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Recent Advances in Circuits, Communications & Signal Processing

- *Proceedings of the 12th International Conference on Electronics, Hardware, Wireless and Optical Communications (EHAC '13)*
- *Proceedings of the 12th International Conference on Signal Processing, Robotics and Automation (ISPRA '13)*
- *Proceedings of the 5th International Conference on Nanotechnology (NANOTECHNOLOGY '13)*

Cambridge, UK, February 20-22, 2013

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Recent Advances in Electrical Engineering Series | 9

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Preface

This year the 12th International Conference on Electronics, Hardware, Wireless and Optical Communications (EHAC '13), the 12th International Conference on Signal Processing, Robotics and Automation (ISPRA '13) and the 5th International Conference on Nanotechnology (NANOTECHNOLOGY '13) were held in Cambridge, UK, February 20-22, 2013. The conferences provided a platform to discuss electronics, hardware engineering, wireless and optical communications, signal processing, robotics, automation, nanomaterials, nanoparticles and colloids, nanomedicine, nanoelectronics, molecular self-assembly, molecular nanotechnology, microscopy etc with participants from all over the world, both from academia and from industry.

Their success is reflected in the papers received, with participants coming from several countries, allowing a real multinational multicultural exchange of experiences and ideas.

The accepted papers of these conferences are published in this Book that will be sent to international indexes. They will be also available in the E-Library of the WSEAS. Extended versions of the best papers will be promoted to many Journals for further evaluation.

Conferences such as these can only succeed as a team effort, so the Editors want to thank the International Scientific Committee and the Reviewers for their excellent work in reviewing the papers as well as their invaluable input and advice.

The Editors

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Plenary Lecture 1

Robust Fuzzy Control for Synchronous Machine with Uncertain Parameters

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Abstract: This paper is concerned with the robust control problem of the synchronous machine systems with uncertain parameters. The uncertain non-linear model is first represented by a Takagi-Sugeno with several fuzzy IF-THEN rules. Next, based on these a T-S fuzzy model, a simple fuzzy controller is designed via the parallel distributed compensation (PDC) technique to realize the stabilization of our system. The robust stability of the closed-loop synchronous machine system are proved based on Lyapunov criterion, some sufficient conditions are derived and the common Pi is solved by linear matrix inequalities (LMI) toolbox of Matlab, so that the whole closed-loop fuzzy system with the synthesized fuzzy control is asymptotically stable. Furthermore, we also discuss the robustness of the closed loop system with perturbations. Finally, a Simulation results demonstrate that the designed fuzzy controller can stabilize the uncertain synchronous machine system.

Brief Biography of the Speaker: Najat Ouaaline graduated from the University Sidi Mohamed Ben Abdellah, faculty of science, Fes, Morocco in 1996, Laboratory of Electronics, Signals, Systems and Computers “LESSI”. She specialized in electronics and signal processing. Since 1997, she worked as a full-time professor in University Hassan 1st, Technical and science faculty in Settat, Morocco, where she actively was a member of the Engineering Didactics Laboratory and System Dynamics “L.I.D.D.S”, Department of Mathematics and Computer Science and as a research associate in the Laboratory of Automation and Computer Engineering “LA2I” at Mohammadia School of Engineers, University Mohammed V-Agdal, Rabat. Her research, interests now in the fuzzy modeling and fuzzy control applications to power electronics and particularly to synchronous and asynchronous machines, where she is involved in the research and development of systems on the application of fuzzy control in power electronics for renewable energy systems. Also, she is the Marocain National Contact Point (NCP) for the SMEs of the Seventh Framework Programme (FP7) of the European Community for research, technological development and demonstration activities. These NCP’s provide information and guidance to SMEs wishing to participate in EU research and are able to offer personalised support in the proposer’s own language. They are connected into an European network of contact points.

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Plenary Lecture 2

Bio-Inspired Neuromorphic Processing and Its Applications

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Abstract: The physiological studies about visual cortex from the investigation of cat's striate cortex by Hubel and Wiesel have confirmed the consensus of foundation knowledge about biological intelligence in the nature. We proposed the new way of implementing the neuromorphic VLSI and processing for mimicking the robust biological intelligence of visual detection, inspired by the ideas on the visual cortex and the implementation of neurophysiological neuron model by Hodgkin and Huxley formalism. The neuromorphic synaptic connections and neurons were investigated for implementation of the visual signal selectivity of cortex, based on the controlled CMOS conductance. The feasibility of neuromorphic device and system approximating biological intelligence was demonstrated by the robust detection of human objects or vehicles. The neuromorphic simple cell based on CMOS conductance and Hodgkin-Huxley formalism showed the corresponding spike bursts in the visual cortex. We show how the neuromorphic system can be implemented using the orientation selectivity and the neural computing to detect the human object or other objects under the limited illumination conditions, regardless of using the fixed camera or mobile camera. The early stage investigation demonstrated the feasibility in various applications, such as the intelligent monitoring of vehicle passengers for the extended emergency service of eCall, the automotive active safety system of object detection and avoidance, or the smart user experience by detecting the human behaviour. Our conclusion is that the neuromorphic mimicking of the visual cortex, coupled with neural networks, suggests it as the new feasible and robust device for the convergence of biological neural system and information technology.

Brief Biography of the Speaker: Il Song Han was born on 1st February 1956. He completed his undergraduate studies at Seoul National University, Seoul, Republic of Korea for Electrionic Engineering in 1979. He earned his Master degree and PhD degree at KAIST, Republic of Korea for Electrical Engineering in 1981 and 1984 respectively. More recently he got the MBA at Cranfield University, Cranfield, United Kingdom in 2000.
He has been with KAIST in Daejeon, Korea, since 2007. From 2002 to 2007, he was an academic with the department of Electronic and Electrical Engineering at University of Sheffield, United Kingdom. He was with the department of Electrical and Electronic Engineering at Imperial College London (U.K.) in 2000, while worked as a senior design engineer at Jennic Ltd in 2001 and 2002. In the period of 1985 to 1998, he worked as a Principal Member of Technical Staffs at Korea Telecom, while he was seconded to the British Telecom Research Lab at Martlesham as the leader of international joint-research work on intelligent ICT development in 1996 and 1997. His research interests are in the areas of analogue-mixed VLSI design, neurompрhic device and vision system, bio-inspired neural networks VLSI, RF front-end circuit, intelligent transportation technology and Electric Vehicle.
Professor Han is a member of automotive recall committee, coordinated by the Ministry of Land, Transport and Maritime Affairs, Korean Government.

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Plenary Lecture 3

Convolutional Codes under Control Theory Point of View. Analysis of Output-Observability

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Abstract: In this work we make a detailed look at the algebraic structure of convolutional codes using techniques of linear systems theory. The connection between this concepts help to better understand the properties of convolutional codes, in particular the concepts of controllability and observability of linear systems can be translated into the context of convolutional codes relating these properties with the noncatastrophicity of the codes. I this work examine the output-observability property and we give conditions for this property.

Brief Biography of the Speaker: Professor Dr. Maria Isabel Garcia-Planas joined the Department of Applied Mathematics at the “Universitat Politecnica de Catalunya” Barcelona, Spain in 1981. Her work had been centred on Linear Algebra, Systems and Control Theory. She has authored over eighty papers and serves on the referee on several journals. She has been plenary Speaker in WSEAS Int. Conf. on Applied and Theoretical Math, Vravrona, Grecia (2000), WSEAS International Conference SIM'01, Qawra, Malta, (2001), 6th WSEAS CSCC, Creta, (2002), 4th WSEAS-ISTACS. Puerto de la Cruz, (2004), 8th WSEAS Int. Conference on Applied Mathematics, Puerto de la Cruz, (2005), 11th WSEAS Int. Conf. on Systems, Creta, (2007), Applied Computing Conference, Istanbul Turkey, (2008). International Conference on Energy, Environment, Devices, Systems, Communications, Computers (EEDSCC '11) Venice, Italy (2011), 3rd INEEE Conference Energy, Environment, Devices, Systems, Communications, Computers (EEDSCC’12) Rovaniemi, Finland (2012).

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Plenary Lecture 4

Non-Linear Convolution and Harmonic Distortions: The Simulation of Sound Devices

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Abstract: The measurement and simulation of audio systems (devices, valve amplifiers, etc.) have been studied by some Authors in recent years. The principal method utilised to obtain information about an audio system is based on the measurement of its impulse response (IR). Once the IR has been caught it is possible to recreate, by the use of linear convolution, the output signal that the audio system will generate when it is physically driven by any input signal. This method gives great results if the system is linear and time-invariant (environments behaviour is much linear and therefore its reverberant effect can be faithfully recreated using IRs) but not satisfactory in other cases, such as the emulation of tube preamps (mainly nonlinear), musical instruments and valve amplifiers.
By using Hammerstein or Wiener series it is possible to represent the input-output relationship of nonlinear systems. These two methods could be generalised using Volterra model. It uses a set of impulse responses to describe the system and not only one as before. By an enhanced impulse response measurement method it is possible to obtain this set of impulses and then with Volterra series it would be possible to have the output of the audio system driven by any input.
A special numerical tool has been developed to recreate the system behaviour by using this method. Finally, satisfactory results have been obtained in comparison with the traditional linear convolution based approach, and will be shown during the lecture.

Brief Biography of the Speaker: Dr Lamberto Tronchin is Associate Professor in Environmental Physics from the University of Bologna and is recognised internationally as a leading authority on the subject of sound and acoustics. A pianist himself, with a diploma in piano from the Conservatory of Reggio Emilia, Dr Tronchin's principal area of research has been musical acoustics, room acoustics and signal processing. He is the author of more than 160 papers and was Chair of the Musical Acoustics Group of the Italian Association of Acoustics from 2000 to 2008. Dr Tronchin is a member of the Scientific Committee of the CIARM, the Inter- University Centre of Acoustics and Musical research, has chaired sessions of architectural and musical acoustics during several international symposiums, been a referee for a number of International journals and is Chair of Organising and Scientific Committees of IACMA (International Advanced Course on Musical Acoustics).
He was a visiting researcher at the University of Kobe in Japan, a visiting professor at the University of Graz in Austria and Special honored International Guest at the International Workshop, ‘Analysis, Synthesis and Perception of Music Signals', at Jadavpur University of Kolkata, India in 2005. He has chaired the International Advanced Course on Musical Acoustics (IACMA), organised with the European Association of Acoustics, which was held in Bologna, in 2005. In 2008 and 2009 he gave plenary lectures at International Congresses on Acoustics in Vancouver, Prague, Bucharest, Santander, Kos, Malta and Paris. He designed theatres and other buildings, as acoustic consultant, in collaboration with several Architects, among them Richard Meier and Paolo Portoghesi.

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Plenary Lecture 5

Biologically Inspired Robot Trunks and Tentacles

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Abstract: Inspired by biological counterparts, particularly invertebrate structures such as elephant trunks and octopus arms, a new class of smooth profile, scalable, and inherently compliant continuum robots is emerging. This talk will review the state of the art in continuum robots and discuss their potential for novel applications. In particular, lessons learned from the development of a series of robot "trunks and tentacles" over the past fifteen years at Clemson University will be discussed. These robots are able to use their ability to bend throughout their smooth, compliant backbones to adapt to complex environmental geometry better than conventional rigid-link "vertebrate" robots. This allows them to negotiate complex obstacle fields and adjust their shape to manipulate a wide variety of objects. Practical robot designs featuring both intrinsic (within backbone) and extrinsic (external to backbone) actuation, and actuated by pneumatic and electric actuators, will be described. Demonstrations of these robots in novel manipulation application domains will be reviewed. Future directions for continuum robot technology will be discussed.

Brief Biography of the Speaker: Ian D. Walker received the B.Sc. Degree (First Class Honours) in Mathematics from the University of Hull, England, in 1983 and the M.S. and Ph.D. Degrees in Electrical and Computer Engineering from the University of Texas at Austin in 1985 and 1989, respectively. He then joined the faculty in Electrical and Computer Engineering at Rice University, where he was an Assistant Professor from 1989 to 1995, and a tenured Associate Professor from 1995 to 1997. In the fall of 1997, he moved to the Department of Electrical and Computer Engineering at Clemson University, where he became a full Professor in 2001.
Professor Walker is a Fellow of the IEEE and a Senior Member of the AIAA. He served as Vice President for Financial Activities for the IEEE Robotics and Automation Society from 2006-2009, and from 2006-2008 served as Chair of the AIAA Technical Committee on Space Automation and Robotics. He has served on the Editorial Boards of the IEEE Transactions on Robotics, the IEEE Transactions on Robotics and Automation, the International Journal of Robotics and Automation, the IEEE Robotics and Automation Magazine, and the International Journal of Environmentally Conscious Design and Manufacturing.
Professor Walker's research centers on robotics, particularly novel manipulators and manipulation. His group is conducting basic research in the construction, modeling, and application of biologically inspired "trunk, tentacle, and worm" robots.

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Plenary Lecture 6

A Practice on the Signal Processing in a Time-Dependent Flow Measurement Chain through a Research Focusing on the Passage from Laminar to Turbulent Regime

Professor Melda Özdinç Çarpinlioğlu
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Abstract: The physical mechanism and the determination of the onset of transition to turbulence in time dependent - periodic pipe flows have considerable difficulty due to the time dependency nature of the transition process itself. A comprehensive review of the previous experimental studies on the manner is presented to determine the relevant flow parameters and their critical ranges , the details of the measurement and data acquisition systems and the proposed methodologies . As an outcome of the review an experimental research devised is presented with its hardware and software for the data accumulation, processing and the graphical presentation of the major output flow parameters . Sinusoidal-pulsatile air flow in a pipeline was generated and controlled to investigate the interactive influences of oscillation frequency, f and velocity amplitude ratio, in the intermediate and inertia dominant regions since transitional characteristics of quasi-steady region are well defined. The sensitivity of the produced pulsatile flow , the ranges of the test cases focusing on the detection method of transition to turbulence are discussed in terms of the sample measurements of local cross-sectional velocity profiles, instantaneous velocity and pressure waveforms with an emphasis on the signal processing and uncertainty analysis through the presentation of the devised software program, named as TDFC.vi prepared in LabView 2009SP1 environment.

Brief Biography of the Speaker: Melda Özdinç Çarpınlıoğlu was born in Gaziantep, Turkey. She received B.Sc., M.Sc. and Ph.D. degrees in Mechanical Engineering from Middle East Technical University METU –Turkey in 1983, 1986 and 1992. She worked as a Research Assistant in 1983-1986 at METU, as an Instructor in 1987-1992 at University of Gaziantep-Turkey . She worked as an Assistant Professor and an Associate Professor in 1992-1997 and 1997-2003 at University of Gaziantep. She has been working as a Professor at University of Gaziantep since 2003. She was the Chairman of the Mechanical Engineering Department and Dean of the Faculty of Engineering in the periods of 1998-2007 and 2006-2009 at University of Gaziantep.
Her main research interests are Boundary Layer Flow, Boundary Layer Transition, Two-Phase Flow Fields, Unsteady-Pulsatile Flow Dynamics, HVAC Systems, Flow Dynamics in Packed Beds, Flow through Collapsible Tubes, Flow Measurement - Calibration ,Flowmeters, and Thermodynamic Analysis. She has several research articles and completed a variety of experimental research projects. She has been directing M.Sc. and Ph.D. studies in her research fields. She has been the acting head of Thermodynamics Branch of Science in department of Mechanical Engineering since 2004.

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Plenary Lecture 7

Obtaining of Perfect $Cd_{1-X}Mn_XTe$ Epitaxial Thin Films and Their Use Potentials

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Institute of Radiation Problems
Head of the Department
Azerbaijan National Academy of Sciences
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Abstract: In this work the obtaining of $Cd_{1-x}Mn_xTe$ (x=0.01) epitaxial thin films has been investigated. $Cd_{1-x}Mn_xTe$ (x=0.01) epitaxial thin films has been grown on freshly broken and polished substrates of BaF2 in a vacuum 10^{-7}Pa in УВН-71 П3 vacuum assembly by the molecular beam condensation method. In the present report are given investigation results of obtaining of $Cd_{1-x}Mn_xTe$ (x=0.01) epitaxial thin films, their crystal structure, surface morphology, physical properties and use potentials in ionizing radiation detecting, solar cells, optical isolators and etc.

Brief Biography of the Speaker: M. Mehrabova graduated from the Department of Physics on the speciality "Physics of Solid States" of Baku State University, Azerbaijan in 1986. At the end of 1980s she worked in the Institute of Space Researches as an engineer and was post graduate student (1988-1991). In 1992 she got degree of Ph.D in physics-mathematics, in 2011 associate professor and then professor of International Ecoenergy Academy.Now she work in the Institute of Radiation problems as a head of "International projects and Information Department" and head of the "Radiation physics of nanosized semiconductor materials" qroup.
Her scientific activity includes Physics of Solid States, Physics of Semiconductors, Radiative study of Materials, Radioecology, Biophysics and so on.
M. Mehrabova first calculated the energy spectrum and the electron wave function for $Pb_{1-x}Mn_xTe$ and $Cd_{1-x}Mn_xTe$ SMS and their size-quantized thin films and studied Faraday effect on the base of the obtained results. She studied theoretically the processes of generation of local levels in the electronic structure of A^3B^6 lamellar crystals under the effect of ionizing radiation and their elimination. In order to provide the effectiveness of operating mode of the photodetectors made on the base of those semiconductors she studied the problems of selecting optimal values of their parameters taking into consideration their photoelectrical properties. She calculated the threshold energy, bias energy, the cross-section of electron scattering and the number of primary defects during radiation effect on those semiconductors. She is author of about 80 papers published in international journals and conference proceedings.
She study the influence of ionizing and non-ionizing radiation on animals, plants, human-beings and crystals. She works on the problem of making radiation- and photodetectors. She works in some projects which deal with ecology problems.
M. Mehrabova was the winner of the International Project of "Young Scientists of Azerbaijan" in 2003 and was awarded by International Diploma of "Young Scientists of XXI century". She received STCU certificate of chief specialist on technology commercialization in 2008. Her materials on innovative technologies of IRP ANAS were printed in International Journals such as "Materials and Coatings for Extreme Environments", "Science Opportunities in Azerbaijan" published on the initiative of STCU in 2009.
M. Mehrabova is the member of "Technology Transfer Center" of ANAS.

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Plenary Lecture 8

Carbon Nanotube Superfiber Development

Professor Mark J. Schulz
Co-Authors: Vesselin Shanov, Dong Qian, Murali Sundaram, Kumar Vemaganti, Yijun Liu, Weifeng Li, Noe Alvarez, Brad Ruff, Arvind Krishnaswamy, Ge(Lucy) Li, Wenwei Jiang, Rohit Parlapalli, Aaron Johnson, Mark Haase, Anshuman Sowani, Rajiv Venkatasubramanian
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Abstract: The goal of this research is to modify carbon nanotube synthesis and processing in order to develop a carbon nanotube superfiber material with properties that exceed those of existing fiber materials. Scaling-up superfiber manufacturing for commercialization is also a goal of the research. Superfiber is formed by synthesizing arrays of aligned carbon nanotubes, possibly post-treating the arrays, and possibly spinning the arrays into fibers. The scope of the research is to produce different forms of superfiber including yarn, braid, sheet, and fabric materials. The superior properties and different material forms will open up new parameter spaces and allow designers to develop revolutionary engineering designs across many industry segments. As an example, we predict that eventually most advanced composite materials will have some form of “Nano Inside.” Intense experimental, analytical and computational technical efforts are underway to scale up of the extraordinary properties of nanotubes to the bulk fibrous materials. Prototype macro scale yarns and sheet are being manufactured using nanotubes. But a major technical challenge has been that defects occur during manufacturing of long aligned nanotube arrays. The defects are preventing scaling up the properties of nanotubes to macro scale material forms. To overcome the problem of defects occurring when growing very long nanotubes, new methods including substrate engineering, thermal healing of defects, micro-spinning, and coating are being investigated. This research is crucial because carbon nanotube array synthesis and yarn formation are highly specialized technologies and many industries are standing by on the sidelines waiting for superfiber materials to be developed. Once the technology is available, industries will rush to supplement or replace their incumbent materials such as copper, aluminum, and carbon fiber with superfiber materials that are lighter, tougher, stronger, and carry more electrical current. The research to be described is closing the gap between the properties of short research grade nanotubes and commercial nanotube bulk materials. The basic research is working on transitioning from nanotubes which are long molecules to fiber materials that can be used in manufacturing. The research is providing a better understanding why nanotubes have defects, why nanotubes stop growing, why yarn does not achieve the strength of nanotubes, and how to overcome these barriers. An academic-corporate collaboration has also been formed to transition the new technology into applications. The technology part of the research is to design new spinning and post processing machinery for long nanotubes that allow manufacturing scale up and commercialization. The intellectual novelty of this research is critical in terms of engineering because it will enable industries to manufacture new textile materials which could revolutionize the engineering designs of many everyday products. This research is sponsored by the National Science Foundation in the USA. Dr. Bruce Kramer and Dr. Grace Wang are the Program Directors.

Brief Biography of the Speaker: Mark J. Schulz is a Professor of Mechanical Engineering and director with Dr. Vesselin Shanov of the NanoWorld Laboratories at the University of Cincinnati. He is also one of the deputy directors of the National Science Foundation’s Engineering Research Center for Revolutionizing Metallic Biomaterials. Mark’s research focus is in the area of smart materials and nanotechnology. The Nanoworld Laboratories synthesize carbon nanotubes and process the nanotubes into intermediate materials such as yarn and sheet. The intermediate materials are a new kind of structural and electronic “raw material” that is used to build multifunctional and smart materials and devices for engineering and medical use. Mark is also Coordinator of Advanced Concepts at General Nano (GN) LLC, a nanoengineering company in Cincinnati, OH, USA (http://generalnanollc.com). GN commercializes carbon nanotube material called Black CottonTM for engineering and medical device applications.

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Plenary Lecture 9

Nanomechanical Characterization of Biological Cells

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Abstract: It is well recognized that cell mecahnics and adhesion are crucial for maintaining cell functions and their changes are associated with many important physiological/pathological processes. The changes of the cell mechanical properties and cell-cell adhesion can therefore be regarded as a prelude to the pathogenesis of certain diseases. For example, malaria-infected red blood cells (RBCs) have notable alternation in the mechanical properties of cell membrane, while diabatic kidney cells have less cell-cell adhesion than normal one. Recent advancements in nanobiomechanical instruments, such and optical tweezers and by atomic force microscope force spectroscopy (AFM-FS) have enabled the characterization of mechanical poperties and cell-cell adhesion of biological cells. Optical tweezers, often incoperated with micro-fluidic systems, allows to the force measurement as low as 100 pN, while AFM-FS could allow to detect sub-nano-Netwon force. These measurements can be incorporated with mechanical modelling to facilitate the determination of the mechanical properties, such as the elasticity and rupture strength of cell and tissue membrane. In addition to the mechanical properties, interfacial characterization, e.g. cell-cell adhesion, can be realized by our recently developed method which is based on these two techniques. In parallel, various theoretical modelling and simulations, such as the cell mechanics theory and cell-cell adhesion model, have been developed for interpreting the experimental data and for facilitating the determination of the mechanical properties of biological materials at the cellular/molecular level. Various biogical cells, such as red blood cell and mesenchymal stem cells, have been examined by using these new techniques, and their results are presented in this talk.

Brief Biography of the Speaker: Dr. Isaac Kuo-Kang Liu completed his PhD study at the Bioengineering and Chemical Engineering Department of Imperial College London, UK in 1995. Currently, he is an Associate Professor (Reader) in Nanobioengineering at School of Engineering, the University of Warwick, UK. Before joining Warwick in 2009, he was a Reader (2003-2009) in Biomedical and Cell Engineering at the Institute of Science and Technology in Medicine, School of Medicine, Keele University, UK and an Associate Professor (1998-2003) in the Mechanical and Production School of Nanyang Technological University, Singapore. He has published more than 50 high-impact journal papers in Bioengineering and Biophysical areas and 30 other publications, including 2 US patents. He is a fellow of the Royal Society of Medicine, a fellow of Nanotechnology Institute, and a senior member of American Institute of Chemical Engineers. He is an editor of several prestigious journals, e.g. Royal Society Interface (Guest Editor). Dr. Liu has been recently awarded one of only seven annual Senior Research Fellowships by Royal Academy of Engineering in recognition of his achievement in nanobiomechanics. He has been invited to give 13 plenary talks in international conferences and many invited lectures in world-renowned institutes such as Cambridge, Oxford, and Max Planck Institute (Stuttgart, Germany).

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Plenary Lecture 10

Biomedical Applications of Gold Nanoparticles

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Abstract: Gold nanoparticles display unique properties which allow them to influence different kinds of biochemical processes. Interestingly, these effects are particle size-dependent and are most likely caused by a particle surface. Gold nanoparticle surface properties as well as their biological effects vary based on their size, which determines the properties of nanomaterial surface. In addition, unlike most of other nanomaterials, gold nanoparticles do not trigger formation of pro-inflammatory multiprotein complexes, known as inflammasomes. Furthermore, they display clear anti-inflammatory activity. Here we discuss biological effects of intact and functionalised gold nanoparticles analysing their possible biochemical mechanisms.

Brief Biography of the Speaker: I obtained my PhD degree in Biochemistry in 1999 in Palladin Institute of Biochemistry NAS of UKraine. Then worked as assistant/associate professor at the Department of Biochemistry, Mechnikoff Odessa National University. In 2001 I obtained a highly competitive Humboldt Research Fellowship and moved to Germany (University of Kaiserslautern). Upon completion of my fellowship I spent three years in Aarhus (Denmark) working as assistant professor at the Interdisciplinary Nanoscience Centre, University of Aarhus. In December 2006 I joined Medway School of Pharmacy as a lecturer in Biochemistry.

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