

Keynote Speakers

Octavian Postolache

«Unobtrusive Smart Sensing and Pervasive Computing for Healthcare: Cardiorespiratory and Physical Rehabilitation Assessment»

Abstract: The ageing phenomena requires the development in the near future of the new systems and services that will provide increasing of healthcare quality, with increased acceptance by the users reducing also the costs. In this context the distinguished lecture will presents a set of vital signals and daily activity monitoring unobtrusive solutions as so as the appropriate signal processing associated with the measurement channels. Will be highlighted:

- Vital signals acquisition and processing by embedded devices in clothes and/or accessories (e.g. smart wrist worn) or in walking aids and transportation equipment such as walker or manual wheelchair. The strength and drawbacks regarding cardiac and respiratory assessment capabilities, the studies on cardiac sensing accuracy estimation and artefacts influence on cardiac function sensing through capacitive coupled electrocardiography, electromechanical film sensor and microwave Doppler radar ballistocardiography, reflective photoplethismography will be discussed.

- Motor activity sensing through microwave motion sensor, MEMS inertial measurement as so as the appropriate signal processing will be discussed. Several methods for diagnosis and therapy monitoring, as time frequency analysis, principal component analysis and pattern recognition of motion signals with application to gait rehabilitation evaluation will be described. Some developed works under the project Electronic Health Record for Physiotherapy promoted by Fundação para Ciência e Tecnologia, Portugal, related to Kinect natural interaction serious games for physiotherapy will be also presented.



Octavian Postolache graduated in Electrical Engineering at the Gh. Asachi Technical University of Iasi, Romania, in 1992 and he received the PhD degree in 1999 from the same university, where he worked as assistant professor. In 2000 he became principal researcher of Instituto de Telecomunicações and Assistant Professor of EST/IPS Setubal in 2001. In 2012 he joined ISCTE-IUL Lisbon where he is currently Aux. Professor. His fields of interests are smart sensors for biomedical and environmental applications, pervasive sensing and computing, wireless sensor networks, signal processing with application in biomedical and telecommunications, non-destructive testing and diagnosis based on smart eddy currents smart sensors, computational intelligence with application in automated

measurement systems. He is currently leader of project regarding the implementation of Electronic Health Records for Physiotherapy (EHR-Physio). He is vice-director of Instituto de Telecomunicações/ISCTE-IUL delegation, and he was leader of several collaboration projects between the Instituto de Telecomunicações and the industry such as Home TeleCare project with Portuguese Telecommunication Agency for Innovation (PT Inovação), Integrated Spectrum Monitoring project with National Communication Agency (ANACOM). He is active member of national and international research teams involved in Portuguese and EU and International projects. Dr. Postolache is author and co-author of 9 patents, 7 books, 14 book chapters, 68 papers in international journals with peer review, more than 220 papers in proceedings of international conferences. He is IEEE Senior Member I&M Society, chair of IEEE I&MSTC-13 Wireless and Telecommunications in Measurements, member of IEEE I&MSTC-17, IEEE I&MSTC-18, IEEE I&MS TC-25, IEEE EMBS Portugal Chapter and chair of IEEE IMS Portugal Chapter. He is Associate Editor of IEEE Sensors Journal, and IEEE Transaction on Instrumentation and Measurements, chair of IEEE MeMeA 2014 and received IEEE best reviewer and the best associate editor in 2011 and 2013.

Naira Hovakimyan

«L1 Adaptive Control and Its Transition to Practice»

Abstract: The history of adaptive control systems dates back to early 50-s, when the aeronautical community was struggling to advance aircraft speeds to higher Mach numbers. In November of 1967, X-15 launched on what was planned to be a routine research flight to evaluate a boost guidance system, but it went into a spin and eventually broke up at 65,000 feet, killing the pilot Michael Adams. It was later found that the onboard adaptive control system was to be blamed for this incident. Exactly thirty years later, fueled by advances in the theory of nonlinear control, Air Force successfully flight tested the unmanned unstable tailless X-36 aircraft with an onboard adaptive flight control system. This was a landmark achievement that dispelled some of the misgivings that had arisen from the X-15 crash in 1967. Since then, numerous flight tests of Joint Direct Attack Munitions (JDAM) weapon retrofitted with adaptive element have met with great success and have proven the benefits of the adaptation in the presence of component failures and aerodynamic uncertainties. However, the major challenge related to stability/robustness assessment of adaptive systems is still being resolved based on testing the closed-loop system for all possible variations of uncertainties in Monte Carlo simulations, the cost of which increases with the growing complexity of the systems. This

talk will give an overview of the limitations inherent to the conventional adaptive controllers and will introduce the audience to the L1 adaptive control theory, the architectures of which have guaranteed robustness in the presence of fast adaptation. Various applications, including flight tests of a Learjet, will be discussed during the presentation to demonstrate the tools and the concepts. With its key feature of decoupling adaptation from robustness L1 adaptive control theory has facilitated new developments in the areas of event-driven adaptation and networked control systems. A brief overview of initial results and potential directions will conclude the presentation.



Naira Hovakimyan received her MS degree in Theoretical Mechanics and Applied Mathematics in 1988 from Yerevan State University in Armenia. She got her Ph.D. in Physics and Mathematics in 1992, in Moscow, from the Institute of Applied Mathematics of Russian Academy of Sciences, majoring in optimal control and differential games. In 1997 she has been awarded a governmental postdoctoral scholarship to work in INRIA, France. In 1998 she was invited to the School of Aerospace Engineering of Georgia Tech, where she worked as a research faculty member until

2003. In 2003 she joined the Department of Aerospace and Ocean Engineering of Virginia Tech, and in 2008 she moved to University of Illinois at Urbana-Champaign, where currently she is W. Grafton and Lillian B. Wilkins Professor of Mechanical Science and Engineering. In 2015 she was named as inaugural director for Intelligent Robotics Lab of CSL at UIUC. She has co-authored a book and more than 300 refereed publications. She is the recipient of the SICE International scholarship for the best paper of a young investigator in the VII ISDG Symposium (Japan, 1996), the 2011 recipient of AIAA Mechanics and Control of Flight award and the 2015 recipient of SWE Achievement Award. In 2014 she was awarded the Humboldt prize for her lifetime achievements and was recognized as Hans Fischer senior fellow of Technical University of Munich. In 2015 she was recognized by UIUC Engineering Council award for Excellence in Advising. She is an associate fellow and life member of AIAA, a Senior Member of IEEE, and a member of SIAM, AMS, SWE, ASME and ISDG. Naira is co-founder of IntelinAir, Inc., a company that commercializes data-drones for various industries. Her research interests are in the theory of robust adaptive control and estimation, control in the presence of limited information, networks of autonomous systems, game theory and applications of those in safety-critical systems of aerospace, mechanical, electrical, petroleum and biomedical engineering.

Amin Al-Habaibeh

«The novel use of Darwin's 'Survival of the fittest' concept in sensory feature selection for the design of condition monitoring systems»

Abstract: The concept of 'Survival of the fittest' is originated from Charles Darwin's book of 1859 "On the Origin of Species by Means of Natural Selection", in which his evolutionary theory was outlined describing the mechanism of natural selection. The survival of the fittest concept has been implemented in the engineering sector in condition monitoring systems by Professor Amin Al-Habaibeh and his team during the past 20 years for feature extraction for evolutionary selection of the most suitable sensors and signal/image processing systems for enhanced system's performance. The term 'ASPS' which stands for Automated Sensor and Signal Processing Selection was used over the past years to articulate the concept which is related to the selection of the most suitable sensory characteristic features for the design of an improved condition monitoring system. A condition monitoring system of a machine, system or a process involves the selection of the most suitable sensor and signal/image processing method to

extract the information related to the health conditions (or any other monitored characteristics) and the least dependent on noise and other operational conditions. Neural networks have been used to independently evaluate the performance of the theory and the suggested methodology. The theory has been tested in several projects and a wide range of applications including end milling, turning, drilling, fixturing systems, crowd monitoring and condition-based maintenance of gears. Ongoing work also includes water leakage detection in pipes and medical applications.



Amin Al-Habaibeh is Professor of Intelligent Engineering Systems at Nottingham Trent University. His research and teaching focuses on several multi-disciplinary topics in the broad area of product design and energy. Amin research interests include condition monitoring, sustainability, renewable energy, advanced manufacturing technologies, product design, mechatronics, condition-based maintenance, and artificial intelligence. Amin is currently leading the Innovative and Sustainable Built Environment Technologies research group (iSBET) and co-founder of the Advance Design and Manufacturing Engineering Centre (ADMEC). Amin received his BSc degree from the University of Jordan in Industrial Engineering (Manufacturing and Design) with distinction. Following a period of research work in the robotics labs at

Tampere University of Technology in Finland, he worked in the plastic industry before moving to Nottingham to study an MSc degree in Manufacturing Systems and a PhD degree in Advanced Manufacturing Technologies at the University of Nottingham. After graduation, he worked at Rolls-Royce University Technology Centre at the University of Nottingham and the Mechatronics Research Centre at Loughborough University before joining Nottingham Trent University in 2004 as senior lecturer with teaching and research duties related to Product Design. In 2010 he was appointed as a reader in Advanced Design and Manufacturing Technologies within the Product Design team. Amin is a Chartered Engineer and has acted as Chairman of the Institution of Engineering and Technology (IET) for the East Midlands Region in 2007-2008 and as the Chairman of IET Derbyshire/Nottinghamshire Local network panel between 2007 and 2010. He has over 100 international journal and conference publications and has three patents applications to his name in the medical and energy sectors. Amin has strong links and collaboration with industry including eight years as the industrial placement advisor and over 20 years of industrial research and collaboration. Amin also acts as a referee of many high impact journal publications and has been member of numerous national and international conferences.

Zuriati Ahmad Zukarnain

«Quantum Communication Simulator (QuCS) as an effective software for Quantum Experiment and Communication»

Abstract: Quantum communication promises for unconditional security with faster transmission. Current digital communication mechanism suffers serious drawbacks due to its inherent weakness. Unlike, digital communication, quantum communication based on complex quantum mechanism principles. Further, quantum based experiments are expensive and sophisticated due to its optical components and sensitive mode. Simulation plays a vital role in all fields of science and engineer. In order to achieve an effective simulation for quantum communication experiments required not only computer science but also mathematics, physics and engineering aspects. Currently, we developed a prototype simulator called quantum communication simulator(QuCS). Quantum experiments basically cover both continuous and discrete events. Further, few devices have its own dynamics action, i.e. avalanche photo detector (APD). Hence, a combination of discrete, continuous and system dynamic simulation techniques are involved to develop a quantum communication simulator. We called this method as hybrid simulation technique. Further, we classified the process of quantum experiments. The devices or components emulation comes under macro simulation. The action or changes in devices is defined as meso simulation. Finally,

design of atomic level such as photon, electron called as micro simulation. The photon or electron is basically refers as quantum bit (qubit). Modeling a qubit is challenging task. Typically, qubits has various properties and careful attention is required in selecting and mapping with macro and meso simulations. Moreover, quantum itself is a stochastic nature. Hence in QuCS, well-defined random functions are implemented. We have developed simulation for a polarized based quantum secret key communication. In this scenario, sender transmits polarized encoded photons as qubits and receiver randomly choose the polarization. This scenario is called as quantum key distribution (QKD). In this experiment, we simulated the fiber optics as channel, photon source, passive photonic components as transmitter and detector, passive photonic components as receiver. The distance and noise factors are the performance metrics. In overall, QuCS simulates the life cycle of qubit during the experiment. The proposed simulation designed as GUI based drag and drop solution with various internet features. Just a simple drag and drop method to develop a quantum experiments. This simulator abstract and encapsulate the quantum mechanics principle. This tool can serve for both teaching as well research. However, simulator lacks of various experiments components in order to build the higher lever experiments. Hence, our future goals are to enhance both quality of results and quantity of components.



Zuriati Ahmad Zukarnain is an associate professor at the Faculty of Computer Science and information Technology, University Putra, Malaysia. She is the head for high performance computing section at Institute for Mathematics and Research (INSPEM), University Putra Malaysia. She received her PhD from the University of Bradford, UK in 2005. Her research interests include: Efficient multiparty QKD protocol for classical network and cloud, load balancing in the wireless ad hoc network, quantum processor unit for quantum computer, Authentication Time of IEEE 802.15.4 with Multiple-key Protocol, Intra-domain Mobility Handling Scheme for Wireless Networks, Efficiency and Fairness for new AIMD Algorithms and A Kernel model to improve the computation speedup and workload performance. She has been actively involved as a member of the editorial board for some international peer-reviewed and cited journals. Dr. Zuriati is currently undertaking some national funded projects on QKD protocol for cloud environment as well as routing and load balancing in the wireless ad hoc network. Dr.Zuriati is the founder of ZA Quantum Sdn Bhd who is pioneer in producing the software for Quantum Experiment and Communication.

Filippo Arrichiello

«Cooperative control of networked robotic systems»

Abstract: Networked robots, i.e. robotic devices connected to a communications network, have been object of widespread research in the latest years due to their broad application domain, flexibility, potential robustness to faults and capacity to accomplish complex tasks alternatively impossible for single units. Despite their clear advantages, networked robots pose challenging problems due to the interaction among control, communication and perception. This talk is about cooperative control strategies for networked multi-robot systems to achieve specific missions as connectivity maintenance and formation control with robustness to failures, with a focus on experimental validation with mobile robots. The talk will end with a focus on networked robots issues when operating in the marine environment, illustrating the main challenges that will be addressed in the ongoing H2020 research project WiMUST.



Filippo Arrichiello was born in Naples, Italy on July 26, 1979. He received the Laurea Degree in Mechanical Engineer from the University of Naples, Italy in 2003 and the PhD in Electrical and Information Engineering from the University of Cassino, Italy in 2007. Currently, he is Associate Professor in Control Engineering at the University of Cassino and Southern

Lazio, Italy where, from 2006 to 2014, he has been Post Doc and Assistant Professor. From March to September 2005 he joined, as a visiting PhD student, the Centre of Excellence Centre of Ships and Ocean Structures of the Norwegian University of Science and Technology, Trondheim, Norway. Between 2008 and 2011 he spent seven months as a Visiting Researcher at the Robotic Embedded Systems Laboratory of the University of Southern California, Los Angeles, USA. His research activity focuses on industrial and mobile robotics with specific interest in multi-robot systems and marine robotics. He is author of more than 50 papers published in international journals and conferences proceedings in the field of robotics. He is actually Editor of the IEEE Robotics & Automation Society Conference Editorial Board for the IEEE International Conference on Robotics and Automation.

Mohammed Amin Awwad

«The Role of English in the Production and Dissemination of Knowledge: Hegemony or Homogeny?»

Abstract: This paper's thesis is that English will continue to rank first in the world language hierarchy as well in the European Union Language hierarchy as regards the production and dissemination of knowledge. Together with French and German it will play an important role in the internationalization and homogenization of higher education

across time and space, and will, therefore, significantly and positively contribute to a more democratic and equitable world. The paper will also show that language, national identity, social, economic, scientific and political discourse and culture are inseparable and nation-specific traits even though this is mitigated by the homogenization processes and character of a universe with a shared international identity. It will provide evidence that inadequate language competence in English, French, and Arabic is responsible for the modest academic achievement in Jordan, Morocco, Tunisia, and the United Arab Emirates university graduates. As universities and other institution of higher education play a major role in the production and dissemination of knowledge, promote internationalization of education, support mobility of students and faculty members, they are best qualified to chart future trends and processes that will lead to the homogenization of Higher Education while still focusing on national, cultural and academic heritage. The paper will argue that the homogenization and the production and distribution of knowledge requires much more than English language competence courses in the basic skills, and in English for academic purposes. Joint on-line open courses, a joint Middle East- European Union area of higher education, and translation programmes can certainly help. However much more important steps and strategies would be needed: establishing joint-degree programmes, and large scale student and faculty mobility programmes, which

proved to be most successful in India and China becoming important contributors to the advancement of science and technology. The paper will also provide evidence that translation cannot and does not produce material which correctly represents the thought processes and the full meaning intended in the original English text. Sometimes, the English (and other mother tongue) texts themselves are subject to an internal process of translation, mediation, and negotiation by their native speakers. Furthermore, the paper will show that complete congruence between any two language structures is untenable, which makes mobility of students and academic staff the best strategy for the production and dissemination of knowledge.



Mohammed Amin Awwad holds a Ph.D. in Linguistics from Brown University in the USA. He has been a full Professor of Linguistics since 1990. He is now the President's Advisor and Vice president for Academic Affairs at Philadelphia University (PU), Amman, Jordan. He has published twenty research papers in regional and international refereed journals, in addition to over sixty reports, working papers, and English Language and Literature book emendations, guides, and online course websites. He started his HE career at Yarmouk University in 1976 as chairman of the English Department. In 1993 he became the Dean of Graduate Studies and Research. He also edited the

University's Journal Abhath al-Yarmouk. From 2001 – 2005 he was the Dean of Language Studies at the Arab Open University Headquarters in Kuwait. In addition to his brief as Vice President for Academic Affairs, he is also the Director of PU's Center for training and Development of Faculty members, the Director of its Language Center, and the Manager of its TEMPUS TIES Program Towards Internationalization of Higher Education in the Meda region.

Frank H. P. Fitzek

«Why Communication Networks are the Next Big Thing ?»

Plenary Talk Abstract: The talk will be about the role of the communication networks for upcoming 5G systems. It will highlight the disruptiveness from existing networks and show new market potentials. New technologies for the networks are also discussed and put into perspective to the requirements of the Tactile Internet. Also the political role of communication networks is discussed.



Frank H. P. Fitzek is a Professor and head of the “Deutsche Telekom Chair of Communication Networks” at TU Dresden coordinating the 5G Lab Germany. He received his diploma (Dipl.-Ing.) degree in electrical engineering from the University of Technology – Rheinisch-Westfälische Technische Hochschule (RWTH) – Aachen, Germany, in 1997 and his

Ph.D. (Dr.-Ing.) in Electrical Engineering from the Technical University Berlin, Germany in 2002 and became Adjunct Professor at the University of Ferrara, Italy in the same year. In 2003 he joined Aalborg University as Associate Professor and later became Professor. He co-founded several start-up companies starting with acticom GmbH in Berlin in 1999. He has visited various research institutes including Massachusetts Institute of Technology (MIT), VTT, and Arizona State University. In 2005 he won the YRP award for the work on MIMO MDC and received the Young Elite Researcher Award of Denmark. He was selected to receive the NOKIA Champion Award several times in a row from 2007 to 2011. In 2008 he was awarded the Nokia Achievement Award for his work on cooperative networks. In 2011 he received the SAPERE AUDE research grant from the Danish government and in 2012 he received the Vodafone Innovation price. In 2015 he was awarded the honorary degree “Doctor Honoris Causa” from Budapest University of Technology and Economy (BUTE). His current research interests are in the areas of wireless and mobile 5G communication networks, mobile phone programming, network coding, cross layer as well as energy efficient protocol design and cooperative networking.