

INVITATION to the
1st Event of the Greek IEEE-EMBS Chapter
"TRENDS IN MEDICAL IMAGING"

Invited lecture by Assoc. Prof. George D. Sergiadis
School of Electrical and Computer Engineering,
Aristotle University of Thessaloniki

**A human-brain oriented image perception:
Hesitancy image processing**

Invited lecture by Prof. Ioannis A. Kakadiaris
Computational Biomedicine Lab,
Department of Computer Science, University of Houston

**Cardiovascular informatics:
How to stop a heart attack before it happens**

14 November 2006, at 14:00
Amphitheater of the School of Electrical and Computer Engineering
National Technical University of Athens, Zografou Campus

A human-brain oriented image perception: Hesitancy Image Processing

In scientific meetings, the capability of the human brain to process information is commonly compared with the up-to-date digital computers. Even more, many scientists tend to assess this processing capability in Teraflops and then try to predict how many more years are needed to the digital computers to catch up with it, assuming a constant technology evolution, according to Moore's law.

However does human brain really work as its digital counterpart? Especially in the processing of images, coming at an astonishing pace from the visual system, are there any similarities with the known "engineering" processing tools?

Based on these questions, Hesitancy Image Processing, derived from the Intuitionistic Fuzzy Logic foundations, tries to offer an alternative approach on the image processing algorithms. This new concept has powerful non-linear capabilities to treat individually every pixel or part of an image, and has also features that are likely to match better biological than digital computers.



Additionally, HIP allows to account for any “a priori” knowledge of the physical process which generates the image. Experimental results will be shown and future research will be suggested.

Cardiovascular Informatics: How to Stop a Heart Attack Before it Happens

Approximately 23,000 heart attacks are suffered annually by Greeks. Similarly, 1.5 million heart attacks are suffered annually by Americans, and about half of them prove fatal, despite a host of new public health initiatives targeting heart disease and its aggravating factors such as obesity. The case of Former US President Bill Clinton, who recently underwent quadruple bypass surgery, demonstrates that even a former president with access to the best medical care available can have undiagnosed heart disease. Clinton himself blamed “insufficient vigilance” and stressed the importance of repeated testing as a means of heart disease prevention. Thus, our collaborators (The Association for the Eradication of Heart Attack) are calling for all men 45 and older and women 55 and older to undergo a comprehensive vascular health assessment. Considering the large amounts of data such screening will produce, there is an urgent need for biomedical image analysis tools (segmentation, shape and motion estimation) to assist in screening for the conditions that underlie sudden cardiac events. In this talk, we present biomedical image analysis tools for the mining of information from cardiovascular imaging for the detection of persons with a high likelihood of developing a heart attack in the near future (vulnerable patients). In addition, we present results from our collaboration with Hippokraton Hospital for “in vivo” detection of inflamed vulnerable plaques.

Short CV: George D. Sergiadis

George D. Sergiadis was born in Thessaloniki, Greece in 1955. He took his diploma in Electrical Engineering from the Aristotle University of Thessaloniki, Greece in 1978, and his PhD from “Ecole Nationale Supérieure des Télécommunications”, Paris France, in 1982. He joined IEEE as a member since 1988. He worked with Thomson CsF, in France, until 1985, participating in the development of the French Magnetic Resonance Scanner. Since 1985 he is with the Aristotle University of Thessaloniki, Greece, teaching Telecommunications and Biomedical Engineering, now as an Associate Professor. For 3 years he served also as the Director of the Telecommunications Department. He has developed the Hellenic TTS engine “Esopos”, and designed the mobile communications for the Athens Olympic Games in 2004. His current research interests include fuzzy image processing and wireless communications. During the academic year 2004-2005 was a visiting researcher at Media Lab, MIT, Cambridge, USA. Dr. Sergiadis is the president of ELEVIT, the Hellenic society for Biomedical Engineering, and a member of TEE, ATLAS, SMRM, ESMRM, EMBS, and SCIP.

Short CV: Ioannis A. Kakadiaris

Ioannis Kakadiaris (www.cbl.uh.edu/~ioannisk/) joined the University of Houston in August 1997 after completing a Post-Doctoral Fellowship at the University of Pennsylvania. He is the Eckhard Pfeiffer Endowed Professor in the Departments of Computer Science and of Electrical and Computer Engineering at the University of Houston (UH). Dr. Kakadiaris is the founder and Director of UH's Computational Biomedicine Laboratory. He is the recipient of the year 2000 NSF Early Career Development Award, Schlumberger Technical Foundation Award, UH Computer Science Research Excellence Award, UH Enron Teaching Excellence Award, and the James Muller VP Young Investigator Prize.