West Lake Photonics Forum &Ph.D Student Symposium 2014 Program

October 30 – November 1, 2014

Zhejiang University
Hangzhou, China
2014

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Welcome Message

We are pleased to invite you to participate in the 2014 West Lake Photonics Forum, being held Oct 30 through 1 Nov 2014. Our sincere wish is for you to join us for this opportunity in beautiful Hangzhou, where we will meet at Zhejiang University, the birthplace of optical engineering in China.

The West Lake Photonics Forum aims at gathering the worldwide leaders in optics and photonics. The forum will feature discussion on the social and economic impact of photonics, the challenges in the field of optics and photonics, the research and development directions in next 20 years, and the future of photonics.

Zhejiang University, one of the leading comprehensive research universities in China, is proud to be the organizer of this event. With strong commitment as a truly international university featuring academic distinction, we attach great emphasis on working with our global partners to strive for international excellence.

The city of Hangzhou, where the University is located, is well-known for its West Lake cultural landscape, which was inscribed on UNESCO's World Heritage List in 2011. The Grand Canal, inscribed on UNESCO's World Heritage List in 2014, is a vast waterway system in the north-eastern and central-eastern plains of China, also starting from Hangzhou. We truly hope to welcome you in Hangzhou, the paradise city in China.

Schedule

2014.10.30 Thursday, Room 301, 3rd Building, Yuquan Campus

Session Chair: Xu Liu

08:45 Opening Ceremony & Official Establishment Ceremony of International Joint Research Laboratory of Photonics

09:15 Sune Svanberg：Photonics Sensors based on Spectroscopy – The Present and the Future

10:00 Yuen-Ron Shen：Laser Spectroscopy for Materials Science

10:45 Photo + Tea Break

11:15 Lars Thylén：Integrated nanophotonics in the 21st century: Status, prospects and requirements for large scale applications

12:00 Lunch break

Session Chair: Limin Tong

14:00 Xi-Cheng Zhang：Passion in THz Wave Science and Technology

14:45 Fredrik Laurell：Solid-state Lasers and Nonlinear Optics – Present Status and Future Development

15:30 Tea break

15:50 Qihaung Gong：Manipulating light at Micro/Nano-Scale

Moderator: Xi-Cheng Zhang
Session Chair: Min Qiu

16:30 Panel Discussion

Evening International Joint Research Laboratory of Photonics Academic Advisory Committee meeting

Schedule

2014.10.31 Friday, Room 301, 3rd Building, Yuquan Campus

Session Chair: Min Qiu

09:00 Zhiyuan Li： Manipulating Plasmonic Wavefront and Light-Matter Interaction in Metallic Nanostructures

09:45 Thomas L. Koch： Photonic Integration: Past, Present and Future

10:30 Tea break

10:50 Paul Urbach： Optimized Focused Spots for Sensing and Manipulation

12:00 Lunch break

Session Chair: Zhiyuan Li

13:00 Katarina Svanberg： Applications of Laser Spectroscopy to Meet Challenges in Medicine

13:30 Hiroshi Yoshikawa： Computer-generated holography for 3D display

14:00 Hui Liu： Trapping Light by Mimicking Gravitational Lensing

14:30 ZHANG Xiaogang: An all-optical locking of a semiconductor laser to the atomic resonance line with 1 MHz accuracy
(State Key Laboratory of Advanced Optical Communication and System Network, Institute of Quantum Electronics, School of Electronics Engineering and Computer Science, Peking University)

14:50 ZHANG Xin: Microscopic analysis of surface Bloch modes on periodically perforated metallic surfaces and their relations with the extraordinary optical transmission
(Nankai University)

15:10 XIU Peng: Controllable High-speed Tomography Phase Microscopy
(State Key Laboratory of Modern Optical Instrumentation, Department of Optical Engineering, Zhejiang University)

15:30 Tea break

15:50 HOU Maoxiang: Sensitivity-enhanced Pressure Sensor with Hollow-core Photonic Crystal Fiber
(Huazhong University of Science and Technology)

16:10 YE Shengwei: Electro-absorption optical modulator using dual-graphene-on-graphene configuration
(University of Electronic Science and Technology of China)

16:30 WANG ShuChang: High-Performance GaN-Based Light-Emitting Diodes on Patterned Sapphire Substrate with a Novel Patterned SiO2/Al2O3 Passivation Layer
(Southeast University)

2014.11.1 Saturday, Room 301, 3rd Building, Yuquan Campus

Session Chair: Katarina Svanberg

09:00 WU Gaofeng: Correlation of intensity fluctuations with random electromagnetic beams
(Soochow University)

09:20 ZHANG Lei: Selected Topics on Advanced Optical Interferometry
(State Key Laboratory of Modern Optical Instrumentation, Department of Optical Engineering, Zhejiang University)

09:40 LUO Haipeng : Microfiber based In-line Mach-Zehnder interferometer for dual-parameters measurement
RAN Yanli: Vibration Fiber Sensors Based on SM-NC-SM Fiber Structure
(School of Optical and Electronic Information, National Engineering Laboratory for Next Generation Internet Access System, Huazhong University of Science and Technology)

10:00 YANG Chenying: High angular tolerant color filters based on subwavelength grating structures
(State Key Laboratory of Modern Optical Instrumentation, Department of Optical Engineering, Zhejiang University)

10:20 ZHANG Shengnan: A Potassium Atom Four-Level Active Optical Clock Scheme
(State Key Laboratory of Advanced Optical Communication and System Network, Institute of Quantum Electronics, School of Electronics Engineering and Computer Science, Peking University)

10:40 Tea break

11:00 QI Zhipeng: Inductively coupled plasmas etching of PZT thin films for fabricating optical waveguides
(School of Electronic Science and Engineering, Advanced Photonics Center, Southeast University)

11:20 CHEN Yahong: Modulating the Correlation Structure of a Laser beam
(School of Physical Science and Technology& Collaborative Innovation Center of Suzhou Nano Science and Technology, Soochow University)

11:40 LIU Xiaowei: Control and Optimization of Parameters of Semiconductor Nanowires Lasers
(State Key Laboratory of Modern Optical Instrumentation, Department of Optical Engineering, Zhejiang University)

12:00 Lunch break

Session Chair: Lars Thylén

13:00 YANG Fan: Numerical investigation of a novel two-stage spectral compression structure employing a logarithmic DIF cascading with a HNLF-NOLM
(University of Electronic Science and Technology of China)

13:20 CHEN Sitao: Silicon Photonic Integrated Devices for On-chip (De)Multiplexing Technology
(State Key Laboratory of Modern Optical Instrumentation, Department of Optical Engineering, Zhejiang University)

13:40 LIU Weiwei: Near-resonant second-order nonlinear susceptibility in c-axis oriented ZnO nanorods
(Wuhan National Laboratory for Optoelectronics, Huazhong University of Science and Technology)

14:00 LI Xibin: Design and Dispersion Engineering of Suspended Silicon Waveguides for Mid-Infrared band Wavelength Conversion
(State Key Laboratory of Modern Optical Instrumentation, Department of Optical Engineering, Zhejiang University)

14:20 LIU Xianlong: Study of scintillation and wander of partially coherent beam in turbulent at mosphere
(Soochow University)

14:40 WANG Yuanwu: Ultra-wideband, flat and low dispersion control of slot silicon microring resonator
ZHOU Feiya: High-efficiency and large-bandwidth wavelength conversion in a slot waveguide with the periodic structure altering the phase mismatch
(School of Optical and Electronic Information, National Engineering Laboratory for Next Generation Internet Access System, Huazhong University of Science and Technology)

Invited Speeches

Topic

Photonics Sensors based on Spectroscopy – The Present and the Future

Sune Svanberg
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and
Center of Optical and Electromagnetic Research, South China Normal University
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The rapid development of photonics and photonic devices has brought about a revolution in many areas of basic and applied science. Optical sensors extend the endurance and the response in time and wavelength of the human eye. In order to access the biomedical and environmental spheres with their numerous processes, and for controlling industrial and technological procedures, sensors based on optical spectroscopy offer many attractive features, including high sensitivity and selectivity, non-intrusiveness and data availability in quasi real time. This development has been enabled by the forth-coming of cost-effective and robust laser- and LED light sources, fiber optics, imaging detectors, microprocessors and computers – a process which is continuing at an ever increasing pace. Spectroscopic sensors benefit the medical, environmental and industrial areas alike, and also offer rich applications and also research possibilities for less favored areas of our globe, an aspect of considerable strategic importance.

Based on the research experience of the presenter, illustrations of the applications of photonic spectroscopic sensors will be given in a broad overview including industrial, environmental, ecological, food safety, pharmaceutical and medical monitoring and control. An outlook for the future is also given.

Speaker

Prof. Sune Svanberg is a member of the Royal Academy of Sciences (10 years in its Nobel Prize Committee for Physics, two of which as the chairman), as well as a member of the Royal Academy of Engineering Sciences. He received his PhD in physics in 1972 at Chalmers University (Sweden). After a post-doc year at Columbia University, New York and initial work on atomic laser spectroscopy he continued laser-based spectroscopy at Chalmers up till 1980, when he became professor and head of the Atomic Physics Division at Lund Institute of Technology. In 1995 he was appointed director of the newly established Lund Laser Centre, which also gained the EC status of a European Large Scale Facility. He has been a member of the Board of Directors of the Optical Society of America and is the recipient of the first EPS Quantum Electronics Prize (1996) and recepient of the first Azko Nobel Science Award (1999). 2004 he was awarded the SKAPA Innovation Prize, and in 2005 the W.E. Lamb Award in Quantum Electronics. He is the coauthor of about 500 scientific papers and more than 20 patents and patent applications, and he helped in the formation of several spin-off companies. He is an honorary professor (bestowed by President Wei Yang in 2006) of Zhejiang Univeristy.

Invited Speeches

Topic

Laser Spectroscopy for Materials Science

Y. R. Shen
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and
Physics Department, Fudan University
Shanghai

Lasers have impacted nearly all areas of science and technology. Laser spectroscopy has revolutionized the field of atomic, molecular, and optical sciences. In materials science in general, it has also created many new venues for characterization of materials. Here, we shall briefly survey the impact of laser spectroscopy on condensed matter physics with emphasis on the more recent progress. Future prospect and potential of newly developed laser spectroscopic techniques on material studies will be discussed.

Speaker

Yuen-Ron Shen (沈元壤) is a professor emeritus of physics at the University of California, Berkeley, known for his work on non-linear optics. He was born in Shanghai and graduated from National Taiwan University. He received his Ph.D. in Applied Physics from Harvard under physicist and Nobel Laureate Nicolaas Bloembergen in 1963, and joined the department of physics at Berkeley in 1964. In the early years, Dr. Shen was probably best known for his work on self-focusing and filament propagation of laser beams in materials. In the 1970s and 1980s, he collaborated with Yuan T. Lee on the study of multiphoton dissociation of molecular clusters. The molecular-beam photofragmentation translational spectroscopy that they developed has clarified much of the initial confusion concerning the dynamics of infrared multiphoton dissociation processes. In the 1980s and 1990s, Professor Shen developed various nonlinear optics methods for the study of material surfaces and interfaces. Among these techniques, second-harmonic generation and sum frequency generation spectroscopy are best known and also widely used by scientists from various fields now. He has collaborated with Gabor Somorjai on the use of the technique of Sum Frequency Generation Spectroscopy to study catalyst surfaces. He is the author of the book The Principles of Nonlinear Optics. Professor Shen belongs to the prolific J. J. Thomson academic lineage tree. He is an honorary professor (bestowed by President Lin Jian Hua in 2014) of Zhejiang Univeristy.

Invited Speeches

Topic

Integrated nanophotonics in the 21st century: Status, prospects and requirements for large scale applications

Lars Thylén

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Integrated photonics device footprint has shrunk exponentially over the past decades, and this, and concomitant performance increase, have relied on material development and emergence of novel device concepts, to the extent that we today have what can be labeled integrated nanophotonics.

In contrast to earlier years there now exists a potential mass market for essentially silicon compatible integrated photonics, namely in optical interconnects, a development that could also greatly benefit sensor and bio applications. In order to meet the requirements of these interconnect applications, integrated photonics should be developed into a true nanophotonics technology, exhibiting low power dissipation, high functionality as well as low cost.

The talk will discuss some routes to such integrated nanophotonics in terms of existing and envisioned developments, further treat the relevant requirements as well as technology regarding materials, device structures and performance. Prospects for approaching electronics CMOS technology in terms of footprint and switch energy are discussed.

Speaker

Prof. Lars Thylén received the M. Sc. degree in Electrical Engineering and the Ph. D. degree in Applied Physics in 1972 and 1982, respectively, both from the Royal Institute of Technology (KTH) in Stockholm. From 1973 to 1982 he was with SRA Communications, working in the areas of digital electronics, digital image processing, diffraction optics and optical signal processing. From 1976 to 1982 he held a research position at the Institute of Optical Research, Stockholm, where he was engaged in research in integrated and guided wave optics, notably waveguide theory, RF spectrum analysis, and optical signal processing. In 1982 he joined Ericsson, heading a group doing research in the area of integrated photonics in lithium niobate and semiconductors and its applications to optical communications and switching. In 1985 to 1986 and in 2007 he was a visiting scientist with the Department of Electrical Engineering and Computer Sciences at the University of California, Berkeley and in the spring of 2008 at HP Laboratories, Palo Alto. He has also been a visiting scientist with the Optical Sciences Center at the University of Arizona, Tucson and in the fall of 2001 at the University of California at Santa Barbara, working on applications of quantum optics. In 1987, he was appointed adjoint professor at the Department of Microwave Engineering, Royal Institute of Technology, Stockholm. Prof Thylen was active in the inception, planning and running of the EU RACE I OSCAR project as well the pioneering RACE II MWTN (Multiwavelength transport network) project and ACTS METON project, and has given a number of invited papers on these projects. Since 1992, he is a professor at the department of Microelectronics and Applied Physics, KTH, heading the Laboratory of Photonics and Microwave Engineering. From 1992 to 1997 he was a consultant to Ericsson. From 1999 to 2002 he was program director of the Swedish Photonics Research program, supported by the Swedish Foundation for Strategic Research, and comprising KTH and Chalmers University photonics research. From 2003 to 2007 he was director of the Strategic Research Center in Photonics at KTH, funded by the Swedish Foundation for Strategic Research. Prof Thylen was active in the inception and planning of the Kista Photonics Research Center, implementing a coordinated photonics research effort in the Stockholm area. He is also one of two Chief Scientists of the Joint Research Center of Photonics of the Royal Institute of Technology and Zhejiang University (PR China), formed in 2003.

Invited Speeches

Topic

Passion in THz Wave Science and Technology

Xi-Cheng Zhang

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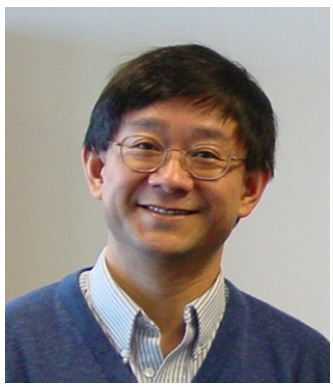
When my children asked me why I dedicated more than 25 years on THz wave related research and development, I replied that my choices were limited during the early 80s'. However, when I think back and review the recent development of broadband THz wave science and technology, I am delighted and very grateful for having had the opportunity, together with many colleagues, students, scientists, engineers, and friends, to work in this exciting field.

Speaker

Dr. Xi-Cheng Zhang graduated from Peking University in 1982 and received his Ph.D. in physics from Brown University, Providence, RI in 1986. He was a visiting scientist at MIT in 1985; 1985 to 1987, he worked in the Physical Technology Division of Amoco Research Center; 1987 to 1991, he was in the Electrical Engineering Department at Columbia University. Dr. Zhang joined Rensselaer in 1992. In 1993-94, he was an AFOSR-SRPF Fellow at Hanscom Air Force Base. He was a Distinguished Visiting Scientist at Jet Propulsion Lab - Caltech in 2006. Dr. Zhang was Professor and Acting Head of the Department of Physics, Applied Physics and Astronomy and Professor in the Department of Electrical, Computer and System, Founding Director of the Center for THz Research at Rensselaer, and co-founder of Zomega Terahertz Corp. Dr. Zhang served as Chairman of NATO Sensor and Electronics Technology Task Group (2007-2010) and Chairman of NATO Exploratory Team (2005-2006).

Dr. Zhang received 28 US patents; authored and co-authored 23 books and book chapters, 300 refereed papers; delivered 400 colloquium, seminars, invited conference presentations, and 200 contributed conference talks. His H-index = 70 (h-index is the largest number h such that h publications have at least h citations.) and i10-index=328 (i10-index is the number of publications with at least 10 citations); total citations greater than 24,400 (Google Scholar on 3/24/2014).

Dr. Zhang is a Fellow of AAAS, APS, IEEE, OSA, and SPIE. Dr. Zhang's honors and awards include: International Society of Infrared, Millimeter, and Terahertz Waves Kenneth F. Button Prize '14; OSA William F. Meggers Award '12; Moscow University Honorable Professor '12; IEEE Photonics Society William Streifer Scientific Achievement Award '11; Rensselaer's William H. Wiley Award '09; the Trustee Celebration of Faculty Achievement Awards '09, '08, '07, '06, '04, '03, '02, '01; Fellow and Lifetime Member of American Physics Society; Fellow and Lifetime Member of Institute of Electrical and Electronics Engineers; Fellow and Lifetime Member of Optical Society of America; First Heinrich Hertz Lecturer (Germany); International Commission for Optics Traveling Lecturer '03; Fellow Lecturer of Optical Society of America '02; K.C. Wong Fellow '02; Distinguished Lecturer of IEEE/LEOS '98-99 & 99-00; Rensselaer's Early Career Award, '96; Cottrell Scholar Award, Research Corporation '95; K.C. Wong Prize, K.C. Wong Foundation /Hong Kong, '95; CAREER Award (previous NSF-NYI), National Science Foundation '95; AFOSR-SRPF Fellow, Hanscom Air Force Base '93-94; Research Initiation Award, National Science Foundation, 92.



Research

Professor Zhang's research interests center around Terahertz waves, also known as T-rays, which exist within a frequency range between microwave and infrared. His research is focused on the generation, detection, and applications of free-space THz beams with ultrafast optics.

Invited Speeches

Topic

Solid-state Lasers and Nonlinear Optics – Present Status and Future Development

Fredrik Laurell

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The solid-state laser is the engine in photonic development. The possibility to engineer light in the temporal, spatial and coherence domain makes it possible to address a palette of applications and it has made photonics as important for societal development as electronics was in the 20th century. Nonlinear optics is the complementary field to lasers, which adds additional functionality. It broadens the field of coherent light sources from X-rays to THz, in strengthens modern telecommunication by providing increase in network speed, and it is essential in quantum optics. By spatial structuring of the nonlinear material the spectral, spatial and temporal properties can be tailored. Ferroelectrics are particular attractive in this sense as the nonlinear tensor can be locally addressed by domain engineering. This talk will review the development of solid-state lasers and functional nonlinear optics and forecast future development.

Speaker

Fredrik Laurell，Head of Research Division，Division of Laser Physics, Applied Physics Department, KTH. In 1983, He received his M. Sc. Degree in Electrical Engineering, LTH, Lund, Sweden. In 1990 received his Ph.D. in Physics, Optics division, KTH. He joined KTH in 1993 and became full professor in 2001. He is the Chairman of the Swedish Optical Society since 2004, and the National committee for optics (ICSU) at the Royal Academy of Science since 2005. He is the chairman of European Optical Society Advisory Committee, member of the board and the Executive Committee 2008-2011. The Fellowship Committee at the European Optical Society 2006 and 2007. He is author of more than 500 papers where 190 have been in international peer reviewed scientific journals and more than 250 at international conferences of which more than 50 were invited.Author of one compendium and co-author of 4 book chapter. Granted 13 different patents (Swedish and/or international). 2 patent applications pending.Hirsch-index: 31, more than 3000 citations according to ISI Web of Knowledge.

Received the following prizes: Göran Gustafsson Prize in Physics 2003; Third prize in Innovation Cup 1999 for a new blue solid-state laser. Prices in Venture Cup for the business plans of Cobolt AB (2000) and Photonic Sensing AB (2003); Advisory board for Excitera (2002-), the entrepreneur association, and the China Student Association at KTH (2004-2006); Fellow of the Optical Society of America 2011.

Invited Speeches

Topic

Manipulating light at Micro/Nano-Scale

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Micro/nano photonic structures permit remarkable control of the propagation of light. A selection of recent results will be presented.

Using two-dimensional photonic crystal made of the composite materials with large and fast third-order optical nonlinearity, ultrafast and low threshold all-optical switching was demonstrated. Based on tunable Fano resonance or PIT of metallic nanostructures, ultrafast modulations on light transmission were also experimentally demonstrated. Moreover, ultracompact plasmonic devices including SPP unidirectional generator, splitter and switch were experimentally demonstrated.

Speaker

Qihuang Gong is the Cheung Kong Professor of Physics at Peking University, China, where he is also the Founding Director of the Institute of Modern Optics and Deputy Dean of Physics School. In addition, Prof. Gong serves as Director of the State Key Laboratory for Mesoscopic Physics. His current research interests are in ultrafast optics, nonlinear optics, and mesoscopic optical devices for applications. He has received the State Natural Science Award (2nd-Class), the Chinese Physical Society's Rao Yutai Prize, and the Wang Daheng Science and Technology Prize given by the Chinese Optics Society.

He is the Member of Chinese Academy of Sciences, Fellow of OSA and Fellow of IoP.

Invited Speeches

Topic

Manipulating Plasmonic Wavefront and Light-Matter Interaction in Metallic Nanostructures

Zhi-Yuan Li
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Surface plasmon polaritons (SPPs) carry information and energy that can be localized around or transport among nanoscale metallic structures without suffering from the diffraction limit of light. The manipulation of SPPs is fundamental for many applications of plasmonics. In this talk, we introduce some of our recent studies on the manipulation of plasmonic wavefront and light-matter interaction in metallic nanostructures. In the aspect of SPP wavefront shaping, we have developed a direct design methodology called the surface wave holography method and show that this method can be easily employed for wavefront shaping of light for both off-plane and in-plane transport, ranging from microwave to infrared, and visible bands [1-5]. In engineering light-matter interaction, we discuss microscopic and macroscopic manipulation of fluorescence radiation from gold nanorod hybrid structures in the system of both single nanoparticle and aligned group nanoparticles [6-9]. Finally we briefly discuss a new microscopic Raman scattering theory that allows us to reveal the physical origin of sub-nanometer spatial resolution in tip-enhanced Raman mapping [10] and discuss how to handle nonlinear optical process in plasmonic nanostructures [11]. These studies could help to explore various approaches and schemes to manipulate plasmonic wavefront and light-matter interaction in metallic nanostructures for potential applications such as optical displays, information integration, and energy harvesting technologies.

Speaker

Zhi-Yuan Li received his BS in Optoelectronics from the University of Science and Technology of China in 1994 and his PhD degree in Optics from Institute of Physics, Chinese Academy of Sciences in 1999 before working in several institutions in Hong Kong and United States of America. He is currently a professor in physics and principal investigator in the Institute of Physics, Chinese Academy of Sciences in Beijing. Prof. Li's research interests include theory, experiment, and application of photonic crystals, nonlinear and ultrafast optics, plasmonics, quantum optics, and optical tweezers. He is the author or coauthor of more than 320 peer-reviewed papers in Chem. Soc. Rev., Phys. Rev. Lett., J. Am. Chem. Soc.，Adv. Mater., Nano Lett., Angew. Chem. Int. Ed., Scientific Reports, Lasers and Photon. Rev., Light: Science & Applications, Phys. Rev., Appl. Phys. Lett., Opt. Lett., Opt. Express, and other physics, optics, chemistry, and materials science journals. These papers have been cited by about 12,000 times, based on which he was selcted as the Thomson Reuters Highly Cited Researcher 2014. He serves as an EPL Co-Editor and the editorial board member of Acta Optica Sinica, Chinese Science Bulletin, and Advanced Optical Materials. He has presented over 50 invited talks in international conferences and 20 invited talks in domestic conferences.

Invited Speeches

Topic

Photonic Integration: Past, Present and Future

Thomas L. Koch
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In recent years the accelerated development of photonic integration has led to a role where it is now a truly enabling technology for advanced communications applications. As the convergence of electronics and photonics technologies continue to mature, these applications can be expected to diversify and it will become increasingly important to drive towards fundamental limits of performance. This talk will review the progression of technology over the years and look to the wealth of research opportunities that that remain ahead.

Speaker

Professor THOMAS L. KOCH, Dean of the College of Optical Sciences, The University of Arizona. He received his A.B. degree at Princeton University in 1977 and Ph.D. degree at California Institute of Technology in 1982. He worked at Bell Laboratories and other company for more than 20 years and joined in Lehigh University since 2003. He became Dean and professor of University of Arizona in 2012.

He is the Vice President of Technical Affairs IEEE Photonics Society; Vice Chair of Electronics, Communication and Information Systems Engineering Section, the NAE; Board of Directors The Optical Society (OSA); SPIE Life Member. He authored 36 patents and more than 335 combined journal and conference publications, chaired more than 12 international conferences, coedited two books and authored or co-authored five book chapters, served on boards or advisory boards of eight international research institutes or companies, served on more than 30 conference program committees.

He is Fellow of Bell Laboratories, IEEE, OSA and Member of National Academy of Engineering, He was awarded IEEE Eric E. Sumner Award in 2008, IEEE Photonics Society William Streifer Award for Scientific Achievement in 1991, IEEE Photonics Society Distinguished Lecturer Award in 1990.

Invited Speeches

Topic

Optimized Focused Spots for Sensing and Manipulation

H. Paul Urbach
Optics Research Group
Delft University of Technology
The Netherlands

Focused spots have wide applications for example in confocal microscopy and in sensing and manipulating sub-wavelength structures. To enhance their performance, focused spots can be optimized by spot shaping and by using new focusing media into which the spot is realized. With several Spatial Light Modulators (SLMs) in series, the polarization, the amplitude and the phase can all be modified together. This implies that widely varying position dependent electromagnetic fields can be realized in for example the pupil of a focusing objective to realize many different optimum focused spots. Some examples of optimum focused spots will be discussed, namely focused fields with largest electric field of specified polarization in the focal point and focused fields by which the maximum force is exerted in a desired direction on a small particle.

The sensitivity of focused spot can be enhanced not only by appropriate field shaping but also by using new media for immersion. We shall discuss a special type of anisotropic medium, a so-called hyperbolic medium, which has the interesting property that, at least for one polarization state, perfect spot confinement and perfect imaging is possible.

Speaker

Prof. Dr. H. P. Urbach has a PhD from the University of Groningen. Until 2008 he was a principal scientist at Philips Research Laboratories in Eindhoven. His main expertise is electromagnetic modeling of problems of applied optics and diffraction optics in particular. He has worked on photolithography for integrated circuits and optical disk mastering, super-resolution and near field techniques in optical recording, inverse problems in x-ray fluorescence spectroscopy,. Current research concerns the optimization of photonic crystal structures to enhance the out-coupling of light from (O)LEDs and to enhance the absorption of light by a solar cell and the optimization of focused fields.

In 2000 he became part-time professor Diffraction Optics in the Optics Research Group of TUD and in 2008 he became leader of this group.

He is the President Elect of the European Optical Society, Member of the Dutch URSI committee, Member of the Advisory Committee of the Dutch Government on Metrology and member of the Dutch national photonics initiative “IOP Photonic Devices”.

Invited Speeches

Topic

Applications of Laser Spectroscopy to Meet Challenges in Medicine

Katarina Svanberg

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Laser based spectroscopic techniques can be used in the detection and therapy of human diseases. Examples from oncology as well as from the specialities of ear, nose and throat and pediatrics will be given.

Laser spectroscopy has been shown to be a valuable tool both in the detection and the therapy of human malignancies. The most important prognostic factor for cancer patients is early tumour discovery. If malignant tumours are detected during the non-invasive stage, most tumours show a high cure rate of more than 90 %. Even though there are many conventional diagnostic modalities, very early tumours may be difficult to discover. Laser-induced fluorescence (LIF) for tissue characterisation is a technique that can be used for monitoring the biomolecular changes in tissue under transformation from normal to dysplastic and cancer tissue before structural tissue changes are seen at a later stage. The technique is based on UV or near-UV illumination for fluorescence excitation. The fluorescence from endogenous chromophores in the tissue alone, or enhanced by exogenously administered tumour seeking substances can be utilised. The technique is non-invasive and gives the results in real-time. LIF can be applied for point monitoring or in an imaging mode for larger areas, such as the vocal cords or the portio of the cervical area [1-4].

Photodynamic therapy is a selctive treatment technique for human malignancies. To overcome the limited light penetration in superficial illumination interstitial delivery (IPDT) with the light transmitted to the tumour via optical fibres has been developed. Interactive feed-back dosimetry is of importance for optimising this modality and such a concept has been developed. The technique has special interest for tumours where there are no other options, such as for recurrent prostate cancer after ionising radiation [5,6]. For correct dosimetry it is important to asses the optical properties of tissue; this can be done by time resolving propagation techniques [7].

Speaker

Katarina Svanberg is an M.D. and a Ph.D and holds a professorship in Oncology at Lund University, Sweden as well as at South China Normal University in Guangzhou, China. She started her research career by studying laser light interaction in biological tissue and is among the early clinical researchers in biomedical optics and photonics for medical applications. Her PhD thesis in Medical Science presented pre-clinical research work within experimental photodynamic therapy and tissue spectroscopy. The post doc research activity was focussed on clinical applications of the pre clinical achievements. Katarina Svanberg has combined her clinical activity with research work and thus been able to introduce a new cancer treatment modality in Oncology (Photodynamic Therapy) at the Lund University Hospital. She has been a key person in the collaboration in between several clinics and departments at Lund University in introducing and applying laser-induced fluorescence spectroscopy for early tumour detection. Katarina Svanberg has also been involved in developing a new method for gas monitoring; Gas in Scattering Media Absorption Spectroscopy (GASMAS) in the human body and this technique has been applied in the diagnosis of sinusitis. GASMAS also seems promising for in situ real time surveillance of preterm babies controlling their lung function. Katarina Svanberg has been active in transferring spectroscopic biomedical techniques to the third world and has also been involved in clinical work in Africa. Katarina Svanberg has coauthored more than 150 peer reviewed papers and contributed with book chapters in the field and also organized many international conferences in Biomedical Optics. She is a board member of the Lund Laser Centre and since 1993 she has served as the director of the Lund University Medical Laser Centre, where she now is the chair of the Board. Katarina Svanberg is a board member at the International Centre for Theoretical Physics (ICTP) in Trieste in Italy and has been a member in many international advisory committees including at FDA and NIH in the US. She is a member of the steering committee for the UNESCO proclaimed Year of Light 2015. During the period 2005-2008 she was a director at large of the Board of the International Society for Optics and Photonics (SPIE) and during the period 2009-2012 in the presidential chain of the society where she served as the President 2011. She is a fellow of SPIE and of the Electromagnetic Research Society (PIERS).

Invited Speeches

Topic

Computer-generated hologram for 3D display

Hiroshi Yoshikawa
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The holography is know as the ideal 3D imaging technology. However, it requires special equipments and knowledge to record the optical hologram. On the other hand, the computer-generated hologram can be easily synthesized with a personal computer. In this lecture, we start from basics of optical holography then move to computer-generated holograms. Output devices are also introduced such as the holographic video display and the holographic fringe printer.

Speaker

Hiroshi Yoshikawa received the B.S. degree, the M.S. degree and the Ph.D. from Nihon University, all in electrical engineering, in 1981, 1983 and 1985, respectively. He joined the faculty at Nihon University in 1985 where he currently holds the position of Professor of Electronics and Computer Science. From Dec. 1988 to Apr. 1990, he was a research affiliate of MIT Media Laboratory. His current research interests are in electro-holography, computer generated holograms, display holography and computer graphics.

Invited Speeches

Topic

Trapping Light by Mimicking Gravitational Lensing

Hui Liu*, and Shining Zhu
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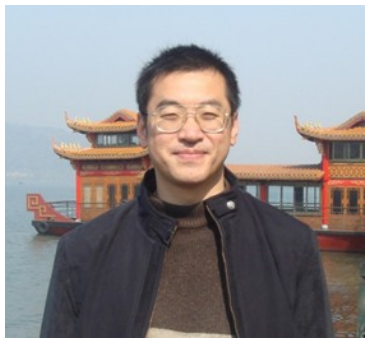
One of the most fascinating predictions of the general theory by Einstein is gravitational lensing, the bending of light in close proximity to massive stellar objects, which wrap space and time due to their powerful gravitational pull. Recently, artificial optical materials were proposed to study the various aspects of curved spacetimes such as invisibility cloaks [1-2], photonic black holes [3] and bending light beam [4]. However, the development of experimental "toy" models that simulate gravitational lensing in curved spacetimes remains a challenging problem, especially for a visible light. Here, we propose utilizing a distorted optical waveguide around a microsphere to mimic curved spacetimes caused by the "gravitational fields" with high precision (see figure 1). Both far-field gravitational lensing effects and the critical phenomenon in close proximity to the photon sphere of degenerated stars or "black hole" analogues are experimentally demonstrated. Furthermore, the proposed curved waveguide can be used as an omnidirectional absorber with prospective light harvesting and microcavity applications [5].

Speaker

Hui Liu, Professor at Nanjing University, Associate director of National Key Laboratory of Solid State Microstructures. National Science Fundation for Outstanding Young Talents of China, 2014. Hui Liu received his Ph.D. in 2003 from Department of Physics, Nanjing University in China. In 2004-2005 he did postdoctoral research at University of California at Berkeley. Since 2006, he is an professor of physics at Nanjing University in China. His research interest includes solid-state laser of optical superlattices, quantum optics in metamaterials, and curved spacetime in photonic chips. He has published over 60 SCI papers, including Nature Photonics, Phys. Rev. Lett, etc. He has taken charge of several national projects, including "863" key projects and NSFC projects. He also worked as the referee for Optic Express, JOSAB.



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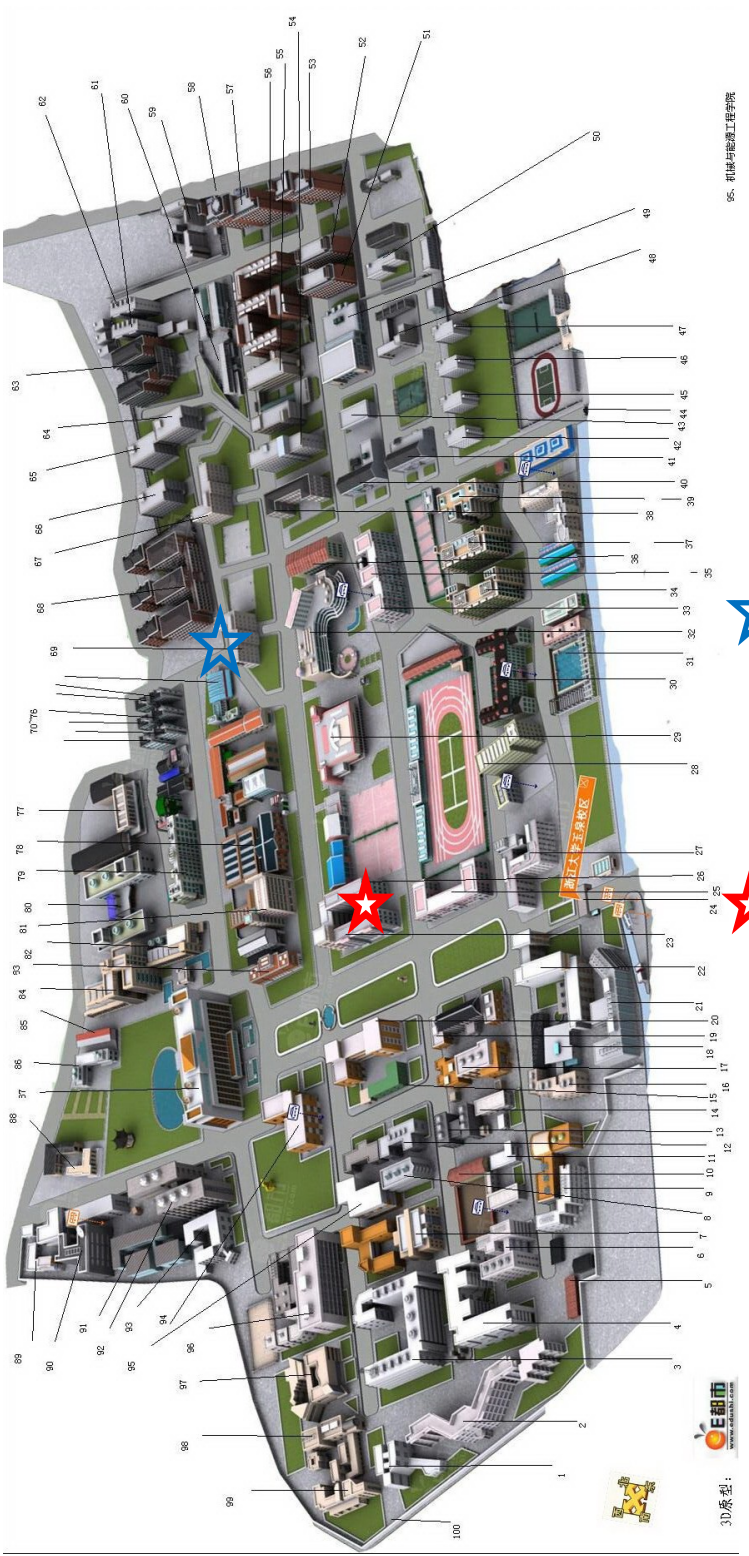
The forum will be held at Room 301, 3rd Building, Yuquan Campus of Zhejiang University, Hangzhou, China.



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3rd Building
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61.24舍 62.23舍 79.热能实验室 89.信息与电子工程学系 97.邵逸夫科技馆
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By Walk

1) 从起点向知泉路出发，沿知泉路行驶800米，过右侧的浙江大学玉泉校区北门，左转进入西溪路

2) 沿西溪路行驶170米，右转

3) 继续沿西溪路行驶230米，在万塘路桥左后方转弯进入天目山路

4) 沿天目山路行驶520米，过右侧的龙都大厦约190米后，进入益乐路

5) 沿益乐路行驶20米，到达终点

全程约2公里

浙江国力大酒店

地址：浙江省杭州市天目山路388号

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Bus

1) 浙江大学正门过马路至玉古路浙大超市门口公交站乘89路；

2) 座5站在古荡小区站下车；

3) 往回走约120米至浙江国力大酒店

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About ZJU

Located in the historical and picturesque city of Hangzhou, Zhejiang University is a prestigious institution of higher education with a long history. Qiushi Academy, the predecessor of Zhejiang University, was founded in 1897 and was one of the earliest modern academies of higher learning established in China. In 1928, the academy was named National Zhejiang University. During the war time in 1940s, Zhejiang University moved to Zunyi, Meitan and other places in succession and stayed in West China for seven years. In 1946, Zhejiang University returned to Hangzhou. In 1952, due to a nationwide restructuring of universities, Zhejiang University underwent a reshuffling of disciplines. Some departments merged into other universities and Chinese Academy of Sciences. The remaining departments were divided and developed to become 4 specialized higher education institutions, namely former Zhejiang University, Hangzhou University, Zhejiang Agricultural University and Zhejiang Medical University. In 1998, the four universities sharing the same ancestor merged to form the new Zhejiang University and set a new goal – to develop into a world-class university. In its 115-year history, Zhejiang University has always been committed to cultivating talent with excellence, advancing science and technology, serving for social development, and promoting culture, with the spirit best manifested in the university motto “Seeking the Truth and Pioneering New Trails”.

Zhejiang University is a comprehensive research university with distinctive features and a national as well as international impact. Research at Zhejiang University spans 12 academic disciplines, covering philosophy, economics, law, education, literature, history, art, science, engineering, agriculture, medicine, management and etc. With 7 faculties and 37 colleges/schools, Zhejiang University has 14 primary and 21 secondary national leading academic disciplines. According to Essential Science Indicator (ESI) ranking about 22 disciplines, Zhejiang University ranks among the top 1% in 14 disciplines, in 4 of which it is listed in the top 100 of the world’s academic institutions.

About ZJU

Zhejiang University focuses on assiduous study and research, and science and technological innovation. It has launched a number of international high-end academic platforms and gathered masters, scholars and high-level research teams in various disciplines. In recent years, Zhejiang University maintains a leading position in China in output indicators including publications, patents and etc., and has made abundant important achievements in science, technology, humanities and social sciences. Zhejiang University always takes initiative in catering for national and regional needs, and exerts itself to become an influential high-level source of innovation and a pool of talents. In 2011, research fund at Zhejiang University amounted to 2.817 billion Yuan. More than a hundred projects under research have each secured a grant of more than 10 million.

At present, there are a total of more than 44,000 full-time students enrolled at Zhejiang University, including approximately 13,800 graduate students, 7700 Ph.D candidates, and 22,600 undergraduates. In addition, there are about 2,700 international students currently attending Zhejiang University. Among its approximate 3,100 standing faculty members, more than 1,200 faculty members have title of professor. Other important facts and figures are as follows: 14 members of the Chinese Academy of Sciences, 13 members of the Chinese Academy of Engineering, 48 scholars in national Recruitment Program of Global Experts, 20 chief scientists of national 973 projects, 81 Chair Professors in Chang Jiang Scholars Program, and 88 scholars awarded with National Science Fund for Distinguished Young Scholars. With five campuses, namely Zijingang, Yuquan, Xixi, Huajiachi and Zhijiang campus, Zhejiang University encompasses an area of 4.5 square kilometers with school buildings covering 1.94 million square meters of floor space. The university library holds a collection of more than 6.27 million volumes. In addition, Zhejiang University has 7 high-level affiliated hospitals.

As a national university standing by River Qiantang, Zhejiang University is striving to build itself into an innovative comprehensive research university with a world-class status. Zhejiang University will be adhering to the spirit of seeking the truth and pioneering new trails, dedicating itself to creating and disseminating knowledge, inheriting and advancing civilization, serving and leading the society, and promoting national prosperity, social development and human progress.

About Hangzhou

Hangzhou, the capital of Zhejiang, is the most distinguished and beautiful City in China. Marco Polo once declared it to be “the most beautiful and elegant city in the world”. Hangzhou was the capital of the Wu and Yue States in the 10th Century during the Five Dynasties Period, and had its political heyday in the Southern Song Dynasty (1127-1279), when it served as the capital of China. Hangzhou is famous for its outstanding natural beauty and historical and cultural sites. West Lake, laid on the west edge of Hangzhou, is the symbol of Hangzhou. It looks like a sparkling pearl imbedded in between a blue smudge of mountains and a metropolitan city, with the zigzagging Qiantang River floating by like a silver ribbon. Aside from West Lake, Temple of Inspired Seclusion built in the Eastern Jin dynasty (317-420AD) is one of the ten most famous ancient Buddhist temples in China. Just as there is paradise in heaven, there are Suzhou and Hangzhou on earth.

The West Lake of Hangzhou in East China has been named as a World heritage site, which clearly reflects Chinese philosophy and aesthetics and inspires park designing art profoundly in China and abroad. The West Lake landscape was initially developed in the 9th century during the Tang Dynasty. Now, after 12 centuries, it has finally become a treasure for the whole world.

Surrounded by mountains on three sides, the 3,322-hectare landscape is a national cultural icon enriched with beautiful scenarios and dramatic legends. After centuries of human efforts in shaping it, the area is appreciated as a marvelous combination of natural and artificial beauty.Covered with luxuriant vegetation, the area is composed of a water surface of 5.66 square kilometers, and five territorial zones divided by causeways, dotted with numerous halls, towers, terraces, pavilions, pagodas, grottoes and temples.