Final Program

2008 IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications

October 12 – 15, 2008
Beijing, China

Sponsor
IEEE Intelligent Transportation Systems Society

Technical Co-sponsors
ASME Division of Design Engineering
Chinese Academy of Sciences
Chinese Association for Automation
Chinese Mechanical Engineering Society
National Natural Science Foundation of China

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Welcome Message from the General and Program Chairs

The 2008 IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications (MESA08) is sponsored by IEEE Intelligent Transportation Systems Society, ASME Division of Design Engineering, Chinese Academy of Sciences, Chinese Association for Automation, Chinese Mechanical Engineering Society; and co-sponsored by National Natural Science Foundation of China. On behalf of the Organizing Committee, we would like to extend to you our warmest welcome to the MESA08.

MESA was the first and so far the only conference that aims to bring mechatronic and embedded system designs and applications together. We are also exploring a unique collaboration model between IEEE and ASME. Currently, MESA is organized by ASME and IEEE alternatively each year. Last September, MESA was held in Las Vegas, Nevada, organized mainly by ASME as one of conferences in the International Design Engineering Technical Conferences (IDETC). This year MESA is mainly organized by IEEE as an independent conference; and next year it will be in San Diego, California, mainly by ASME within the IDETC again. MESA provides a unique opportunity for professionals and students from different fields to meet and exchange ideas and experiences on research and development in mechatronic and embedded systems.

This year we received 181 submissions. A majority of the submitted papers were reviewed by three reviewers. Only papers with at least two positive reviews were accepted. Through a rigorous review process, the Program Committee was able to select 109 papers for presentations in 24 technical sessions. In addition, there are seven excellent keynote and plenary speeches.

The success of MESA08 would be impossible without the tireless effort and dedicated work of the Members of the Organizing Committees. In particular, we would like to express our sincere thanks to Symposia Chairs for their wisdom and hard work in coordinating the review of all submitted papers. We are grateful for Members of the International Program Committee and reviewers for their thorough review of the papers. We would like to thank the Members of the Awards Committee for selecting papers for Best Paper Awards and Best Student Paper Awards. Our appreciation also goes to Members of the Advisory Committee for their guidance and to the keynote and plenary speakers who graciously agreed to share their vision of future challenges in mechatronic and embedded systems and applications. Above all, a special thank goes to all of the authors who have contributed their research works at the conference.

Finally, we sincerely hope you will enjoy the conference and have a great time in Beijing.

Ren C. Luo
Conference Chair

Harry H. Cheng
Conference Chair

Sunil K. Agrawal
Program Chair

XiaoQi Chen
Program Co-Chair

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Bo Chen, Assistant Professor, Michigan Technological University

Embedded System Infrastructure and Theory
Martin Horauer, Professor, U. of Applied Sci. Tech. Vienna, Austria

Mechatronic and Embedded System Applications
Primo Zingaretti, Professor, U. of Politechnica dell Marche, Italy

Development, Verification, Debug Tools for Mechatronic & Embedded Systems
Tianmiao Wang, Professor and Director, Institute of Robotics Research, Beihang University

Mechatronics Control and Manufacturing

YangQuan Chen, Associate Professor, Utah State University

Mechatronic and Embedded Systems in Education
Zhaoqing Wang, Professor and Director, Instructional Division for Computing Technology, Zhejiang Sci-Tech University

Mechatronic Systems
Jian S Dai, Professor, University of London

Sensors and MEMS
V. Sundarrajan, Assistant Professor, Univ of California, Riverside

Machines for Precision Farming
Uriel A. Rosa, Assistant Professor, University of California, Davis

Robotics and Mobile Machines
Ying Chen, Vice President, Hangzhou Dianzi University; Professor, Zhejiang University

Robotics for Human Augmentation and Rehabilitation
Sunil K. Agrawal, Professor, University of Delaware

Micro Air vehicles
Xinyan Deng, Assistant Professor, University of Delaware

Intelligence in Mechatronic and Embedded Systems
Hyo-Sung Ahn, Gwangju Institute of Science and Tech

Special Topics and Sessions
Hami Kazerooni, Professor, Univ. of California, Berkeley
Xudong Hu, Professor and Dean, School of Mechanical Engineering and Automatic Control, Zhejiang Sci-Tech University

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Behnam Arad, California State University, Sacramento, USA
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Ying Chen, Hangzhou Dianzi University, China
Harry H. Cheng, University of California at Davis, USA
Hong Cheng, Xi'an Jiaotong University, China

A Workshop on Using the Ch Computing Environment for Teaching, Research, and Industrial Applications

Objectives

The evolving nature of technology requires the new generation of engineers and scientists developing strong capabilities in computer and information technology. Ch, a user friendly cross-platform C/C++ computing environment, has been widely used for teaching computer programming to solve problems in engineering and science. Ch is a C/C++ interpreter with high-level numerical and plotting extensions. It significantly simplifies numerical and scientific computing. Due to its interactive nature, Ch is especially effective for teaching and learning C programming. Ch is also an embeddable scripting engine, which can be seamlessly embedded into a compiled program to make it reprogrammable through the use of C/C++ scripts. It can be conveniently used to realize many novel computing paradigms such as mobile computing. In this workshop, the evolution and future of C will be presented. Teaching, research, and industrial application experience using Ch will be shared with participants. Various examples of using an embeddable C/C++ interpreter for teaching improvement, research and engineering practice will be presented. More information about the workshop can be found at the workshop web site http://www.asmemesa.org/chworkshop/.

Organizing Committee

Chair, Harry H. Cheng, Professor, University of California, Davis, USA
Co-Chair,Yaoxue Zhang, Professor and Academician
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Institute of Computing Technology, Chinese Academy of Sciences, China

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Co-sponsors

National Natural Science Foundation of China
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Conference Schedule

October 12 Saturday	
8:00-17:00	Registration, *Lobby of Building 8 and Lobby of Friendship Palace*
9:00-17:30	Workshop, *No.5 Conference Room, Building 8*
10:30, 15:00	Coffee/tea break, *Corridor outside No.5 Conference Room, Building 8.*
12:00-13:00	Lunch, *Coffee Shop, Friendship Palace*
October 13 Monday	
8:50-9:00	Opening Ceremony, *Ballroom, Friendship Palace*
9:30-12:10	Keynote Addresses, *Ballroom, Friendship Palace*
12:10-13:30	Lunch, *JuHeYuan Restaurant, Friendship Palace*
13:30-15:00	3 parallel technical sessions, *No.3, No. 4 and No.5Conference Room, Building 7.*
15:00-15:30	Coffee/tea break, *Corridor outside No.5 Conference Room, Building 7.*
15:30-17:00	3 parallel technical sessions, *No.3, No. 4 and No.5Conference Room, Building 7.*
17:00-18:00	MESA Committee Meeting, *No.5Conference Room, Building 8.*
18:00-22:00	Reception, *JuHeYuan Restaurant, Friendship Palace*
October 14 Tuesday	
8:30-9:15	Invited plenary speech, *No. 5 Conference Room, Building 8.*
9:15-10:00	Invited plenary speeches, *No. 5 Conference Room, Building 8.*
10:00 - 10:30	Coffee/tea break, *Corridor outside No.5 Conference Room, Building 8,*
10:30 - 11:15	Invited plenary speeches, *No. 5 Conference Room, Building 8.*
11:15 - 12:00	Presentation of appreciation awards, *No. 5 Conference Room, Building 8.*
12:00-13:30	Lunch, *JuHeYuan Restaurant, Friendship Palace*
13:30-15:00	3 parallel technical sessions, *No.3, No. 4 and No.5Conference Room, Building 7.*
15:00-15:30	Coffee/tea break, *Corridor outside No.5 Conference Room*
15:30-17:00	3 parallel technical sessions, *No.3, No. 4 and No.5Conference Room, Building 7.*
18:00-22:00	Banquet, *Ballroom(YuYingTing), Friendship Palace*
October 15 Wednesday	
8:30-10:00	3 parallel technical sessions, *No.3, No. 4 and No.5Conference Room, Building 7.*
10:00-10:30	Coffee/tea break, *Corridor outside No.5 Conference Room*
10:30-12:00	3 parallel technical sessions, *No.3, No. 4 and No.5Conference Room, Building 7.*
12:00-13:30	Lunch, *JuHeYuan Restaurant, Friendship Palace*
13:30-15:00	3 parallel technical sessions, *No.3, No. 4 and No.5Conference Room, Building 7.*
15:00-15:30	Coffee/tea break, *Corridor outside No.5 Conference Room*
15:30-17:00	3 parallel technical sessions, *No.3, No. 4 and No.5Conference Room, Building 7.*

Program in Brief

October 12 Sunday

9:00-17:30, No. 5 Conference Room, Building 8, Workshop

A Workshop on Using the Ch Computing Environment for Teaching, Research, and Industrial Applications

Chair, Harry H. Cheng,	Professor, University of California, Davis, USA
Co-Chair,Yaoxue Zhang,	Professor and Academician Tsinghua University, China
Co-Chair, Guangnan Ni,	Professor and Academician, Institute of Computing Technology, Chinese Academy of Sciences, China

October 13 Monday

8:50-9:30, Ballroom, Friendship Palace Opening Ceremony

9:30-12:10 Ballroom, Friendship Palace Invited Keynote Speech

Trends and Research Directions in Supply Chain & Logistics Engineering
Prof. Chelsea (Chip) C. White III
H. Milton Stewart School of Industrial and Systems Engineering
Georgia Institute of Technology, USA
H. Milton and Carolyn J. Stewart Chair
Schneider National Chair in Transportation and Logistics

To Set up A Sustainable Transportation Systems for Beijing 2008 Olympic Games
Dr. Xiaoming Liu
Director of the Beijing Municipal Committee of Communications
Beijing Municipal Committee of Transport

The Theory of Commodity Material Flow
Academician Shoubo Xu
Beijing Jiaotong University

Mechatronics Design and Implementation of Driver Assistance Technologies For Intelligent Transportation Systems
Prof. Bahram Ravani
Department of Mechanical and Aeronautical Engineering
University of California, Davis, USA

12:10-13:30, Coffee Shop, Friendship Palace **Lunch**

13:30-15:00 **Parallel Technical Sessions**

MoP1T1 - Sensor Networks 1, No.3 Conference Room, Building 7.
Session Chair: Bo Chen
Session Co-Chair: Lingyun Yuan

MoP1T2 - Robotics 1, No.4 Conference Room, Building 7.
Session Chair: Ying Chen
Session Co-Chair: Thet Thet Mon

MoP1T3 - Intelligence in Mechatronic and Embedded Systems 1, No.5 Conference Room, Building 7.
Session Chair: Hyo-Sung Ahn
Session Co-Chair: Asifullah Khan

15:00-15:30 Corridor outside No.5 Conference Room, Building 7 **Coffee/tea break**

15:30-17:00 **Parallel Technical Sessions**

MoP2T1 - Sensors and MEMS 1, No.3 Conference Room, Building 7.
Session Chair: Wenhui Wang
Session Co-Chair: Jian Dong

MoP2T2 - Mechatronics Control and Manufacturing 1, No.4 Conference Room, Building 7.
Session Chair: Devdas Shetty
Session Co-Chair: Eun-sang Lee

MoP2T3 - Mechatronic Systems 1, No.5 Conference Room, Building 7.
Session Chair: Wenggang Ji
Session Co-Chair: Thom J. van Beek

18:00-22:00, JuHeYuan Restaurant, Friendship Palace **Reception**

October 14 Tuesday

8:30-10:00, No. 5 Conference Room, Building 8 **Invited Plenary Speeches**

Forty Years of Walking and Running
Kenneth J. Waldron
Professor (Research), Design Division
Department of Mechanical Engineering, Stanford University
Professor, School of Engineering, University of Technology, Sydney

Theories of Multisensor Fusion and Its Applications to Intelligent Mechatronics Systems
Ren C. Luo
Distinguished Professor, National Taiwan University

President, Robotics Society of Taiwan

10:00-10:30, Corridor outside No.5 Conference Room, Building 8 **Coffee/Tea Break**

10:30-11:15, No. 5 Conference Room, Building 8 **Invited Plenary Speech**

Application of Mechatronic Systems in Tunneling Machines

Huayong Yang, Professor
National Research Centre of Electrohydraulic Control
Zhejiang University, Hangzhou 310027, People's Republic of China

11:15-12:00, No. 5 Conference Room, Building 8

Presentation of appreciation awards

12:00-13:30, JuHeYuan Restaurant, Friendship Palace **Lunch**

13:30-15:00 **Parallel Technical Sessions**

TuP1T1 - Sensor Networks 2, No.3 Conference Room, Building 7.
Session Chair: Guangping Qi
Session Co-Chair: Joshua Ellul

TuP1T2 - Mobile Machines, No.4 Conference Room, Building 7.
Session Chair: XiaoQi Chen
Session Co-Chair: Abbas Fattah

TuP1T3 - Mechatronic and Embedded System Applications 1, No.5 Conference Room, Building 7.
Session Chair: Primo Zingaretti
Session Co-Chair: Peihan Wen

15:00-15:30, Corridor outside No.5 Conference Room, Building 7 **Coffee/Tea Break**

15:30-17:00 **Parallel Technical Sessions**

TuP2T1 - Embedded System Infrastructure and Theory 1, No.3 Conference Room, Building 7.
Session Chair: Seungtaek Kim
Session Co-Chair: Mehrnaz Motiee

TuP2T2 - Analysis, modelling and simulation, No.4 Conference Room, Building 7.
Session Chair: Zuomin Dong
Session Co-Chair: Markus Özbek

TuP2T3 - Applications in intelligent manufacturing and automation systems, No.5 Conference Room, Building 7.
Session Chair: Roman Kamnik
Session Co-Chair: Wenhui Wang

18:00-22:00, Ballroom(YuYingTing), Friendship Palace **Banquet**

October 15 Wednesday

8:30-10:00 **Parallel Technical Sessions**

WeA1T1 - Hardware, architecture, and protocol, No.3 Conference Room, Building 7.
Session Chair: Chunjing Mao
Session Co-Chair: Chao Yan

WeA1T2 - Mechatronics Control and Manufacturing 2, No.4 Conference Room, Building 7.
Session Chair: Junyi Cao
Session Co-Chair: Tao Ma

WeA1T3 - Mechatronic Systems 2, No.5 Conference Room, Building 7.
Session Chair: Dong-Hoon Kim
Session Co-Chair: Magdalena Chmarra

10:00-10:30, Corridor outside No.5 Conference Room, Building 7 **Coffee/Tea Break**

10:30-12:00 **Parallel Technical Sessions**

WeA2T1 - Applications of sensor networks, No.3 Conference Room, Building 7.
Session Chair: Bo Chen
Session Co-Chair: Li-min Yu

WeA2T2 - Robotics for Human Augmentation, No.4 Conference Room, Building 7.
Session Chair: Sunil K. Agrawal
Session Co-Chair: Xiaowei Dai

WeA2T3 - Embedded System Infrastructure and Theory 2, No.5 Conference Room, Building 7.
Session Chair: Jia Xu
Session Co-Chair: Martin Horauer

12:00-13:30, JuHeYuan Restaurant, Friendship Palace **Lunch**

13:30-15:00 **Parallel Technical Sessions**

WeP1T1 - Perception, path planning, and navigation 1, No.3 Conference Room, Building 7.
Session Chair: Ying Chen
Session Co-Chair: Stephen Nestinger

WeP1T2 - Robotics 2, No.4 Conference Room, Building 7.
Session Chair: Hamid Taghirad
Session Co-Chair: Yini Zhao

WeP1T3 - Development, Verification, Debug Tools for Mechatronic & Embedded Systems, No.5 Conference Room, Building 7.
Session Chair: Tianmiao Wang
Session Co-Chair: Martin Horauer

15:00-15:30, Corridor outside No.5 Conference Room, Building 7 **Coffee/Tea Break**

15:30-17:00 **Parallel Technical Sessions**

WeP2T1 - Perception, path planning, and navigation 2, No.3 Conference Room, Building 7.
Session Chair: Primo Zingaretti
Session Co-Chair: Yu-Cheol Lee

WeP2T2 - Mechatronics Control and Manufacturing 3, No.4 Conference Room, Building 7.
Session Chair: Fei Yu
Session Co-Chair: Xudong Hu

WeP2T3 - Mechatronic and Embedded System Applications 2, No.5 Conference Room, Building 7.
Session Chair: Sabri Cetinkunt
Session Co-Chair: Huaming Qian

Invited Keynote and Plenary Speeches

Trends and Research Directions in Supply Chain & Logistics Engineering

Prof. Chelsea (Chip) C. White III
H. Milton Stewart School of Industrial and Systems Engineering
Georgia Institute of Technology
H. Milton and Carolyn J. Stewart Chair
Schneider National Chair in Transportation and Logistics

Monday October 13, 2008 9:30-10:10 Ballroom, Friendship Palace

Abstract We look at current forces affecting supply chain design and global logistics, including fuel and labor costs; mode shifts; improvements in efficiency within each mode; currency dynamics; risk; labor shortages, laws, and wages in China; international freight transport network congestion; capacity reduction; product & package design to reduce weight and cube; and information technology applications. We then focus on interesting research directions linked to the next level of supply chain control productivity - controlling supply chains in real-time, based on real-time data - and discuss the value of information and how to extract this value effectively.

Biography Professor White is a Chaired Professor in Transportation and Logistics in the School of ISyE, Georgia Tech. His research interests include stochastic optimization and the integration of formal reasoning techniques and concepts in artificial intelligence for problem solving with application to transportation, health care, military decision making, and strategic planning. He is editor-in-chief of the ITS Journal and editor of the IEEE Transactions on Systems, Man and Cybernetics, Part A. He is past president of the IEEE Systems, Man, and Cybernetics (SMC) Society, President-elect of the ITS Michigan Board of Directors, a member of the ITS World Congress Board of Directors, and a member of the ITS America Coordinating Council. He is a Fellow of the IEEE, director of the ITS Research Center, Co-Director of the Sloan Trucking Project, and Director of the EECS ITS Laboratory.

To Set up A Sustainable Transportation Systems for Beijing 2008 Olympic Games

Dr. Xiaoming Liu
Director of the Beijing Municipal Committee of Communications
Beijing Municipal Committee of Transport
Beijing 100053, P.R. of China

Monday October 13, 2008 10:10-10:50 Ballroom, Friendship Palace

Abstract As an Olympic city, Beijing has had to face many challenges, such as transportation, environment, security etc. The transport challenge to Beijing to bid, prepare for and host the games, our trails and triumphs are presented. The address also describes the direction that the Beijing transport is now moving toward, a sustainable transportation system.

Biography Secretary and director of the Leading Party Group of Beijing Municipal Committee of Communications, is responsible for general works of Beijing Municipal Committee of Communications. He also takes charge of the Personnel Department, the Financial Department and the Research Room and contacts with Beijing Transportation Research Center.
Dr. Liu is also a professor of Beijing University of Technology.

The Theory of Commodity Material Flow

Academician Shoubo Xu
Beijing Jiaotong University

Monday October 13, 2008 10:50-11:30 Ballroom, Friendship Palace

Abstract Author makes for the first time according to the basic theory of technological economics — theory of six forces on essential factors of production & living，hierarchical theory on production factors and theory of material flow to produce the theory of material flow based on the 6 essential factors commodity such as labor, capital, physical, nature, freight, time.

This paper makes the commodity movement rule in the development of social economy for the first time, commodity movement includes the movement of physical object of commodity and the capital movement of commodity and the information movement of commodity. The movement of physical object of commodity forms commodity physical flow and the information movement of commodity forms commodity information flow, and the capital movement of commodity forms commodity capital flow. According to the Theory of Material Flow regardless of commodity physical object, commodity capital and commodity information, is material, commodity physical flow, capital flow and iformation flow must obey entire commercial movement rule. The theory of commodity material flow includes Commodity Physical Flow Theory, Commodity Capital Flow Theory and Commodity Information Flow Theory.

Biography Academician Shoubo Xu was born in 1931 at Shaoxing, Zhejiang Province, China. He is the founding father of the discipline called Technological Economics (TE), Energy Technological Economics (ETE)/Comprehensive Energy Engineering (CEE), and the theory of Material Flow Technological Economics (MFTE)/Comprehensive Material Flow Engineering (CMFE). Dr. Xu obtained his BS in power engineering from the Nanjing Institute of Technology in 1955. He then graduated from the Energy Institute of the Academy of Sciences of USSR in 1960 and was awarded a doctor degree in technological science. Currently he is a professor and PhD advisor at Beijing Jiaotong University.

Dr. Xu served as the Chairman of the First Council of the China Society of Technological Economics Research, the first Director of the Institute of Technological Economics of the Chinese Academy of Social Science, the first Chairman of the Department of Technological Economics of the Graduate School of the Chinese Academy of Social Sciences, the President of the Institute of Technological Economics of the State Commission of Planning, PRC. Dr. Xu was also the first Standing Chairman of the China Society of Material Flow Research, the first Chairman of the Special Committee on Material Flow Technological Economics of the China Society of Material Circulation. He has served as an advisor for the State Commission of Energy PRC. He was also a senior advisor of the Ministry of Energy PRC, Director of the Research Bureau of Energy Office of

the State Council PRC, a standing Chairman for the First Council of Beijing Energy Society, a standing Chairman of the First Council of the China Research Society of Energy Bases, the first Director of the Energy Technological Economics/Comprehensive Energy Research Department of the Chinese Academy of Sciences.

In 2001, he was elected as an academician of the Chinese Academy of Engineering.

Mechatronics Design and Implementation of Driver Assistance Technologies For Intelligent Transportation Systems

Prof. Bahram Ravani
Department of Mechanical and Aeronautical Engineering
University of California, Davis, USA
Davis, CA 95616-5294

Monday October 13, 2008 11:30-12:10 Ballroom, Friendship Palace

Abstract The mechatronics design, testing, and implementation of various technologies for driver assisted guidance and control of vehicles in Intelligent Transportation Systems (ITS) is presented. Driver assisted guidance and control in ITS include applications such as lane keeping, intelligent cruise control, and obstacle identification and avoidance. These driver assistance functions require development of mechatronics sensing, human machine interface, and other related technologies. The designs of several mechatronics systems developed for this purpose are discussed. These include:

1. An all-digital magnetic sensing system that would provide reliable sensing of vehicle position from roadway imbedded magnets for lane keeping.
2. A robotic system for installation of the magnets on the roadway.
3. A human-machine interface for driver assistance.
4. An all-accelerometer INS (Inertial navigation System) for dead reckoning of vehicle positions for GPS (Global Position System) based lane keeping.
5. A laser based sensing system for intelligent cruise control.

In applications that require obstacle identification and avoidance, the concept of an innovative radar sensing system is presented.

Experimental data and video from actual implementation of these systems for driver assistance in hazardous snow and ice removal operations in highway maintenance on California highways is also presented. In addition, the theoretical basis used in modeling the human-in-the-loop steering dynamics of vehicles during snow and ice removal operations for the design and simulation of the mechatronics systems developed is discussed.

Biography Bahram Ravani is a Professor of Mechanical Engineering at the University of California - Davis and a Co-Director of the Advanced Highway maintenance and Construction Technology Research Center – A Collaborative research Center between the California Department of Transportation and the University. He has been a faculty member at UC-Davis since 1987. He was the Interim Chair of Electrical and Computer Engineering Department from 2005-2008 and the Chair of Mechanical and

Aeronautical Engineering Department from 1996 to 2001. His areas of current research include Robotics and Mechatronics, Mechanical Design and Manufacturing, Intelligent Transportation Systems and Highway Safety, and Dynamics and Biomechanics. He was a past member of the management committee of the ASME/IEEE Transactions on Mechatronics and a former editor for Design for the same Transaction Journal. He was also a former editor in chief of ASME Transactions Journal of Mechanical Design. He is a Fellow of ASME and a past recipient of several achievement awards including the Machine Design Award of ASME.

Dr. Ravani received his BS degree Magna Cum Laude from Louisiana State University, Baton Rouge, LA in 1976; the MS degree from Columbia University in New York in 1978 and the Ph.D. degree from Stanford University, Stanford, CA, in 1982, all in Mechanical Engineering. He was a tenured faculty at the University of Wisconsin-Madison before moving to UC-Davis.

Optimal Mainstream Traffic Flow Control of Large Scale Motorway Networks

Prof. Markos Papageorgiou
Director
Dynamic Systems & Simulation Laboratory
TECHNICAL UNIVERSITY OF CRETE
University Campus
GR-73100 Chania, GREECE

Tuesday October 14, 2008 19:00-19:30 Ballroom, Friendship Palace

Abstract The continuously increasing daily traffic congestions on motorway networks around the world call for innovative control measures that would drastically improve the current traffic conditions. Mainstream traffic flow control (MTFC) is proposed as a novel and efficient motorway traffic management tool, and its possible implementation and principal impact on traffic flow efficiency is analysed. Variable speed limits, suitably operated and enforced, is considered as one (out of several possible) way(s) for MTFC realisation, either as a stand-alone measure or in combination with ramp metering. A computationally efficient software tool for optimal integrated motorway network traffic control including MTFC is applied to a large-scale motorway ring-road. It is demonstrated via several investigated control scenarios that traffic flow can be substantially improved via MTFC with or without integration with coordinated ramp metering actions.

Biography Markos Papageorgiou was born in Thessaloniki, Greece, in 1953. He received the Diplom-Ingenieur and Doktor-Ingenieur (honors) degrees in Electrical Engineering from the Technical University of Munich, Germany, in 1976 and 1981, respectively. From 1976 to 1982 he was a Research and Teaching Assistant at the Control Engineering Chair, Technical University of Munich. He was a Free Associate with Dorsch Consult, Munich (1982-1988), and with Institute National de Recherche sur les Transports et leur Sécurité (INRETS), Arcueil, France (1986-1988). From 1988 to 1994 he was a Professor of Automation at the Technical University of Munich. Since 1994 he has been a Professor at the Technical University of Crete, Chania, Greece. He was a Visiting Professor at the Politecnico di Milano, Italy (1982), at the Ecole Nationale des Ponts et Chaussées, Paris (1985-1987), and at MIT, Cambridge (1997, 2000); and a Visiting Scholar at the University of Minnesota (1991, 1993), University of Southern California (1993) and the University of California, Berkeley (1993, 1997, 2000).

Forty Years of Walking and Running

Kenneth J. Waldron
Professor (Research), Design Division
Department of Mechanical Engineering, Stanford University
Professor, School of Engineering, University of Technology, Sydney

Tuesday October 14, 2008 8:30-9:15 No. 5 Conference Room, Building 8

Abstract: The first legged robot with an integrated computer controller walked in 1968. Forty years later, legged robots are a reality in some industrial applications, and have been the subjects of very many research projects. There are still unanswered questions that prevent these systems from realizing the potential that was envisioned so many years ago.

In this presentation the author will review the both the very considerable progress that has been made, and the issues that still prevent full realization of the potential. The talk will be illustrated by examples from many sources from the Phony Pony to Asimo and Big Dog, including the author's own work on the Adaptive Suspension Vehicle and KOLT. The talk will discuss both hardware issues such as sensing and actuation and the underlying theories on coordination and stability of multi-legged systems.

Biography: Dr. Waldron obtained the degrees of Bachelor of Engineering and Master of Engineering Science from the University of Sydney (Australia). He received his PhD from Stanford University in 1969. He was also awarded the degree of Doctor of Engineering by the University of Sydney in 1999. After a period with Australian Iron and Steel Pty. Ltd. he has held teaching appointments at Stanford, the University of New South Wales, and the University of Houston, before joining The Ohio State University in 1979. He served as department chairman from April 1st, 1993 to June 30th, 2000. He joined Stanford University on September 1st, 2000. He holds a half-time appointment at the University of Technology, Sydney effective July 2007.

Dr. Waldron's research interests include machine design in general, and particularly geometric, mechanical and software design of robots and computer coordinated mechanical systems. He is also active in research in medical device design, and in the simulation of medical procedures using virtual reality techniques. His interests include the kinematics and dynamics of mechanisms, and application of computer-aided engineering techniques to mechanism design. He has a particular interest in locomotory biomechanics and in the design of computer coordinated vehicles and robotic systems for use in unstructured environments.

Dr. Waldron was the Editor of the ASME Transactions Journal of Mechanical Design from 1988 through 1992. He has authored over 300 journal articles and conference proceedings. He is co-

author, with G.L. Kinzel, of the text Kinematics, Dynamics and Design of Machinery, published by John Wiley and Sons (1998, 2003), and with S. M. Song, of the book Machines that Walk: The Adaptive Suspension Vehicle published by M. I. T. Press (1988). He has edited three other books.
Dr. Waldron is a Fellow of The American Society of Mechanical Engineers. He is immediate Past Technical Leader of the ASME Systems and Design Group and Past President of IFToMM the International Federation for Promotion of Mechanism and Machine Science. He received the ASME Leonardo da Vinci Award in March 1988, the Mechanisms Award in 1990, the Machine Design Award in 1994, the Ruth and Joel Spira Outstanding Design Educator Award in 2002, the Dedicated Service Award in 2004 and the Abbott Award in 2008. He was a speaker in the ASME Distinguished Lecturers Program from 1996 to 1999. He also received the Joseph F. Engelberger Award of the Robotic Industries Association in 1997.

Theories of Multisensor Fusion and Its Applications to Intelligent Mechatronics Systems

Ren C. Luo
Distinguished Professor, National Taiwan University
President, Robotics Society of Taiwan

Tuesday October 14, 2008 9:15 - 10:00 No. 5 Conference Room, Building 8

Abstract: Synergistic use of multiple sensors by machines and systems enables greater intelligence to be incorporated into their overall operation. Motivation for using multiple sensors can be considered as response to simple question: if a single sensor can increase the capability of a system, would the use of more sensors increase it even further?

Multisensor fusion, as defined here, refers to any stage in the integration process where there is an actual combination (or fusion) of different sources of sensory information into one representational format. It is one aspect of the overall integration process which involves mathematical and statistical issues including combining sensor uncertainty Methods for sensor fusion includes Estimation methods such as covariance Intersection (CI), covariance union (CU), Kalman Filtering; Classification methods, such as Support Vector Machine (SVM) etc.

In this talk, some theories of multisensory fusion and its applications to intelligent mechatronics systems such as precision measurements, inspections, sensory controlled robotics systems will be presented and discussed.

Biography: Ren C. Luo (M'83–SM'88–F'92) received the Ph.D. degree in electrical engineering from the Technische Universitaet Berlin, Berlin, Germany. He is currently a Distinguished Professor in the Department of Electrical Engineering at National Taiwan University and President of Robotics Society of Taiwan. He also served as President of National Chung Cheng University in Taiwan. He was a Professor of Department of Electrical and Computer Engineering at North Carolina State University, Raleigh, NC, USA and Toshiba Chair Professor in the University of Tokyo, Japan.

His research interests include sensor-based intelligent robotic systems, multisensor fusion and integration, computer vision, micro/nano technologies, rapid prototyping, and advanced manufacturing systems. He has authored more than 300 papers on these topics, which have been published in refereed technical journals and conference proceedings. He also holds several patents. Dr. Luo received IEEE Eugean Mittlemann Outstanding Research Achievement Award, 1996; ALCOA Foundation Outstanding Engineering Research Award, NCSU, USA; National Science Council Outstanding Research Awards, 1998-1999, 2000-2001, 2002-2005; National Science Council Distinguished Research Awards,2006-2008; TECO Outstanding Science and Technology Research Achievement Award, 2001. Dr. Luo is currently Editor-in-Chief of IEEE/ASME

Transactions On Mechatronics. He served as President of IEEE Industrial Electronics Society (2000-2001). He also served as President of Chinese Institute of Automation Engineers, Convener of Automation Technology Division, National Science Council; Adviser of Ministry of Economics Affairs and Technical Adviser of Prime Minister's Office in Taiwan.

He contributes regularly to IEEE sponsored international conferences by serving as conference General Chairs (IEEE IROS 1992, MFI 1994, IECON 1996, MFI 1999, ICRA 2003, IECON 2007, IROS 2010), Program Chairs, program committees, and offers short courses or tutorials and plenary/keynote speeches in various countries and research communities. Dr. Luo is a Fellow of IEEE since 1992 and a Fellow of IEE.

Application of Mechatronic Systems in Tunneling Machines

Huayong Yang, Professor
National Research Centre of Electrohydraulic Control
Zhejiang University, Hangzhou 310027, People's Republic of China

Tuesday October 14, 2008 10:30-11:15 No. 5 Conference Room, Building 8

Abstract: Tunnel boring machines (TBM) are widely used in tunnel engineering projects. Development of mechatronic systems used in TBM has been one of the major focuses in recent years. The requirements of mechatronic systems in TBM present many challenges because TBM are likely encountered a variety of severe geological working conditions during the operation as the load applied on the machine is variable and unpredictable. With the integration of embedded intelligent control algorithms, communication, condition monitoring and data compilation techniques, one mechatronic control system is presented in detail in this plenary presentation. The system can set tunneling operation parameters automatically. The talk will go on to other two mechatronic systems for cutter head drive and thrust control. The design and control strategies of these mechatronic systems will be discussed by simulation and experimental studies to obtain optimal operation results of TBM. In addition, mechatronic design of the multiple electrohydraulic actuators, which are used to drive cutter head and to control thrust, is highlighted.

Biography: Dr. Huayong Yang is a "Cheung Kong Scholar" Chair Professor of Zhejiang University. He received his Ph.D. from the University of Bath in 1988. Dr. Yang served as the director of the State Key Laboratory of Fluid Power Transmission and Control at Zhejiang University from 1997 to 2001. He has been the director of National Engineering Research Center of Electrohydraulic Control since 2000. He has been also a committee member of the advanced manufacturing technology within the China High Technology 863 program of the Ministry of Science and Technology (MOST) from 2000 to 2010. Besides, he has been the chief scientist of a project supported by the National Basic Research Program of China since 2007. Dr. Yang is a Fellow of the Chinese Mechanical Engineering Society. He is a member of the academic committee of four state key laboratories, which include Fluid Power Transmission and Control at Zhejiang University, Mechanical System and Vibration at Shanghai Jiaotong University, Digital Manufacturing Equipment and Technology at Huazhong University of Science and Technology, and Mechanical Transmission at Chongqing University. He is also the editor of Chinese Journal of Mechanical Engineering. His research interests include motion control and energy saving of mechatronic systems, fluid power component and system development. Dr. Yang has published one book and over 160 technical papers in national and international journals. He holds 45 Chinese patents. He has obtained a National Scientific and Technological Progress Prize (Second Class) and two Ministerial or Provincial Scientific and Technological Progress Prize (First Class). He is also the recipient of the National Outstanding Researcher of the Natural Science Foundation of China.

Technical Sessions

October 12, Sunday

A Workshop on Using the Ch Computing Environment for Teaching, Research, and Industrial Application,

8:00am-17:00pm Registration, Lobby of Building 8
9:00am-12:00pm Technical Program, No. 5 Conference Room, Building 8

Welcome Remarks: Professor Harry H. Cheng, University of California, Davis, USA

Chair: Professor Jianrong Tan (Academician), Zhejiang University, China

(1) Opening Speech
Professor Yaoxue Zhang (Academician)
Tsinghua University, China
(2) "Evolution and Future of C"
Professor Harry H. Cheng
University of California, Davis, USA

Break

Chair: Dongming Guo, Dalian University of Technology, China

(3) "Integration of the Ch Computing Environment in Mechanical Design"
Professor Bahram Ravani
University of California, Davis, USA
(4) "Effective Teaching of Introductory Computer Programming for Solving Problems in Engineering and Science"
Professor Harry H. Cheng
University of California, Davis, USA

12:00pm -1:00pm Lunch, Coffee Shop, Friendship Palace
1:00am-5:30pm Technical Program, No. 5 Conference Room, Building 8

Chair: Professor Ying Chen, Zhejiang University/Hangzhou Dianzi University, China

(1) "Using Ch for Teaching, Research, and Industrial Applications"
Professor Harry H. Cheng
University of California, Davis, USA
(2) "C/C++ Interpreter Ch for Mechatronic and Embedded Systems"
Professor Tianmiao Wang
Beihang University, China
(3) "Teaching C Programming Using Ch "
Professor Li Zheng
Tsinghua University, China

(4) “Teaching Introductory C Programming Using Ch Interpreter“
Professor Qingcang Yu,
Zhejiang Sci-Tech University, China

Break

Chair: Professor Huayong Yang, Zhejiang University, China

(5) “Teaching Automatic Control of Engineering Systems Using Ch Control System Toolkit”
and “Sensor Networks for Structural Health Monitoring Using Ch”
Professor Bo Chen,
Michigan Technological University, USA
(6) “Embedded Scripting in C/C++ for Product Mass Customization”
Professors Jianrong Tan (Academician) and Shuyou Zhang
Zhejiang University, China
(7) "A Ch-Based Platform for Simulation-Driven Designs and Analyses"
Dr. Jerry Young
Managing Director, CAE Technology
Shanghai Academy of Spaceflight Technology
Dr. Larry Chang
CEO, Pro-Lambda Solutions
(8) “The Market and Technology Trend of Computer-Aided Engineering
and Importance of Scripting Languages“
Professor Jin Hwan Choi
Kyung Hee University, Korea
(9) Concluding Speech
Professor Guangnan Ni (Academician)
Institute of Computing Technology, Chinese Academy of Sciences, China

October 13, Monday

MoP1T1 No.3 Conference Room, Building 7
Sensor Networks 1 From 2008-10-13 13:30:00 To 2008-10-13 15:00:00

Session Chair: Bo Chen *Michigan Technological University*

Session Co-Chair: Lingyun Yuan *Yunnan Normal University*

Fostering Reliability of Ad Hoc Networks through Fuzzy Nodes
Saeid Haji Nasiri; Esmaeel Zeinali Kh.

An Anchor Free Location Algorithm for Large Scale Wireless Sensor Networks
Jianquan Guo; Wei Zhao

A Multi-Layered Energy-Efficient and Delay-Reduced Chain-Based Data Gathering Protocol for Wireless Sensor Network
Lingyun Yuan; Yunlong Zhu; Tianwei Xu

OpenSHM: Open Architecture Design of Structural Health Monitoring Software in Wireless Sensor Nodes
Bo Chen; Masayoshi Tomizuka

MoP1T2 No.4 Conference Room, Building 7
Robotics 1 From 2008-10-13 13:30:00 To 2008-10-13 15:00:00

Session Chair: Ying Chen *Zhejiangi University*

Session Co-Chair: Thet Thet Mon *Universiti Malaysia Pahang*

A New Adaptive Method (AF-PID) Presentation with Implementation in the Automatic Welding Robot
Alireza Doodman Tipi; Seyed Atta Mortazavi

Adaptation of Dynamic Matrix Control and its implementation on welding robot
Alireza Doodman Tipi

Digital Microrobotics Based on Bistable Modules: Design of Compliant Bistable Structures
Qiao Chen; Haddab Yassine; Lutz Philippe

Robot Manipulator Identification based on a Customized Neural Network & Close Form Differential Equation
Narbeh Nahapetian; Mohamad Reza Jahed Motlagh; Morteza Analoui

Virtual Design of Multi-axis Positioning for Robotic Application
Thet Thet Mon; Wan Muhd Zulhasifi Wan Ab. Rahim; Rosli Abu Baker

MoP1T3 No.5 Conference Room, Building 7
Intelligence in Mechatronic and Embedded Systems From 2008-10-13 13:30:00 To 2008-10-13 15:00:00

Session Chair: Hyo-Sung Ahn *Gwangju Institute of Science and Technology*

Session Co-Chair: Asifullah Khan *Gwangju Institute of Science and Technology*

A Transformed Domain based Novel Focus Measure for 3D Shape Recovery
Muhammad Tariq Mahmood; Asifullah Khan; Tae-sun Choi

Variable Threshold Based Reversible Watermarking: Hiding Depth Maps
Asifullah Khan; Asad Ali; Muhammad Tariq Mahmood; Imran Usman; Tae-sun Choi

Wireless Localization Networks for Indoor Service Robots
Hyo-sung Ahn

Cooperative Reinforcement Learning: Brief Survey and Application to Bio-insect and Artificial Robot Interaction
Ji-hwan Son; Hyo-sung Ahn

On-chip Object Recognition System Using Random Forests
Osman Hassab Elgawi

MoP2T1 No.3 Conference Room, Building 7
Sensors and MEMS From 2008-10-13 15:30:00 To 2008-10-13 17:00:00

Session Chair: Wenhui Wang *University of Canterbury*

Session Co-Chair: Jian Dong *Zhejiang University of Technology*

Design and Calculation of Micromachined Silicon Condenser Microphone with Free Floating Diaphragm and Gold Backplate
Jian Dong; Shiming Ji; Libin Zhang

Design Analysis of Silicon Cantilever for Label-less Sensing using Finite Element Method
Thet Thet Mon; Mohd Shahrir Mohd Sani; Rosli Abu Baker; Nik Mohd Zuki Nik Mohamad

A NEW COUPLED-FIELD FORMULATION FOR ANALYSIS OF MULTI-DISCIPLINARY MICRO DEVICES
Mehrnaz Motiee; Amir Khajepour; Raafat R. Mansour

Suspended Cell Patterning for Automatic Microrobotic Cell Injection
Wenhui Wang; Maan Alkaisi; James Geoffrey Chase; Xiaoqi Chen; Chris Hann

A New Topology Optimization Method for Multi-physics Micro Domains
Mehrnaz Motiee; Amir Khajepour; Raafat R. Mansour

MoP2T2 No.4 Conference Room, Building 7
Mechatronics Control and Manufacturing 1 From 2008-10-13 15:30:00 To 2008-10-13 17:00:00

Session Chair: Devdas Shetty *Lawrence Technological University*

Session Co-Chair: Eun-sang Lee *Inha University*

Wafer Polishing Process with Signal Analysis and Monitoring for Optimum Condition of Machining
Jung-taik Lee; Sung-chul Hwang; Eun-sang Lee; Harry Cheng

Development of a Bio-Production Execution System for Agricultural Operations Management
Yu-cheng Chou; Stephen S. Nestinger; David C. Pursell; Harry H. Cheng; Uriel A. Rosa

Research on a Platform to Build Real-time Applications for CNC Systems
Wei Zhang; Dong Yu; Yi Hu

MECHATRONIC APPROACH TO THE INSPECTION OF COOLING HOLES IN AERO-ENGINES
Devdas Shetty; Tom Eppes; Claudio Campana; Tom Filburn; Nikolai Nazaryan

Mechatronic Design of A Reconfigurable Machining Machine
Bo Xing; Nkgatho S. Tlale; Glen Bright

MoP2T3 No.5 Conference Room, Building 7
Mechatronic Systems 1 From 2008-10-13 15:30:00 To 2008-10-13 17:00:00

Session Chair: Wenggang Ji *Beijing Institute of Petro-chemical Technology*

Session Co-Chair: Thom J. van Beek *Technische Universiteit Delft*

Mounting and Mesh for electromechanical integrated toroidal drive
Xin Liu; Lizhong Xu

Modeling, analysis and simulation of a Pan Tilt Platform based on linear and nonlinear systems.
Imran S. Sarwar; Afzaal M. Malik

Research on the Control System for Automatic Pipeline Welding Based on CANopen
Wengang Ji; Xiangdong Jiao; Canfeng Zhou; Tiexiang Li; Lixin Zhang

Task Based Optimal Geometric Design and Positioning of Serial Manipulators
Sasan Barissi; Hamid Taghirad

Connecting Views in Mechatronic Systems Design, a Function Modeling Approach
Thom J. Van Beek; Tetsuo Tomiyama

October 14, Tuesday

TuP1T1 No.3 Conference Room, Building 7
Sensor Networks 2 From 2008-10-14 13:30:00 To 2008-10-14 15:00:00

Session Chair: Guangping Qi *Beijing Institute of Technology*

Session Co-Chair: Joshua Ellul *University of Southampton*

DPICache: A Distributed Program Image Cache for Wireless Sensor Networks
Joshua Ellul; Kirk Martinez

Wireless Synchronous Triggering Technology Special for Wireless Sensor Networks
Guangping Qi; Ping Song

Improving the Security of Time Synchronization in WSN
Wei Guo; Yu Hua; Hong_jiao Ma

Closing the Control Loop in Intelligent Spaces Systems: Control Over Wireless Networks with a Packet Loss Perspective
Bin Liu; Fei-yue Wang; Qingming Yao; Hui Gao

TuP1T2 No.4 Conference Room, Building 7
Mobile Machines From 2008-10-14 13:30:00 To 2008-10-14 15:00:00

Session Chair: XiaoQi Chen *University of Canterbury*

Session Co-Chair: Abbas Fattah *Isfahan University of Technology*

Embedded Sensor Fusion System for Unmanned Vehicle Navigation
Philipp Scherz; Andreas Haderer; Klaus Pourvoyeur; Andreas Stelzer

Motion control and efficiency analysis of a special design five-link biped robot with torso
Reza Dehghani; Abbas Fattah

A Low-Cost Unmanned Underwater Vehicle Prototype for Shallow Water Tasks
Wenhui Wang; Xiaoqi Chen; Aaron Marburg; James Geoffrey Chase; Christopher Eric Hann

A Novel Wall Climbing Robot Based on Bernoulli Effect
Matthias Wagner; Xiaoqi Chen; Mostafa Nayyerloo; Wenhui Wang; Geoffrey Chase

Micro Helicopter Steering: Review and Design for the muFly Project
Dario Schafroth; Christian Bermes; Samir Bouabdallah; Roland Siegwart

TuP1T3 No.5 Conference Room, Building 7
Mechatronic and Embedded System Applications 1 From 2008-10-14 13:30:00 To 2008-10-14 15:00:00

Session Chair: Primo Zingaretti *Università Politecnica delle Marche*

Session Co-Chair: Peihan Wen *Tsinghua University*

Automated Inspection of Flexible Assembly: System Design and Algorithm Research
Peihan Wen; Li Zheng; Jian Zhou; Burton Clarke

Curriculum Development and Progressive Engineering Practice Design in Embed System Education
Xiaojuan Li

RTE Template Structure for AUTOSAR based Embedded Software Platform
Hyun Chul Jo; Shiquan Piao; Sung Rae Cho; Woo Young Jung

Application of PC/104 Embedded Computer to Air Pressure Control Device
Jinyun Li; Baoren Li; Zeshang Gao

Study on Characteristics of Interface Between Multiple Laminar Streams and Application for Secondary Etching Inside Microchannels

Xie Haibo; Zheng Yi; Fu Xin; Yang Huayong; Du Hong-yang

TuP2T1 No.3 Conference Room, Building 7
Embedded System Infrastructure and Theory 1 From 2008-10-14 15:30:00 To 2008-10-14 17:00:00

Session Chair: Seungtaek Kim *Korea Institute of Industrial Technology*

Session Co-Chair: Mehrnaz Motiee *University of Waterloo*

High-level Design Environments for FPGA-based Content Processing
Kevin Cheng; Martin Fleury

A Topology Control Algorithm to Balance Energy Consumption in Wireless Sensor Network
Hao Xiaochen; Dou Jingjing; Liu Haoran

An Internet-based HW/SW Co-Simulation Platform for VLSI design
Zhongqi Li; Xiang Ling; Jianhao Hu; Shihong Wu

Hardware Implementation of the Fast Optimization Method eDEAS
Tae-gyu Kim; Eun-su Kim; Jong-wook Kim

An Integrated Automotive Software Development and Validation System Based on CASOS-OSEK
Wu-ling Huang; Xin Qiao; Yunfeng Ai; Qingming Yao; Hui Gao

TuP2T2 No.4 Conference Room, Building 7
Analysis, modelling and simulation From 2008-10-14 15:30:00 To 2008-10-14 17:00:00

Session Chair: Zuomin Dong *University of Victoria*

Session Co-Chair: Markus Özbek *University of Duisburg-Essen*

Model Generation for the Verification of Automatically Generated Mechatronic Control Software
Maarten Foeken; Mark Voskuijl; Andres Alvarez Cabrera; Michel Van Tooren

Hybrid Time-Optimal Predictive Control for Mechanical Systems with Backlash Nonlinearity
Lingxun Dong; Lihua Dou; Heping Feng

Development of HILS System for Testing Embedded System of the Brake Control Unit for Hybrid Electric Vehicle
Hyun-soo Hwang; In-gyu Jang; Inkeun Seo; Jaewook Jeon; Sung-ho Hwang

Design and Analysis of a Hybrid Backup Power System for a High-Rise and High-Speed Elevator
Leon Zhou; Zuomin Dong; Sibo Wang; Zhiping Qi

Modeling and Simulation of a Fuel Cell-based Hybrid Powertrain
Markus Oezbek; Dirk Soeffker

TuP2T3 No.5 Conference Room, Building 7
Applications in intelligent manufacturing and automation systems From 2008-10-14 15:30:00 To 2008-10-14 17:00:00

Session Chair: Roman Kamnik *University of Ljubljana*

Session Co-Chair: Wenhui Wang *Mechanical Engineering*

Embedded Control System for Combat Vehicle Driving Simulator
Roman Kamnik; Miha Amrož; Peter Čepon; Jernej Kuželički; Ivan Prebil

Application of machine vision to automated cell injection
Wenhui Wang; Darren Hewett ; Christopher Eric Hann ; J. Geoffrey Chase ; Xiaoqi Chen

Development of a Web-Based Remote Monitoring System for Evaluating Degradation of Machine Tools Using ART2
U-il Jang; Min-seok Noh; Kook-jin Choi; Dae-sun Hong

Research of Pipeline Robot Tracking & Localization Technology Based on ELF-EP Communication
Haiming Qi; Xiaohua Zhang; Hongjun Chen; Jinrui Ye

October 15, Wednesday

WeA1T1 No.3 Conference Room, Building 7
Hardware, architecture, and protocol From 2008-10-15 08:30:00 To 2008-10-15 10:00:00

Session Chair: Chunjing Mao *Capital Normal University*

Session Co-Chair: Chao Yan *Hangzhou Dianzi Univ.*

A Middleware Based Control Architecture for Modular Robot Systems
Hongxing Wei; Shiyi Li; Ying Zou; Liang Yang; Tianmiao Wang

Research and Design of Digital Synthesizer Based on MATLAB
Chunjing Mao; Yong Guan; Yongmei Liu

A Study of Concurrent Integrated Process Planning Architecture and Cooperative Model in Holonic Manufacturing System
Chao Yan; Wu Liqun

An Adaptive Multidisciplinary Integration Framework for Mechatronic Systems Collaborative Design
Pengfei Zeng; Yongxian Liu; Yongping Hao

WeA1T2 No.4 Conference Room, Building 7
Mechatronics Control and Manufacturing 2 From 2008-10-15 08:30:00 To 2008-10-15 10:00:00

Session Chair: Junyi Cao *Xi'an Jiaotong University*

Session Co-Chair: Tao Ma *Beijing Institute of Technology*

Fractional Proportional Integral Control for Pneumatic Position Servo Systems
Junyi Cao; Binggang Cao; Xining Zhang; Guangwei Wen

Neural Network Based Inverse Control of Systems with Hysteresis
Tao Ma; Jie Chen; Wenjie Chen; Fang Deng

Robust control of DC-DC converters in complex environments
Fang Deng; Jie Chen; Weijie Chen; Tao Ma

Fractional Order Linear Quadratic Regulator
Yan Li; Yangquan Chen

Fuzzy Sliding Mode Control of a Ball Screw Driven Stage
Mohammad Shams; Mohammad Zarei- Nejad; Masoud Safdari

WeA1T3 No.5 Conference Room, Building 7
Mechatronic Systems 2 From 2008-10-15 08:30:00 To 2008-10-15 10:00:00

Session Chair: Dong-Hoon Kim *Korea Institute of Machinery and Materials*

Session Co-Chair: Magdalena Chmarra *Technische Universiteit Delft*

Design Considerations and Experimental Results of a 60 W Compressed-Air-to-Electric-Power System
Daniel Krähenbühl; Christof Zwyssig; Hansulrich Hörler; Johann Walter Kolar

Application and Evaluation of Intelligent Machine Tools based on Knowledge-Evolution in M2M Environment
Dong-hoon Kim; Jun-yeob Song; Suk-keun Cha

High Level Model Integration for Design of Mechatronic Systems
Andrés Alberto Alvarez Cabrera; Mustafa Suphi Erden; Maarten Foeken; Tetsuo Tomiyama

Revisiting the Divide and Conquer Strategy to Deal with Complexity in Product Design
Magdalena Chmarra; Andres Álvarez; Thom Van Beek; Valentina D'amelio; Mustafa Erden

A Novel Motion Control Design Approach Through Variable Structure Controller Based on Extended State Observer
Jin Tianxu; Chen Jie; Bai Yongqiang

WeA2T1 No.3 Conference Room, Building 7
Applications of sensor networks From 2008-10-15 10:30:00 To 2008-10-15 12:00:00

Session Chair: Bo Chen *Michigan Technological University*

Session Co-Chair: Li-min Yu *Pingdingshan Mining Group Corporation*

Greenhouse Monitoring with Wireless Sensor Network
Teemu Ahonen; Reino Virrankoski; Mohammed Elmusrati

Design of Monitoring System for Coal Mine Safety Based on Wireless Sensor Network
Li-min Yu; Anqi Li; Zheng Sun; Hui Li

The Application of TinyOS Beaconing WSN Routing Protocol in Mine Safety Monitoring
Zheng Sun; Xiao-guang Zhang; Hui Li; Anqi Li

Design of a Multi-Modal and High Computation Power Wireless Sensor Node for Structural Health Monitoring
Bo Chen; Jinjiang Wang

WeA2T2 No.4 Conference Room, Building 7
Robotics for Human Augmentation From 2008-10-15 10:30:00 To 2008-10-15 12:00:00

Session Chair: Sunil K. Agrawal *University of Delaware*

Session Co-Chair: Xiaowei Dai *Beihang University*

Development of Assistive Mobile Robots Helping the Disabled Work in a Factory Environment
Jung Won Kang; Bong Sung Kim; Myung Jin Chung

Current Closed Loop Control for Increasing Virtual Stiffness in Haptic Interaction
Dai Xiaowei; Zhang Yuru; Cao Yonggang; Wang Dangxiao

Identifying Welding Skills for Robot Assistance
Jelmer Van Essen; Marco Van Der Jagt; Nils Troll; Mark Wanders; Mustafa Suphi Erden

A Minimum Jerk Design of Active Artificial Foot
Amaraporn Boonpratatong; Settapong Malisuwan; Patrick Degenaar; Tawiwat Veeraklaew

WeA2T3 No.5 Conference Room, Building 7
Embedded System Infrastructure and Theory 2 From 2008-10-15 10:30:00 To 2008-10-15 12:00:00

Session Chair: Jia Xu *York University*

Session Co-Chair: Chengrui Zhang *Univ. of Applied Sciences Technikum Vienna*

An On-Board Diagnosis Hardware for Embedded Systems
Satoshi Hiratsuka; Akira Fusaoka

A Method for Satisfying Asynchronous and Periodic Timing Requirements in Real-Time Embedded Systems
Jia Xu

Source Code Based Component Recognition in Software Stacks for Embedded Systems
Dietmar Schreiner; Markus Schordan; Gergoe Barany; Karl M. Goeschka

Engine Based Embedded Control System Design and Implementation
Tianliang Hu; Chengrui Zhang; Lin Yang; Junzhe Tan

Modeling and Analyzing Distributed Real-time and Embedded Systems with High-Level Petri Nets
Liqiong Chen; Zhiqing Shao; Guisheng Fan; Xiuying Wang

WeP1T1 No.3 Conference Room, Building 7
Perception, path planning, and navigation 1 From 2008-10-15 13:30:00 To 2008-10-15 15:00:00

Session Chair: Primo Zingaretti *Università Politecnica delle Marche*

Session Chair: Ying Chen *Zhejiang University*

Mobile Agent-based Remote Vision Sensor Fusion
Stephen Nestinger; David Ko; Alex Rumer; Harry Cheng

A Subgoal-Guided Force Field Method for Robot Navigation
Dalong Wang; Dikai Liu; Ngai Ming Kwok; Kenneth Waldron

Nonlinear Model Predictive Controller Design with Obstacle Avoidance for a Mobile Robot
Heonyoung Lim; Yeonsik Kang; Changwhan Kim; Jongwon Kim; Bum-jae You

The Study on Dynamic Parameters of CODOG in the Mode Switching Process
Jiang Desong

Extended Kalman Filter with Adaptive Measurement Noise Characteristics for Position Estimation of an Autonomous Vehicle
Khitwongwattana Amornsri; Maneewarn Thavida

WeP1T2 No.4 Conference Room, Building 7
Robotics 2 From 2008-10-15 13:30:00 To 2008-10-15 15:00:00

Session Chair: Hamid Taghirad *K. N. Toosi University of Technology*

Session Co-Chair: Yini Zhao *Harbin Institue of Technology*

Best kinematic performance analysis of a 6-6 cable-suspended parallel robot
Hamoon Hadian; Abbas Fattah

Energy based Nonlinear Control of Underactuated Brachiation Robot
Yini Zhao; Hongtai Cheng; Di Zhao; Xiaohua Zhang

Development of a Compliant Based Microgripper for Microassembly
Mohd Nashrul Mohd Zubir; Bijan Shirinzadeh

Dynamic and Sensitivity Analysis of KNTU CDRPM: A Cable Driven Redundant Parallel Manipulator
Mohammad M. Aref; Pooneh Gholami; Hamid Taghirad

WeP1T3 No.5 Conference Room, Building 7
Development, Verification, Debug Tools for Mechatronic & Embedded Systems From 2008-10-15 13:30:00 To 2008-10-15 15:00:00

Session Chair: Tianmiao Wang *Beihang University*

Session Co-Chair: Martin Horauer *Universityof Applied Sciences Technikum Wien*

A Remote Software/Hardware Co-simulation Platform for SoC design
Shihong Wu; Xiang Ling; Zhongqi Li; Yang Yue

EasyLab: Model-Based Development of Software for Mechatronic Systems
Simon Barner; Michael Geisinger; Christian Buckl; Alois Knoll

Motivating Model Checking of Embedded Systems Software
Thomas Reinbacher; Michael Kramer; Martin Horauer; Bastian Schlich

Architectural and Functional Modelling of an Automotive Driver Information System Using SysML
Yue Guo; Arun Chakrapani-rao; Peter Jones

WeP2T1 No.3 Conference Room, Building 7
Perception, path planning, and navigation 2 From 2008-10-15 15:30:00 To 2008-10-15 17:00:00

Session Chair: Primo Zingaretti *Università Politecnica delle Marche*

Session Co-Chair: Yu-Cheol Lee *Electronics and Telecommunications Research Institute*

Sonar Grid Map Based Localization for Autonomous Mobile Robots
Yu-cheol Lee

Evaluating Performance of Multiple RRTs
Matthew Clifton; Gavin Paul; Ngai Kwok; Dikai Liu; Da-long Wang

Integrated Flight Dynamics Modelling for Unmanned Aerial Vehicles
Qing Ou; Xiaoqi Chen; David Park; Aaron Marburg; James Pinchin

Robot localization using omnidirectional vision in large and dynamic outdoor environments
Andrea Ascani; Emanuele Frontoni; Adriano Mancini; Primo Zingaretti

WeP2T2 No.4 Conference Room, Building 7
Mechatronics Control and Manufacturing 3 From 2008-10-15 15:30:00 To 2008-10-15 17:00:00

Session Chair: Fei Yu *Mads Clausen Institute*

Session Co-Chair: Xudong Hu *Zhejiang Sci-Tech University*

Operator Model for Construction Equipment
Ahmed Elezaby; Mohamed Abdelaziz; Sabri Cetinkunt

An Active Vibration Isolation System Using a Loop Shaping Control Technique
Kyihwan Park; Sangyoo Kim; Dongyoub Choi; Byounguk Sohn

Experimental Studies of a Fractional Order Universal Adaptive Stabilizer
Shayok Mukhopadhyay; Yan Li; Yangquan Chen

Obstacle Rotary Inverted Pendulum Control via Polytope Techniques
Juan Zhang; Jie Chen; Peng Li

WeP2T3 No.5 Conference Room, Building 7
Mechatronic and Embedded System Applications 2 From 2008-10-15 15:30:00 To 2008-10-15 17:00:00

Session Chair: Sabri Cetinkunt *University of Illinois at Chicago*

Session Co-Chair: Huaming Qian *Harbin Engineering University*

Design of Embedded Control System for Resistance Type Exercise Machine
Srivani Motamarri; Sabri Cetinkunt

Fiber Optical Gyro Fault Diagnosis Based on Wavelet Transform and Neural Network
Huaming Qian; Zhenlv Zhang; Jichen Ma

The Development of an Intelligent Electronic Stethoscope
Fei Yu; Arne Bilberg; Frands Voss

Embedded Vision System
Abhishek Aggarwal

The new insertion method of liquid powders using the electrode array for e-paper applications
Seungtaek Kim; Snagho Lee; Sungbok Kang; Youngjune Cho

First Draft of Call for Papers for

MESA09

2009 ASME/IEEE International Conference on Mechatronic and Embedded Systems and Applications

August 30 – September 2, 2009

San Diego Convention Center/Omni San Diego Hotel, California

Objectives

Mechanical and electrical engineering show an increasing integration of mechanics with electronics and information processing. This integration is between the components (hardware) and the information-driven functions (software), resulting in integrated systems called mechatronic systems. The development of mechatronic systems involves finding an optimal balance between the basic mechanical structure, sensor and actuator implementation, automatic digital information processing and overall control for which embedded systems play a key role. The field of embedded system is getting more and more challenging, and issues in development of embedded software are attracting attention of an increasing number of researchers both in industry and academia. The goal of this 5th ASME/IEEE MESA09 is to bring together experts from the fields of mechatronic and embedded systems to disseminate the recent advances made in the area, discuss the future research directions, and exchange application experience with respect to the conference themes.

Topics

- Mechatronics and cyber-physical systems
- Embedded systems infrastructure and theory
- Sensor and MEMS
- Development, verification, and debug tools for mechatronic and embedded systems
- Sensor networks
- Autonomous machines
- Mechatronic and embedded system applications
- Education in mechatronics and embedded computing
- Unmanned aerial vehicle technologies and applications

Paper Submission

For detailed information, please visit the conference web site at
www.asmemesa.org or http://www.asmeconferences.org/idetc09/

Important Dates

February 06, 2009:	Abstract, proposal for special session due
February 13, 2009:	Full paper due
April 24, 2009:	Author notification of acceptance
May 15, 2009:	Submission of final paper

Technical Co-Sponsors

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