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Chair's Welcome Message

The aim of the first KES International Conference on Innovation in Medicine and Healthcare (InMed-13) was to gather a multidisciplinary group consisting of researchers and engineers, managers, students and practitioners from the medical arena, to discuss the ways that innovation, knowledge exchange and enterprise can be applied to issues relating to medicine, surgery, healthcare and the issues of an ageing population. A central theme of the conference was Smart Medical and Healthcare Systems which covered the ways in which modern intelligent systems contribute to the solution of problems faced by healthcare and medical practitioners today, addressing the application of these systems through all of the key themes of this year's conference.

As the first conference in the series, InMed-13 took the form of a workshop event hosted by Piraeus, Greece on 18 and 19 July 2013, hosted by the University of Piraeus. Delegates came from over 10 countries giving an international perspective. There were five invited speakers that provided in-depth keynote talks on various aspects of innovation and technological advances applied to medicine and healthcare. There were oral paper presentation sessions on Medical and Healthcare Innovations, Ambient Telecare and Smart Medical and Healthcare Systems.

Thanks are due to the University of Piraeus for hosting the event, to the keynote speakers, session chairs, authors, reviewers and delegates. We intend the conference to continue as a regular event to benefit the medical and healthcare community.

The InMed-13 Conference Chairs

Organisation

Honorary Conference Co-Chairs
Prof. Dimitrios Koutsouris
National Technical University of Athens, Greece
and
Prof. Mike Smith
Former Pro-Vice Chancellor Research, Sheffield Hallam University, UK

General Conference Chairs
Professor Maria Virvou
University of Piraeus, Greece
and
Professor George Tsihrintzis
University of Piraeus, Greece
and
Professor Lakhmi Jain
University of South Australia, Australia

Executive Chair
Professor Robert Howlett
Bournemouth University, UK and KES International

Programme Chair
Dr. Chris Herbert MInstKT
Business Manager - Medipex, UK

Smart Medical and Healthcare Systems Workshop Chair
Dr Carlos Toro
Vicomtech-IK4, Spain

Institute of Knowledge Transfer Liaison Chair
Russ Hepworth
Business Development Manager, IKT

Organisation and Management
Innovation through Knowledge Transfer is organised and managed by
KES International (www.kesinternational.org) in partnership with the Institute of
Knowledge Transfer (www.ikt.org.uk) and the University of of Pireaus.

International Programme Committee

Name	Affiliation
Prof. Arnulfo Alanis	Departamento de Sistemas y Computación Instituto Tecnológico de Tijuana
Asst.Prof. Ahmad Taher Azar	Faculty of Computers and Information, Benha University, Egypt
Dr. Kostas Berberidis	University of Patras, Greece
Prof. Jenny Benois-Pineau	Université Bordeaux 1, France
Dr. Alexia Briasouli	Information Technologies Institute, Centre for Research and Technology, Hellas (CERTH)
Dr. Christopher Buckingham	Aston University, Birmingham, UK
Prof. Michele Ceccarelli	University of Sannio, Benevento, Italy
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Dr. Prof. Jesús M. Doña Fernández	Andalusian Health Service, Spain & University of Malaga, Spain
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Prof. Despina Perrea	Medical School of Athens University of Athens, Greece

Name	Affiliation
Dr. Panagiota Poirazi	Institute of Molecular Biology and Biotechnology
Prof. PhD Eng. Dorin Popescu	University of Craiova, Romania
Prof. Daniel Racoceanu	University Pierre and Marie Curie, France
Dr. Ana Respício	University of Lisbon, Department of Informatics, Portugal
Dr. John Ronczka	Australian Society of Rheology, Australia
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Dr. Carlos Toro	Vicomtech-IK4, Spain
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Prof. Athanassios Tsakalidis	University of Patras, Greece
Dr. Manolis Tsiknakis	Computational Medicine Laboratory, Greece
Prof. Junzo Watada	Waseda University, Japan
Prof. Andree Woodcock	Coventry University, UK
Prof. Yoshida Yoshido	Harvard Medical School, USA
Prof. Reyer Zwiggelaar	Aberystwyth University, UK

Invited Keynote Talks

Prof. Manuel Graña
Professor at the Computer Science and Artificial Intelligence of the University of the Basque Country

Applications of computational intelligence to medicine and healthcare

Abstract: Computational intelligence covers a broad spectrum of computational techniques for the design of intelligent systems, which can be one of the mainstreams of innovation in medicine and healthcare. Medicine and healthcare are a source of huge amounts of data of all sorts, encompassing demographical, analytical data, and full spectrum of signal and image data modalities. Knowledge engineering and computational intelligence provide means for the efficient and accurate processing, management, and reasoning on this data. Some of the aspects that will be covered in this presentation are:

- Development of knowledge based systems for the management and processing of medical images. Specific application to the domain of vessel image segmentation and processing in angiographic images and specific diseases such as abdominal aortic aneurysm.
- Development of computer aids to clinical decisions, entailing classification and signal/image processing techniques. Specific application domain are the neurosciences and the computer aided diagnostic systems for pathologies such as Alzheimer's disease, schizophrenia. Looking image/signal biomarkers as well as providing diagnostic support.
- Development of knowledge engineering for semantically enhanced systems providing intelligent and continuously evolving computer support for clinical decision systems. Specific developments on the breast cancer treatment and prevention will be discussed.
- Application of intelligent serious games for the training of medical and healthcare personnel to enhance performance or diffuse innovation in the clinical environment.
- Some of the topics have been covered by researchers at Vicomtech, a research center with close ties to the Grupo de Inteligencia Computacional of the UPV/ EHU.

Biography: Manuel Graña is currently full professor at the Computer Science and Artificial Intelligence of the University of the Basque Country (UPV/EHU), in the Facultad de Informatica in San Sebastian. His research interests include Machine Learning and Pattern Recognition, Medical Image Processing and Computer Aided Diagnosis systems, Mobile Robot Navigation, Multi-Agent Systems with natural inspiration, Social Network innovations via Computational Intelligence. The development of Lattice Computing approaches in those domains is his principled research endeavor. He is member of MIR Labs, IEEE and ACM. He has chaired three international conferences (IWANN 2007, HAI 2010, KES 2012). He has been editor of more than ten books. He has been advisor of more than twenty successful doctoral students. He has coauthored over one hundred papers in impact research journals.

Prof. Leon D. Iasemidis

Professor and the Rhodes Eminent Scholar Chair of the Biomedical Engineering Program

Center for Biomedical Engineering and Rehabilitation Science

Louisiana Tech University, USA

Brain's Connectome: Application to Diagnosis and Treatment of Epilepsy

Abstract: Epilepsy, a common neurological disorder second only to stroke and Alzheimer's, affects 1 to 2% of the population worldwide and is characterized by seizures, abrupt disruptions of brain's electrical activity. The mainstay for the treatment of epilepsy remains still pharmacological despite its low efficacy. An engineering systems approach to epilepsy (epileptogenesis) and seizures (ictogenesis) has produced results and novel concepts that could revolutionize the diagnosis and treatment of epilepsy and other neurological dynamical disorders in the near future. It is based on measuring the brain networks' functional connectivity (connectome) over time utilizing mathematical tools from the theory of chaos and information theory. We will present results from the application of this novel technology to the electroencephalogram (EEG) and magnetoencephalogram (MEG) in conjunction with neuroimaging (MRI) acquired in studies with rodent models of epilepsy and patients with focal epilepsy. The impact of this technology ranges from diagnosis (e.g. accurate localization of the epileptogenic focus), to differential diagnosis (e.g. epilepsy versus metabolic encephalopathy; epileptic versus psychogenic non-epileptic seizures), to evaluation of treatment in emergency conditions like status epilepticus or monitoring of conventional anticonvulsant therapy. Finally, this line of research is leading to the development of innovative treatments for epilepsy, for example, timely intervention through closed-loop implanted stimulators with an automatically defined but ever changing form of stimulus administered at seizure warnings.

Biography: Dr. Iasemidis is a world expert in nonlinear dynamics and the detection, prediction and control of crises in complex systems. He is considered one of the founders of the field of epileptic seizure prediction. His research and peer-reviewed publications, edition of special journal issues, patents, interdisciplinary conference organizations and presentations have stimulated an international interest in the understanding of the mechanisms of epileptogenesis through a systems engineering approach. Dr. Iasemidis serves on the editorial board of the Annals of Biomedical Engineering and the International Journal of Neural Systems and, in the past, of Epilepsia and the IEEE Transactions on Biomedical Engineering. He is a reviewer for a plurality of journals and research sponsoring national and international agencies, including the National Institutes of

Health (NIH) and the National Science foundation (NSF). He collaborates with renowned for treatment of epilepsy medical centers, notably Cleveland Clinic, Mayo Clinic and Barrow Neurological Institute. Dr. Iasemidis' research has been highlighted in multiple forums, including the New York Times, Discover magazine, the Teaching Company, and the American Society for the Advancement of Science (AAAS), and has been funded by NIH, VA, DARPA, NSF, DoD, the Epilepsy Foundation of America, the Science Foundation of Arizona, the Whitaker Foundation and the healthcare industry.

Prof. Dimitrios Koutsouris
National Technical University of Athens, Greece

Infomation Systems and Electronic Services in Health: From E-Medical Care to E-Health Care

Biography: Dimitris Koutsouris was born in Serres, Greece, in 1955. He received his Diploma in Electrical Engineering in 1978 in Greece, DEA in Biomechanics in 1979 in France, Ph.D. degree in Genie Biologie Medicale in France, and the Doctorat d' Etat in Biomedical Engineering in 1984 in France. Since 1986 he was research associated on the University of Southern California in Los Angeles, and the Renè Dèscartes in Paris, France. He is currently a professor of Biomedical Engineering and Chairman in the Department of Electrical & Computer Engineering of National Technical University of Athens, Greece. He has published over 100 research articles and book chapters and more than 150 conference communications. Dr. Koutsouris is a member of many honorary and professional societies and is currently the president of the Greek Society of Biomedical Technology.

Prof. Mike Smith
Former Pro-Vice Chancellor Research, Sheffield Hallam University, UK & Chairman, The Institute of Knowledge Transfer

Innovation and Knowledge transfer in the UK National Health Service: past, present and future

Biography: Professor Mike Smith has worked in the University sector as Pro Vice Chancellor for Research, Knowledge Transfer and Enterprise. He has also held senior positions in the UK's National Health Service in Clinical Science and R&D. His extensive experience of healthcare and medical devices has extended into the commercial sector, particularly the commercialisation of innovations and company formation. He is currently Chair of Medipex Limited and The Institute of Knowledge Transfer.

Ann Starkey

Deputy Chief Exec of Leading UK Medical Innovations Company, Medipex

Innovation and co-creation of IP through knowledge transfer and knowledge sharing in the healthcare sector

Abstract: Innovation is the first step on the long journey to commercialisation and Medipex works with National Health Service Organisations to take their innovations through that journey to generate products and services that are fit for purpose in a modern and cost conscious health service. This journey involves finding appropriate partners to help in the development and delivery of innovative products and services. Since its inception a decade ago, Medipex has increasingly worked with healthcare companies and Higher Education Institutions, to help them harness NHS expertise and understand the markets for their own innovations.   Latterly we have started to bring academia, the NHS and the healthcare industry together at an early stage to develop cost effective new services that deliver better patient care through the co- creation of innovation. The introduction of the Research Excellence Framework (REF), that requires Universities to demonstrate tangible outcomes of their research has led to Universities seeking our advice and expertise on how to accomplish this. There are many examples of the types of innovation we have helped to develop: eg ELAROS, a home based triaging of long term continence problems using telehealth model to cut down inappropriate referrals and reduced pharmacy costs. EPAQ, an electronic quality of life questionnaire that patients with pelvic floor problems can complete on line either at home or in the GP surgery. This cuts out the need for an initial hospital visit, whist giving the Consultant Urologist the necessary information to make an initial diagnosis. Telewound care which joins up existing technologies ("Smart Phones" and Digital pen and paper) with a model of best practice to improve care and reduce costs of care by sending information and photos about a wound via a smart phone to a specialist nurse for assessment.

Biography: Ann has over 25 years experience of working at the interface between Higher Education and Healthcare Sector, latterly in research and project management in the Faculty of Medicine and Health at the University of Leeds University. Prior to joining Medipex she was part of the Executive Team that set up the Company and her role within the company is that of general and operations manager. She has an MBA with Distinction, from the University of Leeds (2007) She is a Visiting Fellow at Sheffield Hallam University , and was recently appointed Chair of the Transatlantic Business Council's Healthcare Advisory Board.

Conference Schedule

Thursday 18 July 2013

8.30-9.30: Registration

9.20-9.30: Conference Opening and Welcome

9.30-10.00: Invited Keynote Talk

Prof Mike Smith, Former PVC Sheffield Hallam University and the IKT, UK

Innovation and Knowledge transfer in the UK National Health Service: past, present and future

10.00-10.30: Invited Keynote Talk

Prof Dimitris Koutsouris, National Technical University, of Athens Greece

Information Systems and Electronic Services in Health, from E-Medical Care to E-Health Care

10.30-10.40: Questions and Discussion

10.40-11.00 Coffee

11.00-13.00: Oral Paper Presentation Session

Medical and Healthcare Innovations

Chair: Prof Lakhmi C.Jain, University of South Australia

(6 papers)

13.00-14.00: Lunch

14.00-14.35: Invited Keynote Talk

Ann Starkey, Medipex, UK

Innovation and co-creation of IP through knowledge transfer and knowledge sharing in the healthcare sector

14.35-15.10: Ambient TeleCare Keynote Talk

Andrei Bursuc

15.10-15.30: Coffee

15.30 - 17.30: Oral Paper Presentation Session

Ambient TeleCare

Chair: Alexia Briasouli, Informatics & Telematics Institute, Thessaloniki, Greece

(5 papers)

19.30 pm Conference Dinner

Friday 19 July 2013

8.30-9.30: Registration

9.30-10.30: Invited Keynote Talk

Prof Leon D. Iasemidis, Louisiana Technical University, USA

Brain's Connectome: Application to Diagnosis and Treatment of Epilepsy

10.30-11.00 Coffee

11.00-13.00: Oral Paper Presentation Session

Smart Medical and Healthcare Systems

Chair: Dr Carlos Toro, Vicomtech-FP4, Spain

(6 papers)

13.00-14.00: Lunch

14.00-15.00: Invited Keynote Talk

Prof Manuel Grana, University of the Basque Country, UPV-EHU, Spain

Applications of Computational Intelligence to Medicine and Healthcare

Discussion on Future of the Conference and Close

Paper Presentations

Session A: Medical and Healthcare Innovations
Chair: Prof Lakhmi C.Jain

Software Defined Network Application in Hospital
Keisuke Nagase

Active Learning enhanced with Expert Knowledge for Computed Tomography Image Segmentation
Josu Maiora, Guillermo García, Borja Ayerdi, Manuel Graña & Mariano De Blas

Emotional analysis thru EEG signals, to monitor high performance athletes
Adrian R. Aguinaga, Arnulfo Alanis Garza, Rosario Baltazar, Miguel Lopez Ramire & Víctor M. Zamudio

An extraction of the violacein sequence from pJP101 for expression and analysis in pHSG398
Julian Harrison & John Ronczka

Mapping systems within systems
John Ronczka

Innovative Treatment for Glaucoma: Iridocorneal Angle in Phacovitrectomy with Silicone
Jesús Hernán González Cortés, Carlos Romo Aguirre, Josué Roberto Lozano, Mariya Kalashnikov, John Ronczk, Alejandro Martínez López Portillo, Jesús Mohamed Hamscho

Session B: Ambient TeleCare
Prof Alexia Briasouli

Ambient Health Monitoring: The Smartphone as a Body Sensor Network Component
Tudor Pascu, Martin White, Natalia Beloff, Zeeshan Patoli, Leon Barker

Segmentation and classification of dynamic activities from accelerometer signals
Laurent Oudre, Maeva Doron & Chantal Simon

Visual saliency maps for studies of behavior of patients with neurodegenerative diseases: Observer's versus Actor's points of view
Hugo Boujut, Vincent Buso, Jenny Benois-Pineau, Yann Gaestel, Jean-François Dartigues

A comprehensive Remote Monitoring and Feedback Service for People with Dementia living at Home
Alexia Briassouli, Ioannis Kompatsiaris

DemCare action dataset for evaluating dementia patients in a home-based environment
Avgerinakis Konstantinos & Kompatsiaris Ioannis

Session C: Smart Medical and Healthcare Systems
Dr Carlos Toro

Multicriteria Analysis and Case-Based Reasoning: Applications to the Training of Young Doctors in the Context of Breast Mammogram
Jean Renaud, Christian Fonteix, Mauricio Camargo, Aline Deruyver, Laure Morel & Didier Casner

Smart Medical System for the Universal Remote Delivery of Rehabilitation
Gorka Epelde, Eduardo Carrasco, Shabs Rajasekharan, Julio Abascal,
Jose Manuel Jimenez, Karmelo Vivanco, Isaac Gomez-Fraga, Xabier Valencia

GoCardio: A novel approach for mobility in cardiac monitoring
Iker Mesa, Eider Sanchez, Javier Diaz, Carlos Toro, Arkaitz Artetxe, Manuel Graña, Frank Guijarro, César Martínez, Jose Manuel Jiménez, Jose
Antonio Alarcon & Alessandro De Mauro

Business Intelligence Strategy for Data Warehouse in Andalusian Health Service
Antonia Ortega, Monica Holgado & Jesús Doña

Housing Health and Safety Decision Support System with Augmented Reality
Arturas Kaklauskas, Mindaugas Krutinis, Ludmil Kovachev, Petar Petkov, Lina Bartkiene & Ieva Jackute

Knowledge translation for emerging infectious diseases: challenges and opportunities
Joel Kettner