XVth IEEE-SPIE Symposium „Photonics and Web Engineering"
Faculty of Electronics and IT, Warsaw University of Technology, 29-30 January 2010

Participants of the 25th WILGA Symposium Session on Electronics for High Energy Physics (HEP) Experiments. Sitting L to R: G.Kasprowicz, prof.R.Romaniuk, prof.T.Morawski, M.Ramotowski, dr K.Poźniak

The Symposium on „Photonics and Web Engineering" (Fotonika i Inżynieria Sieci Internet) is traditionally organized two times a year at the Faculty of Electronics and Information Technologies, Warsaw University of Technology (during last week of each January) and in WILGA resort (the whole last week of each May). The Symposium has an international patronage of IEEE (Poland Section and Region 8), SPIE – The International Society for Optical Engineering (Bellingham, WA,USA), as well as domestic patronage of PSP – Photonics Society of Poland, Committee of Electronics and Telecommunications, Polish Academy of Sciences (KEiT PAN), and the Institute of Electronic Systems (ISE), Warsaw University of Technology (PW). The Symposium is widely known in the Internet under the acronym IEEE WILGA. The return from 'googling' of this term is more than 2000. During the term 2009-2013 the Symposium is additionally supported by the EU 7th FP Project EuCARD – European Coordination for Accelerator Research and Development – coordinated by CERN [cern.ch/eucard]. A special session on EuCARD is organized during WILGA.

The IEEE WILGA Symposium is organized since 1998 by the M.Sc and Ph.D. student research group PERG-ELHEP from ISE PW. XXVth Symposium has gathered around 80 persons and presentations. The mainstream subjects were design, fabrication and tests of advanced electronic and photonic systems in hardware and software aspects. The participants of the January Symposium are B.Sc., M.Sc., and Ph.D. students and young researchers from Warsaw University of Technology (WUT) and cooperating institutions like Faculty of Physics – Warsaw University, Sołtan Institute of Nuclear Research in Świerk (IPJ), Kopernik Center of Space Research in Warsaw (CBK), CERN in Geneva, etc. The cooperation is realized at common grants and research projects. The students are sometimes accompanied by their tutors and mentors who give invited and keynote presentations. Some tutors bring a few students and organize topical sessions.

Biomedical IT
The Biomedical session was devoted to the problems of knowledge discovery from massive medical measurement data bases. The sine qua non condition of knowledge discovery is data quality in big sets. Such sets of good quality are rare. Data bases from the past hardly fulfill these conditions. They are not full. This interesting research direction is frequently associated with building of such data bases from the scratch. This in turn enters even more general problems of organization and administration of health services in particular countries and regions in the near future. The session on biomedical IT was chaired by prof.J.Mulawka.

Object design of electronic systems
A session devoted to object design of hardware and software concerned optimization of interaction, and task sharing between these two system layers. New questions were asked associated with object approach to hardware design in such a way as to obtain the best fit between the corresponding object structures in both layers. Automation of optimal complex code generation was considered in C++, VHDL and MatLab script. A few Ph.D. theses is under preparation in this relatively new topical area. The area embraces such research as: integration of hardware and software, functions sharing between hardware and software, functions exchange, configurability, optimization of available physical system resource usage.

Electronic systems for high energy physics experiments

The session on electronics for HEP experiments concerned the following subjects: building of TOTEM detector for research of internal three layered bag structure of the proton; CMS spectrometer designed for Higgs boson search; European free electron laser E-XFEL; safety Interlock system for LHC accelerator; modernization of the PS and SPS accelerators in CERN, etc. The electronic systems for HEP have very special properties. They usually are constructed as distributed measurement and measurement-control systems with numerable measuring and large amount of data acquisition channels. Most of these data are not useful, thus they have to be triggered at several levels. These systems are synchronous with precise data stamping to enable reconstruction of the physically interesting event. The HEP apparatus has large dimensions and very precise time distribution is necessary to all parts of the measuring network.

Electronic systems for astronomy and space technology

A number of M.Sc. and Ph.D. theses is realized in cooperation with WUT and CBK as well as IPJ. The conducted research concerned new solutions to CCD converters and building of ultra low noise cameras for astronomical research applications. A number of papers were presented on next generation CCD cameras for Pi-of-the-Sky project to observe optical counterparts to GRB effects. Now the prevailing theories say that GRB is a signature of a birth of a black hole. A generated jet of relativistic matter along the axis of the rotation of collapsing celestial body is a source of ultra strong synchrotron radiation. This radiation is detected on Earth or by the satellites. The role of the Pi-of-the-Sky telescopes is a wide angle observations of the whole sky, for relatively not big values of the 'magnitudo', but with the possibility to generate a negative observation time from a particular event – designated as zero time. The work on Pi-of-the-Sky cameras lead the team to design really ultimately low-noise CCD based apparatus. The cameras are now applied also in quite different fields like research and industry.

Functional applications of electronic systems

A session on applications of advanced electronic and photonic systems contained nearly twenty papers on the following subjects: building of a miniature quadrocopter; control system development in robotics; minimal-energy functional systems combined with energy harvesting technology; image recognition for the purpose of road traffic analysis, safety and protection (including registration tables recognition); safe, reliable and ultrastable power mains for biomedicine; power supplies for photomultipliers; 3D laser scanners; and other. The electronic systems with energy harvesting capability use all possibilities to recover energy from the environments they reside i.e. temperature differences, optical illumination, etc.

Digital signal processing

The session on digital signal processing and high performance computing (HPC) contained works on design and software for DSP processor cluster and PC cluster. Cluster calculations embrace also the research on computing problem decomposition to parallel streams of tasks. Cluster based HPC are used for factorization of large numbers, inversion of large matrixes, speeding of floating number calculations, solving complex problems, etc.

Web Engineering

Web and Internet engineering embraces many hardware and software problems. The hardware layer contains for example embedded web micro-servers in all kinds of appliances and user devices like in cars, homes, but also communications between the machines (M2M). The software layer and mixed layer contains a diversity of web access via the PC and without the usage of a PC.

Palindromes

Prof.T.Morawski, a widely known palindormist, had a presentation on his creative work in this field of fine literary arts. He presented the Symposium participants with his new books.

WILGA, May 2010

Symposium program and plans for the XXVIth meeting in WILGA on 24-30 May 2010 are accessible on the web http://wilga.ise.pw.edu.pl. The Symposium language is English and the papers are published in IEEE eXplore, Elektronika Journal by Association of Polish Electrical Engineers (SEP), JET - Journal of Electronics and Telecommunications by the Committee of Electronics and Telecommunications, PAS; and Proceedings SPIE – The International Society for Optical Engineering, USA. The organizers of WILGA 2010 Symposium invite warmly young researchers and students to submit their papers there and to join the international IEEE community gathered there. The paper submissions are open at photonics@ise.pw.edu.pl.

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