jia Fang and Wang Lei, Southeast University, Nanjing, China</p> <p>092 <i>The Pedagogy of creating a Mechatronic Product integrated with English Communication Skills for Teaching Design and Innovation to Engineering Undergraduates</i> Nickols F.M.J. and Le Vasan M., University of Brunei Darussalam, Brunei</p>	<p><b>WA-4 Miscellaneous Applications 3</b> KeLi Building , No.2 Conference Room (克立楼 2号会议室) Chair: Dr K F Tsang</p> <p>076 <i>Influence Analysis of Reflector Shape with Respect to the Fibre Optic Based Dynamic Measurement of Lubricant Film for Slide Bearing</i> Xiaodong Zhang, and Liang Yang, Xi'an Jiaotong University, China</p> <p>007 <i>Bovine Intelligence for training horses</i> John Billingsley, University of Southern Queensland, Australia</p> <p>042 <i>Wavelet-Network-Based Predictive Model in Combustion Process of CFBB</i> Wenjing Hong, Qingyin Jiang, and Zhikai Cao, Xiamen University, China</p> <p>032 <i>Dynamic Modeling and Control Programme Simulation for Sterilization Cauldron</i> Zhikai Cao, Xiamen University, China"</p>
2.40 pm	<p><b>Coffee</b> SongEn Building , Room 220 nearby (颂恩楼 220室附近)</p>	
3.00 pm	<p><b>Wrap up session</b> SongEn Building , Room 220 (颂恩楼 220) Chair: Prof John Billingsley</p>	
4.30 pm	<p>Finish</p>	
6.30 pm	<p><b>Dinner at lakeside restaurant</b> Transport from Jianwen Building (建文楼大厅)</p>	<p>Own cost (about ¥100)</p>
9.30 pm	<p>Finish</p>	

# Organising Committee

---

## **International Steering Committee**

Prof. John Billingsley (Chair), Australia  
Dr. Robin Bradbeer, Hong Kong  
Prof. Peter Brett, UK

## **Technical Programme Committee (Hong Kong)**

Dr. Robin Bradbeer, (Chair)  
Dr. Lam F Yeung  
Dr. K F Tsang  
Dr Robin C W Li  
Mr W C Lee  
Mr W K Leung  
Mr W K Luk  
Mr Nicky Ng  
Ms Susana Cheung  
Mr Joe Sun

## **Local Organising Committee (Xiamen)**

Prof Xu Xiao-Mei (Chair)  
Dr Tong Feng  
Prof Chen En  
Dr. Tang Li-Guo  
Prof Guo Yin-Biao  
Prof Chen Zhong  
Prof Zhu Wen-Zhang

## **International Programme Committee**

Prof. John Billingsley (Chair), Australia  
Dr Robin Bradbeer, Hong Kong  
Prof. Peter Brett, UK  
Dr Sunita Chauhan, Singapore  
Michel Cotsaftis, France  
Dr J M Lee, Korea  
Prof T H Lee, Singapore  
Prof Li Bin, China  
Dr B L Luk, Hong Kong  
Dr Frank Nickols, Oman  
Dr Gerald Seet, Singapore  
Prof Lakmal Seneviratne, UK  
Prof Ron Summers, UK  
Dr Sam Cubero, Australia  
Prof Brian Davies, UK  
Prof Fang Shi-Liang, China  
Prof Toshio Fukuda, Japan  
Dr John Gray, UK  
Prof Huang Jian-Guo, China  
Prof Masao Ikeda, Japan

Prof Rolf Johanson, Sweden  
Prof Okyay Kaynak, Turkey  
Dr Sherman Lang, Canada  
Mr Michael Lees, Australia  
Prof Ewald von Puttkamer, Germany  
Toshiro Noritsugu, Japan  
Prof T J Tarn, USA  
Dr Pensiri Tongpadungrod, Thailand  
Dr K F Tsang, Hong Kong  
Prof S K Tso, Hong Kong  
Dr Ljubo Vlacic, Australia  
Prof Friedrich Wahl, Germany  
Prof Wang Ning, China  
Juergen Wahrburg, Germany  
Dr Richard Weston, UK  
Prof Xu Ke-Ping, China  
Prof Peter Xu, New Zealand  
Yul Yunazwin, Indonesia  
Dr L F Yeung, Hong Kong  
Prof Zhou Chang-le, China

## **Welcome to M2VIP 2007**



Dear friends and colleagues, a warm welcome to another M2VIP. As we celebrate our 14<sup>th</sup> annual conference, we also celebrate our return to mainland China. On behalf of the International Steering Committee and the International Programme Committee we thank our colleagues at Xiamen University for their help and assistance in making this conference possible. I am sure that you will have a great time. As those who have been to M2VIP before know, this conference is not just about the papers and other sessions; it's also about meeting people, getting to know them, and enjoying their company along with good food and drink!

This year we have had a large number of papers submitted, of which we accepted around 65%. I think the Programme Committee and the International Reviewers have done a magnificent job in getting a high standard of papers for the conference.

I hope that you have a great time in Xiamen; it's a wonderful city, and I encourage you to come back and spend more time here away from the rigors of academia and engineering.

Dr Robin Bradbeer  
Chair, International Programme Committee  
M2VIP 2007

## **Welcome message from Xiamen University**



On behalf of the Local Organizing Committee, we earnestly welcome your participation in the 14th International Conference on Mechatronics and Machine Vision in Practice which will be held on 3rd - 5th December 2007 in Xiamen. This is the first workshop jointly organized by the M2VIP and Xiamen University. Following the success of its thirteen predecessors, M2VIP 2007 will provide a dynamic forum for international experts and researchers to present and review up-to-date technical advances in mechatronics and machine vision which have culminated in practical applications, or which promise practical implementation in the very near future.

Xiamen University, founded in 1921, was the first university in China which was established by an overseas Chinese entrepreneur, Mr. Tan Kae-kee. As a prestigious university in China, it is the centre of inspiring education and productive researches in China. As the organizer of this eminent conference, Xiamen University will strive for excellence with perseverance and try the best to offer the participants with service of superior quality. We also invite you to pay a visit to the picturesque campus of Xiamen University and our laboratories. Constructive advice and suggestions are also welcomed.

Last but not least, I'd like to pay special thanks to Dr. Robin Bradbeer for her consistent commitment to this conference.

Welcome to Xiamen and we hope that you can enjoy your trip and have a fruitful conference.

Prof. Xiaomei Xu  
Chairman of Local Organizing Committee  
Department of Oceanography  
Xiamen University