

PROCEEDINGS OF SPIE

Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments 2011

Ryszard S. Romaniuk

Editor

23–29 May 2011

Wilga, Poland

Organized by

Institute of Electronic Systems, Faculty of Electronics and Information Technologies,
Warsaw University of Technology (Poland)

Sponsored by

PSP—Photonics Society of Poland (Poland) • SPIE Europe • Committee of Electronics
and Telecommunications, Polish Academy of Sciences (Poland) • EuCARD—European
Coordination of Accelerator R&D (EU FP7) • IEEE Poland Section • PKOpto—Polish Committee
of Optoelectronics of SEP

Volume 8008

Proceedings of SPIE, 0277-786X, v. 8008

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

The papers included in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. The papers published in these proceedings reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from this book:

Author(s), "Title of Paper," in *Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments 2011*, edited by Ryszard S. Romaniuk, Proceedings of SPIE Vol. 8008 (SPIE, Bellingham, WA, 2011) Article CID Number.

ISSN 0277-786X
ISBN 9780819485823

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445
SPIE.org

Copyright © 2011, Society of Photo-Optical Instrumentation Engineers

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/11/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

SPIE 
Digital Library

SPIDigitalLibrary.org

Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc.

The CID number appears on each page of the manuscript. The complete citation is used on the first page, and an abbreviated version on subsequent pages. Numbers in the index correspond to the last two digits of the six-digit CID number.

Contents

xi	<i>Symposium Committees</i>
xiii	<i>Introduction</i>

SESSION 1 **DEVELOPMENT OF PHOTONICS AND ELECTRONICS IN EUROPE AND POLAND: KNOWLEDGE REPRESENTATION**

8008 02	Wilga Photonics and Web Engineering 2011 [8008-10] R. S. Romaniuk, Warsaw Univ. of Technology (Poland)
8008 03	Ontological engineering versus metaphysics (Invited Paper) [8008-60] E. Tataj, Warsaw Univ. of Technology (Poland); R. Tomanek, Cardinal Stefan Wyszyński Univ. (Poland); J. Mulawka, Warsaw Univ. of Technology (Poland)
8008 04	Considerations on conceptual knowledge representation (Invited Paper) [8008-66] M. Porwolik, Cardinal Stefan Wyszyński Univ. (Poland); J. Mulawka, Warsaw Univ. of Technology (Poland)
8008 05	Accelerator infrastructure in Europe: EuCARD 2011 (Invited Paper) [8008-26] R. S. Romaniuk, Warsaw Univ. of Technology (Poland)
8008 06	Photonics and terahertz technologies: part 1 (Invited Paper) [8008-70] R. S. Romaniuk, Warsaw Univ. of Technology (Poland)
8008 07	Photonics and terahertz technologies: part 2 [8008-71] R. S. Romaniuk, Warsaw Univ. of Technology (Poland)

SESSION 2 **ADVANCED PHOTONICS AND ELECTRONICS SYSTEMS: HARDWARE ASPECTS**

8008 08	Automatic test-bench for GEM detectors (Invited Paper) [8008-81] K. Pozniak, Warsaw Univ. of Technology (Poland); T. Czarski, Institute of Plasma Physics and Laser Microfusion (Poland); G. Kasprówicz, Warsaw Univ. of Technology (Poland); W. Dominik, Univ. of Warsaw (Poland); M. Lorenc, Warsaw Univ. of Technology (Poland); R. Dąbrowski, Univ. of Warsaw (Poland); K. Jakubowska, L. Karpinski, Institute of Plasma Physics and Laser Microfusion (Poland); I. M. Kudła, K. Kierzkowski, Univ. of Warsaw (Poland); A. Komarzewski, J. Rządkiwicz, Institute of Plasma Physics and Laser Microfusion (Poland); Z. Salapa, Univ. of Warsaw (Poland); M. Scholz, Institute of Plasma Physics and Laser Microfusion (Poland); W. Zabolotny, Warsaw Univ. of Technology (Poland)
8008 09	Prototype readout electronics and silicon strip detector study for the silicon tracking system at compressed baryonic matter experiment [8008-16] K. Kasiński, R. Szczygieł, P. Gryboś, AGH Univ. of Science and Technology (Poland)
8008 0A	TDR-oriented behavioral modeling of reflected pulse in DSL line [8008-22] K. Opalska, Warsaw Univ. of Technology (Poland)

- 8008 0B **GTAG: architecture and design of miniature transmitter with position logging for radio telemetry** [8008-25]
 Š. Řeřucha, Institute of Scientific Instruments of the ASCR (Czech Republic) and Masaryk Univ. (Czech Republic); T. Bertonicka, Masaryk Univ. (Czech Republic); P. Jedlička, Institute of Scientific Instruments of the ASCR (Czech Republic)
- 8008 0C **Nonparametric filter for voice signals** [8008-34]
 L. V. Kolchenko, National Aviation Univ. (Ukraine) and Hamburg Univ. of Applied Sciences (Germany); R. B. Sinitsyn, National Aviation Univ. (Ukraine)
- 8008 0D **Feasibility study for porting the data acquisition system of the TOTEM experiment to alternative platforms** [8008-48]
 A. Fiergolski, Warsaw Univ. of Technology (Poland)
- 8008 0E **Dual port memory based Heapsort implementation for FPGA** [8008-53]
 W. M. Zabolotny, Warsaw Univ. of Technology (Poland)
- 8008 0F **Optimization of FPGA processing of GEM detector signal** [8008-55]
 W. M. Zabolotny, Warsaw Univ. of Technology (Poland); T. Czarski, M. Chernyshova, Univ. of Warsaw (Poland); H. Czyrkowski, R. Dąbrowski, W. Dominik, Institute of Plasma Physics and Laser Microfusion (Poland); K. Jakubowska, L. Karpiński, Univ. of Warsaw (Poland); G. Kasprowicz, Warsaw Univ. of Technology (Poland); K. Kierzkowski, I. M. Kudła, Institute of Plasma Physics and Laser Microfusion (Poland); K. Poźniak, Warsaw Univ. of Technology (Poland); J. Rządkiwicz, Univ. of Warsaw (Poland); Z. Sałapa, Institute of Plasma Physics and Laser Microfusion (Poland); M. Scholz, Univ. of Warsaw (Poland)
- 8008 0G **Application of multidimensional estimation algorithms in cyclic A/D converters** [8008-56]
 K. Jędrzejewski, Warsaw Univ. of Technology (Poland)
- 8008 0H **Realization of the diagnostic DOOCS server for the FLASH accelerator's master oscillator system** [8008-61]
 M. Linczuk, P. Więckowski, Warsaw Univ. of Technology (Poland)
- 8008 0I **Object oriented approaches to hardware design** [8008-65]
 P. K. Drabik, Warsaw Univ. of Technology (Poland)
- 8008 0J **Readout electronics for the GEM detector** [8008-67]
 G. Kasprowicz, Warsaw Univ. of Technology (Poland); T. Czarski, M. Chernyshova, Institute of Plasma Physics and Laser Microfusion (Poland); H. Czyrkowski, R. Dąbrowski, W. Dominik, Univ. of Warsaw (Poland); K. Jakubowska, L. Karpiński, Institute of Plasma Physics and Laser Microfusion (Poland); K. Kierzkowski, I. M. Kudła, Univ. of Warsaw (Poland); K. Poźniak, Warsaw Univ. of Technology (Poland); J. Rządkiwicz, Institute of Plasma Physics and Laser Microfusion (Poland); Z. Sałapa, Univ. of Warsaw (Poland); M. Scholz, Institute of Plasma Physics and Laser Microfusion (Poland); W. Zabolotny, Warsaw Univ. of Technology (Poland)
- 8008 0K **FPGA mezzanine card DSP module** [8008-90]
 T. Janicki, R. Cieszewski, G. Kasprowicz, K. T. Poźniak, Warsaw Univ. of Technology (Poland)
- 8008 0L **Analytic and simulation-aided methods for improvement of intelligent cyclic ADCs performance** [8008-100]
 Ł. Małkiewicz, Warsaw Univ. of Technology (Poland)

- 8008 OM **An investigation of quality of the conductive lines deposited by inkjet** [8008-2]
L. Futera, Tele and Radio Research Institute (Poland) and Warsaw Univ. of Technology (Poland); M. Jakubowska, Warsaw Univ. of Technology (Poland); G. Kozioł, A. Araźna, K. Janeczek, Tele and Radio Research Institute (Poland)

SESSION 3 ADVANCED PHOTONICS AND ELECTRONICS SYSTEMS: SOFTWARE ASPECTS

- 8008 ON **Selected issues of the universal communication environment implementation for CII standard (Invited Paper)** [8008-04]
A. Zagoździńska, K. T. Poźniak, P. K. Drabik, Warsaw Univ. of Technology (Poland)
- 8008 OO **Simulation of trading strategies in the electricity market** [8008-05]
K. Charkiewicz, R. Nowak, Warsaw Univ. of Technology (Poland)
- 8008 OP **The development of algorithms for parallel knowledge discovery using graphics accelerators** [8008-09]
P. Zieliński, Warsaw Univ. of Technology (Poland) and Univ. of Warsaw (Poland); J. Mulawka, Warsaw Univ. of Technology (Poland)
- 8008 OQ **Plug-in to Eclipse environment for VHDL source code editor with advanced formatting of text** [8008-32]
B. Niton, K. T. Pozniak, R. S. Romaniuk, Warsaw Univ. of Technology (Poland)
- 8008 OR **Reed-Solomon's algorithm and software for correcting errors in a text** [8008-39]
O. Volivach, A. Beletsky, National Aviation Univ. (Ukraine)
- 8008 OS **Simulation of concept acquisition according to Posner's theory using artificial neural networks** [8008-57]
D. Grzegorzczak, Warsaw Univ. of Technology (Poland); M. Nieznański, Cardinal Stefan Wyszyński Univ. (Poland); J. J. Mulawka, Warsaw Univ. of Technology (Poland)
- 8008 OT **Contrast pattern kernel for strings** [8008-107]
J. Węclawski, S. Jankowski, Warsaw Univ. of Technology (Poland)

SESSION 4 APPLICATIONS OF PHOTONICS IN ASTRONOMY

- 8008 OU **Observations of Cepheids in Pi of the Sky experiment (Invited Paper)** [8008-76]
M. Siudek, Ctr. for Theoretical Physics (Poland); A. Barnacka, N. Copernicus Astronomical Ctr. (Poland); B. Kaminski, Univ. of Warsaw (Poland); K. Malek, L. Mankiewicz, Ctr. for Theoretical Physics (Poland); M. Sokolowski, The Andrzej Soltan Institute for Nuclear Studies (Poland); F. A. Zarnecki, Univ. of Warsaw (Poland)
- 8008 OV **Quasars spectra classification with the help of GPU computing** [8008-78]
P. Wasiewicz, Warsaw Univ. of Technology (Poland); K. Hryniewicz, N. Copernicus Astronomical Ctr. (Poland)
- 8008 OW **Astronomical spectral database of active galactic nuclei** [8008-80]
P. Wasiewicz, Warsaw Univ. of Technology (Poland); K. Hryniewicz, N. Copernicus Astronomical Ctr. (Poland); P. Gajewski, The Warsaw School of Information Technology (Poland)

- 8008 0X **Pointing model of new Pi of the Sky detector in Spain** [8008-83]
M. Ćwiok, Univ. of Warsaw (Poland); L. Mankiewicz, R. Opiela, M. Siudek, Ctr. for Theoretical Physics (Poland); M. Sokołowski, The Andrzej Soltan Institute for Nuclear Studies (Poland); A. F. Żarnecki, Univ. of Warsaw (Poland)
- 8008 0Y **Present status of Pi of the Sky telescopes** [8008-87]
A. Majcher, M. Sokołowski, T. Batsch, The Andrzej Soltan Institute for Nuclear Studies (Poland); A. J. Castro-Tirado, Instituto de Astrofísica de Andalucía (Spain); H. Czyrkowski, M. Ćwiok, R. Dąbrowski, Univ. of Warsaw (Poland); M. Jelínek, Instituto de Astrofísica de Andalucía (Spain); G. Kasprowicz, Warsaw Univ. of Technology (Poland); A. Majczyna, The Andrzej Soltan Institute for Nuclear Studies (Poland); K. Małek, L. Mankiewicz, Ctr. for Theoretical Physics (Poland); K. Nawrocki, The Andrzej Soltan Institute for Nuclear Studies (Poland); R. Opiela, Ctr. for Theoretical Physics (Poland); L. W. Piotrowski, Univ. of Warsaw (Poland); M. Siudek, Ctr. for Theoretical Physics (Poland); R. Wawrzaszek, Space Research Ctr. (Poland); G. Wrochna, The Andrzej Soltan Institute for Nuclear Studies (Poland); M. Zaremba, Warsaw Univ. of Technology (Poland); A. F. Żarnecki, Univ. of Warsaw (Poland)
- 8008 0Z **Intelligent thermal imaging camera with network interface** [8008-98]
K. M. Siewlewicz, G. Kasprowicz, K. T. Poźniak, R. S. Romaniuk, Warsaw Univ. of Technology (Poland)
- 8008 10 **What is new on the second edition of the variable stars catalogue from the Pi of the Sky data?** [8008-99]
A. Majczyna, The Andrzej Soltan Institute for Nuclear Studies (Poland); M. Siudek, Ctr. for Theoretical Physics (Poland); M. Należyty, Univ. of Warsaw (Poland); A. Majcher, M. Sokolowski, The Andrzej Soltan Institute for Nuclear Studies (Poland)

SESSION 5 COMMUNICATIONS TECHNOLOGIES

- 8008 11 **Improving of dielectric resonator coupling with rectangular waveguide (Invited Paper)** [8008-42]
B. Pratsiuk, K. Savin, P. Sergienko, Y. Prokopenko, National Technical Univ. of Ukraine KPI (Ukraine)
- 8008 12 **New FEC encoding technique based parity selected codes for 4-ary PAM signal** [8008-44]
A.-R. Al-Qawasmi, Philadelphia Univ. (Jordan); A. Al-Lawama, Mutah Univ. (Jordan)
- 8008 13 **Carrier tracking loop for deeply coupled GNSS receiver** [8008-46]
P. Bojda, Univ. of Defence Brno (Czech Republic)
- 8008 14 **Markov chain error generator for wireless channel** [8008-47]
J. Pavlovič, J. Polec, J. Poctavek, K. Kotuliaková, Slovak Univ. of Technology (Slovakia)
- 8008 15 **Wireless device for activation of an underground shock wave absorber** [8008-58]
M. Chikhradze, G. Tsulukidze Mining Institute (Georgia) and Georgian Technical Univ. (Georgia); I. Akhvlediani, G. Tsulukidze Mining Institute (Georgia); N. Bochorishvili, G. Tsulukidze Mining Institute (Georgia) and Georgian Technical Univ. (Georgia); E. Mataradze, G. Tsulukidze Mining Institute (Georgia)

- 8008 16 **Modeling transmission parameters of polymer microstructured fibers for applications in FTTH networks** [8008-92]
P. Gdula, Warsaw Univ. of Technology (Poland) and National Institute of Telecommunication (Poland); K. Welikow, Warsaw Univ. of Technology (Poland); P. Szczepański, Warsaw Univ. of Technology (Poland) and National Institute of Telecommunication (Poland); R. Buczyński, Institute of Electronic Materials Technology (Poland) and Univ. of Warsaw (Poland); R. Piramidowicz, Warsaw Univ. of Technology (Poland)
- 8008 17 **Data mining approach to web application intrusions detection** [8008-95]
A. Kalicki, Warsaw Univ. of Technology (Poland)

SESSION 6 MULTIMEDIA TECHNOLOGIES

- 8008 18 **Overview of the major challenges in the wide baseline stereo vision (Invited Paper)** [8008-74]
M. Roszkowski, Warsaw Univ. of Technology (Poland)
- 8008 19 **Towards H.265 video coding standard** [8008-75]
A. Abramowski, Warsaw Univ. of Technology (Poland)
- 8008 1A **Adaptive motion estimation design with hardware-specific constraints** [8008-88]
M. Jakubowski, Warsaw Univ. of Technology (Poland)
- 8008 1B **Analysis of 3D scene using structured light technique** [8008-101]
M. Jędryka, Warsaw Univ. of Technology (Poland)
- 8008 1C **Extended hierarchical temporal memory for visual object tracking** [8008-108]
S. Kryś, S. Jankowski, Warsaw Univ. of Technology (Poland)
- 8008 1D **Rate control for multiview systems** [8008-73]
M. Wieczorek, Warsaw Univ. of Technology (Poland)

SESSION 7 ADVANCED BIOMEDICAL SYSTEMS

- 8008 1E **Prognosis for children with acute liver failure due to Amanita phalloides poisoning (Invited Paper)** [8008-11]
M. F. Wachulski, Warsaw Univ. of Technology (Poland); D. Kamińska-Gocał, M. Dądalski, P. Socha, The Children's Memorial Health Institute (Poland); J. J. Mulawka, Warsaw Univ. of Technology (Poland)
- 8008 1F **The effect of cell phones on human health** [8008-14]
I. N. Abu-Isbeih, Philadelphia Univ. (Jordan); D. Saad, Telecommunications Regulatory Commission (Jordan)
- 8008 1G **Simulation of electroencephalographic signals for depth of anesthesia assessment** [8008-28]
O. Panichev, A. Popov, O. Bodilovskyi, V. Tkachenko, National Technical Univ. of Ukraine (Ukraine)

- 8008 1I **J2ME implementation of system for storing and accessing of sensitive data on patient's mobile device** [8008-54]
W. M. Zabołotny, R. Wielgórski, M. Nowik, Warsaw Univ. of Technology (Poland)
- 8008 1J **Quantization and psychoacoustic model in audio coding in advanced audio coding** [8008-72]
G. Brzuchalski, Warsaw Univ. of Technology (Poland)
- 8008 1K **Chronic insomnia cases detection with the help of Athens Insomnia Scale and SF-36 health survey** [8008-77]
P. Wąsiewicz, Warsaw Univ. of Technology (Poland); M. Skalski, M. Fornal-Pawlowska, Medical Univ. of Warsaw (Poland)
- 8008 1L **On insomnia analysis using methods of artificial intelligence** [8008-79]
P. Wasiewicz, Warsaw Univ. of Technology (Poland); M. Skalski, Medical Univ. of Warsaw (Poland)
- 8008 1M **Optical coupling devices to a broadband low level laser therapy set** [8008-91]
L. Gryko, Białystok Univ. of Technology (Poland); A. Zajac, Białystok Univ. of Technology (Poland) and Military Univ. of Technology (Poland)
- 8008 1N **Prediction of protein phosphorylation sites using classification trees and SVM classifier** [8008-103]
P. Betkier, Z. Szymański, Warsaw Univ. of Technology (Poland)

SESSION 8 RADAR TECHNOLOGIES

- 8008 1O **SAR and InSAR georeferencing algorithms for inertial navigation systems (Invited Paper)** [8008-20]
M. Greco, IDS-Ingegneria Dei Sistemi SpA (Italy); K. Kulpa, Warsaw Univ. of Technology (Poland); G. Pinelli, IDS-Ingegneria Dei Sistemi SpA (Italy); P. Samczynski, Warsaw Univ. of Technology (Poland)
- 8008 1P **Linear landmark extraction in SAR images with application to augmented integrity aero-navigation: an overview to a novel processing chain** [8008-24]
L. Fabbri, Univ. of Florence (Italy); M. Messina, M. Greco, G. Pinelli, IDS-Ingegneria Dei Sistemi SpA (Italy)
- 8008 1Q **Estimation of the meteorological formations parameters in pulsed Doppler weather radars with arbitrary staggering of pulse repetition intervals** [8008-29]
D. S. Rachkov, A. V. Semeniaka, D. I. Lekhovytskyi, Kharkiv National Univ. of Radio Electronics (Ukraine)
- 8008 1R **Multipath effect in multilateration surveillance system** [8008-36]
I. Konchenko, F. Yanovsky, National Aviation Univ. (Ukraine)
- 8008 1S **Software defined noise radar with low sampling rate** [8008-38]
K. Lukin, P. Vyplavin, E. Savkovich, S. Lukin, Usikov Institute for Radiophysics and Electronics (Ukraine)

- 8008 1T **Least square spline decomposition in time-frequency analysis of weather radar signals** [8008-45]
K. I. Shelevytska, O. S. Semenova, I. V. Shelevytsky, F. J. Yanovsky, National Aviation Univ. (Ukraine)
- 8008 1U **CFAR BI detector for mariner targets in time domain for bistatic forward scattering radar** [8008-51]
Chr. Kabakchiev, The St. Clement of Ohrid Sofia Univ. (Bulgaria); I. Garvanov, State Univ. of Library Studies and Information Technologies (Bulgaria); M. Cherniakov, M. Gashinova, Univ. of Birmingham (United Kingdom); A. Kabakchiev, V. Kiovtorov, M. Vladimirova, P. Daskalov, Institute of Information and Communication Technologies (Bulgaria)
- 8008 1V **Preliminary results of ground reflectivity measurements using noise radar** [8008-52]
Ł. Maślikowski, P. Krysik, Warsaw Univ. of Technology (Poland); K. Dąbrowska-Zielińska, W. Kowalik, M. Bartold, Institute of Geodesy and Cartography (Poland)
- 8008 1W **Application of arbitrary waveform generator for noise radar** [8008-18]
K. A. Lukin, O. V. Zemlyaniy, P. L. Vyplavin, V. P. Palamarchuk, Usikov Institute for Radiophysics and Electronics (Ukraine)

SESSION 9 MATERIALS FOR PHOTONICS AND ELECTRONICS, OPTICAL FIBERS

- 8008 1X **Specialty optical fibers: revisited (Invited Paper)** [8008-105]
R. S. Romaniuk, Warsaw Univ. of Technology (Poland)
- 8008 1Y **Fiber optic structures for dynamic stress sensing** [8008-106]
R. Plaga, P. Lesiak, T. R. Woliński, Warsaw Univ. of Technology (Poland)
- 8008 1Z **Approaches for diagnostic and predictive maintenance** [8008-40]
K. P. Boshnakov, V. I. Petkov, Univ. of Chemical Technology and Metallurgy (Bulgaria); L. A. Doukowska, D. I. Borissova, S. L. Kojnov, Institute of Information and Communication Technologies (Bulgaria)
- 8008 20 **C-Ni films for cold cathode applied in fluorescent lamp** [8008-64]
I. Stępińska, E. Czerwosz, H. Wronka, M. Kozłowski, Tele and Radio Research Institute (Poland)
- 8008 21 **Resistance changes of carbon-palladium films obtained by PVD for sensor's applications** [8008-89]
K. Molenda, A. Kamińska, S. Krawczyk, M. Kozłowski, E. Czerwosz, H. Wronka, Tele and Radio Research Institute (Poland)

Author Index

Symposium Committees

Symposia Steering Committee

Andrzej W. Domański, Warsaw University of Technology (Poland)
Leszek Jaroszewicz, Military University of Technology, Warsaw (Poland)
Jerzy Klamka, Elektronika, Association of Polish Electrical Engineers (Poland)
Ryszard S. Romaniuk, Warsaw University of Technology (Poland)
Jan Dorosz, Białystok University of Technology (Poland)
Jerzy Szabatin, Warsaw University of Technology (Poland)
Tomasz R. Woliński, Warsaw University of Technology (Poland)
Wiesław L. Woliński, Warsaw University of Technology (Poland)
Grzegorz Wrochna, Sołtan Institute for Nuclear Studies (Poland)

Symposium Committee

Tomasz Adamski, Warsaw University of Technology (Poland)
Michał Borecki, Warsaw University of Technology (Poland)
Tomasz Czarski, Warsaw University of Technology (Poland)
Stanisław Jankowski, Warsaw University of Technology (Poland)
Grzegorz Kasprowicz, Warsaw University of Technology (Poland)
Ryszard Kossowski, Warsaw University of Technology (Poland)
Krzysztof Kulpa, Warsaw University of Technology (Poland)
Maciej Linczuk, Warsaw University of Technology (Poland)
Lech Mankiewicz, Center for Theoretical Physics, Polish Academy of Sciences (Poland)
Tadeusz Morawski, Warsaw University of technology (Poland)
Jan J. Mulawka, Warsaw University of Technology (Poland)
Leszek Opalski, Warsaw University of Technology (Poland)
Anatoli Piatonow, Warsaw University of Technology (Poland)
Krzysztof T. Poźniak, Warsaw University of Technology (Poland)
Michał Ramońowski, Warsaw University of Technology (Poland)
Ryszard S. Romaniuk, Warsaw University of Technology (Poland)
Wojciech M. Zabołotny, Warsaw University of Technology (Poland)

Symposium Chair

Ryszard S. Romaniuk, Warsaw University of Technology (Poland)

Session Chairs

- 1 Development of Photonics and Electronics in Europe and Poland: Knowledge Representation
Ryszard S. Romaniuk, Warsaw University of Technology (Poland)

- 2 Advanced Photonics and Electronics Systems: Hardware Aspects
Krzysztof T. Poźniak, Warsaw University of Technology (Poland)
- 3 Advanced Photonics and Electronics Systems: Software Aspects
Wojciech M. Zabołotny, Warsaw University of Technology (Poland)
- 4 Applications of Photonics in Astronomy
Lech Mankiewicz, Center for Theoretical Physics, Polish Academy
of Sciences (Poland)
- 5 Communications Technologies
Leszek Opalski, Warsaw University of Technology (Poland)
- 6 Multimedia Technologies
Jan J. Mulawka, Warsaw University of Technology (Poland)
- 7 Advanced Biomedical Systems
Jan J. Mulawka, Warsaw University of Technology (Poland)
- 8 Radar Technologies
Krzysztof Kulpa, Warsaw University of Technology (Poland)
- 9 Materials for Photonics and Electronics, Optical Fibers
Stanisław Jankowski, Warsaw University of Technology (Poland)
- 10 Photonics and Web Engineering I
Maciej Linczuk, Warsaw University of Technology (Poland)
- 11 Photonics and Web Engineering II
Ryszard S. Romaniuk, Warsaw University of Technology (Poland)
- 12 WILGA 2011 SPIE–PSP Best Student Paper Awards
Ryszard Kossowski, Warsaw University of Technology (Poland)
Michał Ramotowski, Warsaw University of Technology (Poland)

Introduction

The **SPIE-IEEE-PSP WILGA** Symposium [wilga.ise.pw.edu.pl] is a kind of international Forum of Young Science in Photonics, Advanced Electronics and Internet Engineering. It is organized twice a year under the eminent patronage of two big international engineering institutions SPIE [www.spie.org] and IEEE [www.ieee.org] and their Polish counterparts: PSP—Photonics Society of Poland [www.photonics.pl], successor of Polish Chapter of SPIE [www.spie.pl] and IEEE Poland Section [www.ieee.pl], with participation of IEEE R8 [ewh.ieee.org/reg/8/sac/cms]. The patrons of the symposium are: PAS—Polish Academy of Science (The Committee on Electronics and Telecommunication) [keit.pan.pl], Association of Polish Electrical Engineers (SEP) [www.sep.com.pl], Polish Committee of Optoelectronics SEP [pkopto.ise.pw.edu.pl], Warsaw University of Technology [www.pw.edu.pl], Institute of Electronic Systems [www.ise.pw.edu.pl].

WILGA Organizers: The Symposium is organized by a group of devoted young people - photonics, mechatronics, and electronics researchers - gathered in the PERG/ELHEP Research Group [[Zespól Badawczy PERG](http://Zespól_Badawczy_PERG)] of the Institute of Electronic Systems at the Faculty of Electronics and Information Technology of WUT. Most of these young researchers are active members of PSP, SEP, SPIE, OSA and IEEE. The symposium is diligently done by young researchers for young fellow researchers and the main aim is to have a lot of fun and to learn a lot.

WILGA Publications: The WILGA Symposium publishes its papers in the following proceedings series, technical and peer-reviewed journals: Proceedings of SPIE, since 2002; IEEE eXplore, Internet publication data base; Photonics Letters of Poland, since 2009; Elektronika, SEP Journal, since 1998; JET—Intl. Journal of Electronics and Telecommunications, PAS.

WILGA Proceedings of SPIE: There has been now quite a long tradition of WILGA publishing its works in the Proceedings of SPIE. This volume is the 11th published of the WILGA-SPIE series. The WILGA-SPIE volume series contains more than 1000 papers; all WILGA Symposiums have published more than 2000 papers with around 4000 participants. This is an extraordinary achievement for a modest symposium oriented solely on young researchers. No one event of similar character could compare to this achievement. This success was only possible due to big involvement of young researchers in their work. The following WILGA SPIE Proceedings were published: Wilga 2002 – Proc. SPIE 5125; Wilga 2003 – Proc. SPIE 5484; Wilga 2004 – Proc. SPIE 5775; Wilga 2005 bis – Proc. SPIE 5948 (Warsaw SPIE COO'05); Wilga 2005 – Proc SPIE 6159; Wilga 2006 – Proc. SPIE 6347; Wilga 2007 – Proc. SPIE 6937; Wilga 2008 – Proc. SPIE 7124; Wilga 2009 – Proc. SPIE 7502; Wilga 2010 – Proc. SPIE 7745; WILGA 2011 – Proc. SPIE 8008.

SPIE Poland 2005: The SPIE Poland meetings in 2005 were very special because then the Polish Chapter of SPIE (predecessor of Photonics Society of Poland) hosted together with SPIE and some other regional SPIE Chapters, the SPIE Warsaw Congress on Optics and Optoelectronics – SPIE COO Warsaw 2005. WILGA 2005 Symposium was split to two parts – one held usually in WILGA and the second jointly with the COO'05.

WILGA ways and topics: The official language of the Symposium is English. Peer reviewed papers are published in a renowned, worldwide recognized series Proceedings of SPIE in USA. The symposium is designed mainly for for Ph.D., M.Sc., and B.Sc. students (from physics, electronics and mechatronics, as well as material research) and their tutors/mentors. WILGA has a number of main topical tracks. Historically, the first one was Photonics and Web Engineering. Generally, WILGA embraces advanced photonic, mechatronic and electronic systems, in the following aspects: theory, modeling, algorithms, simulations, emulations, design, hardware, software, hardware-software interaction and integration, measurements, testing, commissioning and exploitation. WILGA also addresses new research tendencies like 3D photonics and electronics design, micro- and nano-systems, material engineering including meta-materials.

Topical sessions are organized by leading experts. Sessions usually begin with current tutorials and are filled with contributed papers by students and young researchers. One of the most important session tracks in WILGA are photonics applications and systems for superconductive accelerator (and free electron laser) technology and high energy physics experiments. We warmly invite students, young researchers, and their tutors to participate in WILGA.

WILGA 28th: The WILGA 2011 Symposium January edition was held 28–30 January 2011 at WUT's FE&IT. WILGA 2011; the May edition took place 23–29 May 2011 in a resort owned by Warsaw University of Technology. Nearly 200 presentations were presented during both editions of Wilga, covering a broad area of photonics applications and web engineering, and nearly 250 persons participated. An exceptionally efficient chair of the Organization Committee of WILGA 2011 was Dr Maciek Linczuk [M.Linczuk@elka.pw.edu.pl].

The working research sessions of 28th WILGA 2011 were: general photonics, optical fiber technology, optical communications, optoelectronics, applications of optical fibers, integration of electronics, photonics and mechatronics, distributed measurement systems, LHC and CMS at CERN, optics and optoelectronics for astronomy, fundamentals of FPGA-DSP systems, object oriented design of hardware, terabit optical data links, software-hardware co-design, biomedical engineering, computational intelligence of advanced systems, development of photonics and electronics in Europe and Poland, radar technology, terahertz photonics, etc.

WILGA 2011 - SPIE-PSP award for the best student paper presentation: The WILGA 2011 Award Committee was managed skillfully by Dr Ryszard Kossowski of WUT [kossowski@ia.pw.edu.pl]. The awards were a single category intended for students having just finished their M.Sc (including B.Sc.) degrees. The winners of SPIE-PSP WILGA 2011 competitions, and the titles of their presentations were: M.Sc. and B.Sc. category: 1 – Robert Plaga, Faculty of Physics WUT, "Fiber optic structures for dynamic stress sensing"; 2 – Tomasz Janicki, PERG-ELHEP-ISE Lab., "FPGA mezzanine card DSP module," (prepared with Ph.D. student Radoslaw Cieszewski); 3 – Krzysztof Sielewicz, PERG-ELHEP-ISE Lab., "Intelligent thermal imaging camera with network interface." The winning papers are published in this volume.

WILGA offsprings: The WILGA Symposium gave birth to a few topical meetings and conferences which then flourished on their own. These include student regional meetings (Opole, Wrocław, Kielce, Białystok, Lublin, Toruń and other), of SPIE student chapters, IEEE student branches, but also stand-alone conferences. Some of these meetings are still held periodically with Wilga, while some of them gained complete independence. WILGA is very proud of this sort of partnership, since the very good idea of WILGA is proliferating elsewhere. One of such meetings is, now fully independent, SPS – Signal Processing Symposium which started at Wilga in 2003.

SPIE – PSP WILGA 2012: The organizers of WILGA 2012 Symposium, to be held on 28 May – 03 June 2012, warmly invite interested young researchers and students in photonics and related fields to participate in this exceptional and very friendly research event oriented to host young researchers from Poland and all over Europe.

References

1. **WILGA 2002:** R.S.Romaniuk, K.T.Poźniak (editors), Proc. SPIE **5125**; Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments; ISBN 9780819449856; 472 pages, 55 papers; (2003)
2. **WILGA 2003:** R.S.Romaniuk (editor), Proc.SPIE **5484**; Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments II; ISBN 9780819454157; 734 pages, 94 papers; (2004)
3. **WILGA 2004:** R.S.Romaniuk (editor). Proc. SPIE **5775**; Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments III; ISBN 9780819457561; 710 pages, 92 papers; (2005)
4. **WILGA 2005:** R.S.Romaniuk, S.Simrock, V.M.Lutkovski (editors), Proc. SPIE **5948**, Photonics Applications in Industry and Research IV; ISBN 9780819459558; 864 pages, 89 papers; (2005)
5. **WILGA 2005:** R.S.Romaniuk (editor), Proc. SPIE **6159**; Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments 2005; ISBN 9780819462114; 1244 pages, 172 papers; (2006)

6. **WILGA 2006:** R.S.Romaniuk (editor), Proc. SPIE **6347**; Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments 2006; ISBN 9780819464316; 874 pages, 111 papers; (2006)
7. **WILGA 2007:** R.S.Romaniuk (editor), Proc. SPIE **6937**; Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments 2007; ISBN 9780819471246; 1274 pages, 152 papers; (2008)
8. **WILGA 2008:** R.S.Romaniuk, T.R.Woliński (editors), Proc. SPIE **7124**; Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments 2008; ISBN 9780819473585; 312 pages, 35 papers; (2008)
9. **WILGA 2009:** R.S.Romaniuk, K.S.Kulpa (editors), Proc. SPIE **7502**; Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments 2009; ISBN 9780819478139; 786 pages, 100 papers; (2009)
10. **WILGA 2010:** R.S.Romaniuk (editor), Proc. SPIE **7745**; Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments 2010; ISBN 9780819482358; 626 pages, 73 papers; (2010)
11. **WILGA 2011:** R.S.Romaniuk (editor), Proc. SPIE **8008**; Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments 2011; ISBN 9780819485823; 614 pages, 71 papers; (2011)
12. J.Doros, R.Romaniuk, The role of regional developments in optical fiber technology and photonics, Proc. SPIE 5028, 2003, pp.xi-xii
13. R.Romaniuk, K.Pozniak, Foreword: Photonics and electronics for astronomy and high energy physics experiments in Poland, Proc.SPIE 5125, 2002, pp.xiii-xxxiv
14. W.Woliński, Z.Jankiewicz, R.Romaniuk, Proceedings of SPIE – The International Society for Optical Engineering: Introduction, Proc. SPIE 5230, 2003, pp.ix-x
15. R.Romaniuk, Proceedings of SPIE – The International Society for Optical Engineering: Introduction, Proc. SPIE 5775, 2005, pp.xxi-xxvii
16. R.Romaniuk, Proceedings of SPIE – The International Society for Optical Engineering: Introduction, Proc. SPIE 5848, 2005, pp.xvii-xxi
17. R.Romaniuk, Proceedings of SPIE – The International Society for Optical Engineering: Introduction, Proc. SPIE 6347, 2006, pp.xxix-xxxii
18. W.Wolinski, Z.Jankiewicz, R.Romaniuk, Proceedings of SPIE – The International Society for Optical Engineering: Introduction, Proc. SPIE 6598, 2007, pp.ix-xii
19. R.Romaniuk, Proceedings of SPIE – The International Society for Optical Engineering: Introduction, Proc. SPIE 6937, 2008, pp.xxix-xli
20. W.Woliński, Z.Jankiewicz, R.Romaniuk, Proceedings of SPIE – The International Society for Optical Engineering: Introduction, Proc. SPIE 5229, 2003, pp.xi-xii
21. J.Doros, R.Romaniuk, T.Wolinski, Eleventh conference on optical fibers and their applications, Proc. SPIE 7120, 2008, pp.xiii-xv
22. R.Romaniuk, K.Kulpa, Photonics applications in Astronomy, Communications Industry and High-Energy Physics Experiments 2009: Introduction, Proc. SPIE 7502, 2009, art no 750201, pp.xxiii-xxiv
23. R.Romaniuk, Photonics and Web Engineering in Poland, WILGA 2009, Proc. SPIE 7502, 2009, art no. 750202
24. R.Romaniuk, WILGA Symposium on photonics applications, Photonics Letters of Poland 1 (2), 2009, pp.46-48

25. R.S.Romaniuk, Wilga 2010, Photonics Applications, Proc.SPIE 7745, pp.xiii-xviii, 2010
26. R.S.Romaniuk, Wilga 2011, Photonics Applications, Proc.SPIE 8008, pp.xiii-xvii, 2011

Ryszard S. Romaniuk
Institute of Electronic Systems
Warsaw University of Technology (Poland)
WILGA Symposium Chair (SPIE, PSP)

