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POLAND CHAPTER

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POLISH SPIE CHAPTER

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SPIE Int. Congress on Optics and Optoelectronics SPIE-COO, Warsaw '05



**Warsaw University of Technology,
Warsaw, Poland
28 August - 2 September 2005**

Congress Chairs:

Tomasz R. Wolinski, SPIE-PL President
Warsaw University of Technology, Poland

Donald C. O'Shea, SPIE Past President
Optical Engineering Editor
Georgia Institute of Technology, USA

Hugo Thienpont, SPIE Photonics
Europe 2004 Chair Vrije Universiteit
Brussel, Belgium

Honorary Committee:

Malgorzata Kujawinska, SPIE President
Elect

Warsaw University of Technology, Poland

Stanislaw Mankowski, Rector Warsaw
University of Technology, Poland

Wieslaw Wolinski, Associate Member
Polish Academy of Sciences, Poland

The SPIE's Congress in Warsaw will aim to integrate scientists from West, Central, East Europe, and overseas, as well as to cover hot scientific topics in modern optics and optoelectronics. Since every event has its beginning, we believe that the Congress will be the first from a new series of SPIE's conferences organized by different Central and East European SPIE Chapters, each odd year (2005, 2007, 2009, etc.).

Congress Topical Meetings/Conferences:

SPIE-COO Warsaw 2005 will consist of several internationally recognized conferences/topical meetings that originally have been organized and/or cosponsored by the Poland Chapter of SPIE throughout the last decade plus Hot Topics.

Invitation Letter from Prof. Tomasz R. Woliński

Present your research in Warsaw!

Optics and Optoelectronics have a long research tradition in Poland. From the very beginning, they have been promoted by the Polish Physical Society, Polish Academy of Sciences, and the Committee on Optoelectronics of the Association of Polish Electrical Engineers.

In September 1988, the Poland Chapter of SPIE, the first European Chapter, was inaugurated in Warsaw. Since then, the Poland Chapter has organized and cosponsored numerous international conferences, and edited nearly 100 volumes of Proceedings of SPIE. Based on this experience, the optics and optoelectronics community in Poland has decided to focus all its conference activities in the year 2005 on one great event – SPIE's International Congress on Optics and Optoelectronics (COO).

This 2005 COO will consist of 14 internationally recognized conferences – most of them were originally organized by the Poland Chapter of SPIE throughout the last decade. A special session on Hot Topics in Optoelectronics will be a highlight of the meeting.

The year 2005 commemorates not only the 100th anniversary of Albert Einstein's papers on the special theory of relativity and the 50th anniversary of SPIE, but it is also the year in which Prof. Malgorzata Kujawinska, our colleague from the Poland Chapter, is taking leadership as the SPIE President.

The Warsaw University of Technology (WUT), founded in 1826, is one of the largest institutions of higher education in Central Europe, and is the largest university of technology in Poland. Its renovated historical Main Building from the 19th Century located in the center of Warsaw is in the vicinity of the hotels specially selected for the meeting attendees. Among the distinguished scientists who developed optics at the WUT was Prof. Mieczyslaw Wolfke (1883–1947), a forerunner of holography and Prof. Bohdan Karczewski (1930-1978), who in the late 1960s belonged to the "School of Optics" associated with the world-class Polish scientist Prof. Adalbert (Wojciech) Rubinowicz (1889–1974), one of the founders of quantum theory of radiation and theory of diffraction ("Rubinowicz-Kirchhoff diffraction integral").

Poland, the largest country that joined the European Union on 1st May 2004 has been for ages the place in Europe where East met West. Warsaw, its capital city located in the heart of the country and totally destroyed during World War II, has since been beautifully rebuilt. Today, Warsaw is the most cosmopolitan, dynamic and progressive of all Poland's cities, with many luxurious hotels, elegant shops but also with its remarkable historical places.

Please join us for this exciting new meeting where established optics/optoelectronics giants are challenged by dynamically emerging markets from newly admitted European Union countries. We would like to share with you new scientific ideas, and also create business opportunities for potential investors in this part of the world. Perhaps most important, we would like you to experience more than 1,000 years of Polish history and culture along with traditional Polish hospitality.

You will be most welcome in our country.

Tomasz R. Wolinski

HOT TOPICS IN OPTOELECTRONICS

- *Photonic Crystal Fibers and Their Applications*, Phillip S. J. Russell, Univ. of Bath (United Kingdom)
- *Linear and Nonlinear Discrete Optics*, George I. Stegeman, CREOL/Univ. of Central Florida (USA)
- *Left-handed materials in a complex world*, Allan D. Boardman, Univ. of Salford (United Kingdom)
- *Distributed feedback lasing in liquid crystalline materials*, Peter Palffy-Muhoray, Kent State Univ. (USA)
- *Negative index materials: new frontiers in optics*, Costas M. Soukoulis, FORTH (Greece) & Iowa State Univ. (USA)
- *Strategy and policy for photonics in the next European Research Programme*, Ronan Burgess, Henri J. Rajbenbach, European Commission, Directorate General Information Society (Belgium)
- *Quantum cascade lasers: from bandstructure engineering to commercialization*, Federico Capasso, Harvard Univ. (USA)
- *Low coherence measurement and imaging techniques*, Adolf F. Fercher, Medical Univ. of Vienna (Austria)
- *Third-generation sensors for night vision*, Paul R. Norton, U.S. Army Night Vision & Electronic Sensors Direct (USA)
- *Integrated optical sensors for the chemical domain* Paul V. Lambeck, Univ. of Twente (Netherlands)
- *Publishing optics*, Donald C. O'Shea, Editor, Optical Engineering, Georgia Institute of Technology (USA)

1. Liquid Crystal Optics and Applications (LCOA)

CHAIRS:

Tomasz R. Wolinski (*Warsaw Univ. of Technology, Poland*)

Marc Warengem (*LPCIA Univ. d'Artois, France*)

Shin-Tson Wu (*College of Optics and Photonics, Univ. of Central Florida, USA*)

This conference on Liquid Crystals Optics and Applications (LCOA) will be eighth in a series of International Liquid Crystals (LCs) conferences organized in Poland since 1990, under the umbrella of SPIE/Poland Chapter. The conference aims to provide an international forum for exchange of scientific ideas and technological advances in applied optics and related aspects of LCs research through the participation of scientists, researchers and engineers active in the field from all over the world. The conference program will be focused on topics that are currently subject of intense research efforts in view of perspective applications, e.g. LC photonics and photonic bandgap structures; LC fibers and waveguides; holography and lasing in LCs; new display and non-display applications of LCs, and much more. Research in this field continues to expand and becomes more diverse, but basic challenges still remain. Original submissions that will address new or improved applications in many industrial and scientific areas will be especially welcome. The conference program will consist of oral and poster presentations on topics that include, but are not limited to:

- New optical effects in liquid crystals of potential applications
- Chiral phases, ferroelectric and antiferroelectric liquid crystals
- Electro- and thermo-optical effects
- Polymer liquid crystals
- Liquid crystal composite structures and their applications
- Liquid crystal fibers, waveguides and photonic structures
- Tuning with liquid crystals and light
- Display devices and applications
- Telecom and sensing applications
- Nonlinear optics, photorefractivity, lasing and spatial solitons in liquid crystals
- Holography in liquid crystals

2. Photonics Applications in Industry and Research (PA-IV)

CHAIRS:

Ryszard S.Romaniuk (*Warsaw Univ. of Technology, Poland*)

Stefan Simrock (*DESY, Hamburg, Germany*)

Vladimir Lutkovski (*Belarus State Univ., Minsk, Belarus*)

The Conference on Photonics Applications, which will be the fourth in a series, is a major event in this geographical region. The photonics applications include mainly, but are not limited to the following fields: astronomy, communications, industry, environmental and municipal engineering, transport engineering, oil and mining, airborne and marine, safety technologies, lighting and high energy physics experiments, including accelerator development. These fields are among the biggest benefactors of recent developments in the photonics and especially of practical, applied side of the current research. The conference traditionally gathers a large audience from the young and aggressively contributing research community active in the industrial, military, physics, environmental and research fields and originating from the business, research, academia, trade and applications fields. This broad combination of participants and, thus, the moved subjects make out of this conference a unique wide forum for experience exchange between the adjacent yet supplementing fields. The conference program will consist of oral and poster presentations on topics that include, but are not limited to:

- Electronic and photonic systems for accelerators and free electron lasers
- Electronic and photonic equipment for astronomy
- Photonics and electronics in adverse environments
- Multi-system integration: photonics, electronics and mechatronics
- FPGA integration with multi-gigabit optical transmission
- Functional integration between hardware and software in photonic systems
- Environmental applications of photonic and electronic systems
- Photonics in communications, optical networks, and terabit internet
- Optical computing and photonic switching applications

3. Nonlinear Optics Applications (NOA)

CHAIRS:

Mirosław Karpierz (*Technical Univ. of Szczecin, Poland*)

Allan Boardman (*Univ. of Salford, UK*)

George Stegemann (*CREOL, School of Optics, Univ. of Central Florida, USA*)

International Workshops on Nonlinear Optics Applications have been organized since 1992 by Warsaw University of Technology and Technical University of Szczecin. This NOA Conference is treated as the VIIIth in the series. The purpose of the conference is to provide a forum for both senior and young scientists from different countries to present and discuss current research problems. The conference deals with experimental and theoretical aspects of nonlinear optics applications including all types of nonlinear materials, effects and devices. Usually the main interest is focused on nonlinear guided wave optics, optical solitons in different media, and its applications for optical switching and processing. However, the conference is widely open to related photonic phenomena, and is not strictly classified as a subject of nonlinear optics, such as magneto-optic effects. The conference program will consist of oral and poster presentations on topics that include, but are not limited to:

- Nonlinear fiber effects
- Nonlinear pulse propagation and temporal solitons
- Self-trapping, self-guiding effects and spatial solitons
- Spatio-temporal nonlinear effects
- Waveguide arrays and discrete spatial solitons
- Nonlinear effects in periodic structures
- Nonlinear fiber-optic and integrated devices
- Optical switching and processing
- Nonlinear component modeling
- New nonlinear materials

4. Photonic Crystals and Fibers (PCF)

CHAIRS:

Wacław Urbanczyk (*Wrocław Univ. of Technology, Poland*)

Bożena Jaskorzynska (*Royal Institute of Technology, Stockholm. Sweden*)

Phillip Russell (*Univ. of Bath, United Kingdom*)

This conference will focus on the latest developments in the area of 1D, 2D, and 3D photonic structures, with special emphasis on photonic crystal fibers and photonic integrated circuits. The scope of the meeting is broad, covering fundamental physics, new phenomena, material properties, fabrication technologies, device design, modeling and characterization methods. Emerging industrial and scientific applications of photonic crystal devices will also be covered. Furthermore, the conference will provide a possibility for interchange of expertise and new ideas between the participants. The conference program will consist of oral and poster presentations on topics that include, but are not limited to:

- Fiber gratings
- Photonic crystal circuits for integrated optics
- Photonic crystal fibers
- 3-D photonic crystals
- Nonlinear phenomena in photonic crystal structures
- Light generation and amplification in photonic crystal structures
- Photonic crystal components and subsystems for optical telecom
- Photonic crystal active and passive waveguide components
- Photonic crystal components for sensing applications
- Modeling methods and computational algorithms
- Disorder and fabrication tolerances in photonic crystal structures

5. Optical Fibers I: Technology (OFT)

CHAIRS:

Jan Rayss (*Maria Curie-Sklodowska Univ., Lublin, Poland*)

Brian Culshaw (*Univ. of Strathclyde, Glasgow, United Kingdom*)

Anna Grazia Mignani (*CNR – Institute of Applied Physics “Nello Carrara”, Florence, Italy*)

Development of optical fibers technology promotes various base elements of photonics and microoptics. We hope that the presentation of current possibilities of widely understood technology of optical fibers and elements of optical fibers technique as well as direct discussion in the research teams dealing with modelling, prototyping and production of new types passive and active optical fibers for telecommunication and special applications will stimulate optical fibers optoelectronics in the European Community. It is also anticipated that the theory and practice concerning the new materials for optical fibers technology and new optoelectronics elements and devices manufacturing will be discussed. The conference program will consist of oral and poster presentations on topics that include, but are not limited to:

- New technologies for telecommunication optical fibers
- Technologies of active and passive fiber optics components
- Fiber Bragg gratings manufacturing
- Materials and technologies of microstructured fibers (photonic crystal fibers incl.)
- Liquid core and liquid crystals fibers technology
- Materials and technologies for integrated optical and photonic circuits
- Technology of optical fibers for optical amplifiers, fiber lasers and high energy transmission
- Sol-gel materials for fiber optics and optoelectronics
- Technology of special optical fibers (highly birefringent, photosensitive, polarising, nonlinear, etc)
- Fibers and cables for security systems
- Raw materials for optical fibers technologies
- Polymer, hermetic and optical coatings for fibers and integrated optics
- “Exotic” shapes and properties of optical fibers, capillaries and structures

6. Optical Fibers II: Applications (OFA)

CHAIRS:

Leszek R. Jaroszewicz (*Military Univ. of Technology, Warsaw, Poland*)

Brian Culshaw (*Univ. of Strathclyde, Glasgow, United Kingdom*)

Anna Grazia Mignani (*CNR – Institute of Applied Physics “Nello Carrara”, Firenze, Italy*)

The application aspect of optical fibers originates from telecommunication and has been developed for more than 25 years. In the last two decades, however, some other areas of the optical fiber applications have been intensively developed. All of them are based on the fundamental principle of the optical fiber operation – light waveguiding in a closed, flexible medium protected from environmental influences or making it more sensitive to a chosen interaction. Such an approach to optical fibers amplifies technical usefulness in each area starting from transmission of optical signals and high optical power, through different sensors applications (interferometric, polarimetric, intensity and other types), up to operation with images and spectroscopic signals. Because some other SPIE-COO conferences are directed towards optical fiber technology (OFT), integrated optics (IOTA) and photonic fibers (PCF), this conference is designed only for applications of optical fibers. Thus, the objective of this conference is to provide an opportunity to get a broad overview of the field by covering a wide range of concepts, devices designs, theory and applications. The conference program will consist of oral and poster presentations on topics that include, but are not limited to:

- Optical fiber applications as point sensors
- Optical fiber applications as distributed sensors
- Optical fiber interferometry and polarimetry
- Optical fiber applications in smart structures and smart materials
- Chemical, environmental, biochemical and medical applications of optical fibers
- Imaging and spectroscopy applications of optical fibers
- New telecommunication applications of optical fibers
- Active and passive fiber optic components
- New concept of optical fiber theory

7. Acousto-Optics and Photoacoustics (AOPA)

CHAIRS:

Antoni Sliwinski (*Gdansk Univ. of Technology, Poland*)

Rainer Reibold (*Physikalisch-Technische Bundesanstalt, Braunschweig, Germany*)

Vitali Voloshinow (*Moscow State Univ., Russia*)

This conference will be concerned with all physical and technological aspects of light and sound interactions mainly in ultrasonic and hypersonic range covering basic physics of ultrasonic light diffraction in Raman-Nath and Bragg as well as in the intermediate regimes, new phenomena, new materials and their properties, fabrication technologies, modeling, acoustooptical devices designing and characterization. Traditionally photoacoustic spectroscopy and related problems will be included in the programme. Submissions which address potential applications in modulation of light, acoustooptical filtering and other ways of signal processing in areas including telecommunications, astronomy, non-destructive evaluation, acoustical microscopy, acousto-optical and photoacoustic spectroscopy and related topics are sought to be presented and will be kindly welcome. It is anticipated that the international community dimension will be reflected in both invited and contributed presentations. The conference program will consist of oral and poster presentations on topics that include, but are not limited to:

- Physical principles of acoustooptics
- Raman-Nath and Bragg diffraction
- Acoustooptic devices for signal processing (modulators, switches, transducers and other elements in integrated optics)
- Acoustooptic devices (modulators, switches, transducers, etc.)
- Non-destructive testing
- Non-linear acoustooptical interactions
- Photoacoustic spectroscopy (methods and applications)

8. Systems of Optical Security (SOS)

CHAIRS:

Zbigniew Jaroszewicz (*Institute of Applied Optics, Warsaw, Poland*)

Sergei Yu. Popov (*Royal Institute of Technology, Kista, Sweden*)

Frank Wyrowski (*Friedrich-Schiller-Univ., Jena, Germany*)

The present SOS conference will be already fourth in the series and, similarly like the previous ones, will be concerned with applications of optics in health monitoring, biomedicine, environmental sensing and public safety protection. The number of research papers, new discoveries, as well as ready-to-use techniques in this field continues to grow and become more diverse, but the whole subject still remains far from being concluded. The main purpose of the meeting will be to reflect the present state of research in this field and a reasonable overview of both proven, as well as expected applications of optical systems in widely understood security systems. It is anticipated that the international dimension of the meeting will be reflected in both invited and contributed presentations. The conference program will consist of oral and poster presentations on topics that include, but are not limited to:

- Optical/optoelectronic systems for detection, recognition and identification
- Biochemical, and biomolecular sensing
- Biometrics
- Environmental sensing and monitoring
- Transportation control
- Inspection systems for industrial processes
- Safety and health care
- Novel concepts in counterfeit deterrence
- Cryptography
- Watermarking

9. Metamaterials (MM)

CHAIRS:

Tomasz Szoplik (*Warsaw Univ., Poland*)

Ekmel Ozbay (*Bilkent Univ., Turkey*)

Costas Soukoulis (*FORTH, Heraklion, Greece & Ames Lab., Iowa State Univ., USA*)

Nikolay Zheludev (*Univ. of Southampton, United Kingdom*)

This conference will provide an insight into interactions of electromagnetic waves with artificial materials of wavelength and sub-wavelength scale structure. Modeling and fabrication technologies of metamaterials in microwave, infrared and visible spectral range will be the main focus. Submissions devoted to the concepts of new devices based on negative refraction materials with potential use in the fields of photonics, plasmonics and microwave technology are especially encouraged. In the conference programme there will be invited talks delivered by top notch experts in the field including that by Victor G. Veselago, who has coined the term left handed media, as well as contributed presentations. The conference is supported by the European 6FP Network of Excellence METAMORPHOSE (Metamaterials organized for radio, millimeter wave, and photonic superlattice engineering). The conference program will consist of oral and poster presentations on topics that include, but are not limited to:

- Metallic and dielectric 1D, 2D and 3D nano and microstructures for microwave and optical applications
- Metamaterials based on magneto-optic effects
- Chiral structures
- Electrically controllable, tunable and smart materials
- Plasmonics
- Individual nanoparticles and nanoparticle films
- Optical properties of effective media
- Non-linear optical phenomena in complex media
- Metamaterials in middle and near infrared spectral range
- Device applications of metamaterials
- Modeling of metamaterials
- Novel concepts in metamaterials

10. Integrated Optics : Teory and Applications (IOTA)

CHAIRS:

Tadeusz Pustelny (*Silesian Univ. of Technology, Gliwice, Poland*),

Paul Lambeck (*Univ. of Twente, Enschede, The Netherlands*),

Christopher Gorecki (*Univ. de Franche-Comte, Besancon, France*)

This conference intends to provide a forum to discuss the latest development related to research and technology in the segments of integrated optical circuits and photonic integrated circuits. Topics to be discussed will include: problems of dielectric optical waveguides and integrated circuits, problems of theory and modeling of integrated optic systems and the possibility of the application of integrated optic systems in telecommunication, metrology and sensor techniques. The conference program will consist of oral and poster presentations on topics that include, but are not limited to:

- Dielectric waveguides and integrated circuits
- Active and passive waveguide components, modulators and switches
- Integrated planar waveguides
- Materials and fabrication technology for integrated optical and photonic circuits
- Characterization of linear and nonlinear optical waveguide devices
- Integrated optical circuits for optical signal processing
- Optical system and network modeling
- Models for integrated photonic circuits
- Numerical and semi-analytical methods for the modeling of guided-wave optics, active, passive and nonlinear components
- Components and subsystems for optical telecommunications
- Components and circuits for optoelectronic sensors
- Photonic components for microwave systems
- Nonconventional application of optoelectronic integrated circuits and photonic integrated circuits

11. Infrared Photoelectronics (IPH)

CHAIRS:

Antoni Rogalski (*Military Univ. of Technology, Warsaw, Poland*)

Eustace Dereniak (*Univ. of Arizona, Tucson, USA*)

Fiodor F. Sizov (*Institute of Semiconductors, Kiev, Ukraine*)

The focus of this conference is on recent developments and future directions in the materials and devices for infrared applications. Papers should address many aspects and recent advances in material science including fundamental material properties and processes, detector device structures and results. The materials of interest include standard materials such as mercury cadmium telluride, indium antimonide, extrinsic silicon, as well as semiconductor superlattices and quantum wells, microbolometers, pyroelectrics, and other novel concepts. Special attention is directed towards focal plane arrays fabricated with different materials as well as integrated circuits of readout electronics. Also, the challenges facing multicolour devices (third generation detectors) should be considered. An objective of this conference is to provide an opportunity to get a broad overview of the field by covering a wide range of infrared spectrum, materials, device designs, and applications. This diversity of topics has been chosen to encourage the exchange of ideas between different infrared detector disciplines. The conference program will consist of oral and poster presentations on topics that include, but are not limited to:

- Infrared optoelectronic materials (semiconductors, pyroelectric, multilayered materials, growth processes: MOCVD, MBE, LPE, etc.)
- Physics of materials (characterization: structural, electrical, and optical, low dimensionality, new device-related phenomena)
- Semiconductor detectors and focal plane arrays
- Thermal detectors and focal plane arrays
- Microelectronics for thermal imagers
- New trends and recent achievements in infrared photoelectronics

12. Lasers and Applications (LA)

CHAIRS:

Krzysztof Abramski (*Wrocław Univ. of Technology, Poland*)

Victor Apollonov (*General Physics Institute of Russian Academy of Sciences, Moscow, Russia*)

Antonio Lapucci (*Instituto Nazionale di Ottica Applicata, Firenze, Italy*)

This conference will be dealt with new ideas of laser physics, laser technology and laser applications. The recent progress in development of all basic types of lasers will be reviewed. All aspects of laser oscillation, excitation, spectral analysis of laser output, laser beam formatting, pulse operation will be considered. Particularly new generation of fiber lasers and ultra-short pulse lasers and new laser applications in metrology and technology are welcome. The conference program will consist of oral and poster presentations on topics that include, but are not limited to:

- Solid state lasers (diode pumped, microchip, high power, mode-locked)
- Semiconductor lasers (signal lasers, high power lasers, laser arrays)
- Gas lasers (atom, ion, molecular, metal vapour, excimer, fast flow)
- Fiber lasers
- Short pulse lasers
- Chemical lasers
- Laser applications (metrology, technology, industry)

13. Medical Imaging (MI)

CHAIRS:

Andrzej Kowalczyk (*Nicolaus Copernicus Univ., Toruń, Poland*)

Adolf F. Fercher, (*Medical Univ. of Vienna, Austria*)

Valery V. Tuchin (*Saratov State Univ., Russia*)

Medical imaging conveys morphological and functional information on living tissues and is very useful for diagnostics and monitoring a wide spectrum of pathologies. Optical methods are particularly valuable because of non-contact and non-invasive characteristics. There are several relatively well established technologies like microscopy as well as these based on the interference of low coherent light (OCT), diffusion of photons (DCT) or emission of luminescent probes. Recently, new modalities which combine optics with ultrasound (optoacoustic tomography) or with spectroscopy (CARS, CARS-OCT) have been proposed. The conference goal is to provide a forum for discussion between researchers, applied scientists, clinicians and students. Contributions in conventional and novel applications of optics and optoelectronics in medical imaging ranging from physical principles and specific techniques through data processing are invited. The conference program will consist of oral and poster presentations on topics that include, but are not limited to:

- Physics of medical imaging
- Physiology, function, and structure from medical images
- New concepts in medical imaging
- Optical sensors in medicine
- Modeling and simulations in medical imaging
- Image processing
- Picture archiving and imaging informatics