Contents

General Information

International Conference on Micro/Nano Optical Engineering (ICOME2014)

- **Date:** July 3-5, 2014
- **Conference Venue:** Research and Development Building, Changchun Institute of Optics, Fine Mechanics and Physics (CIOMP), Dongnanhu Road

Welcome to CIOMP

On behalf of the Changchun Institute of Optics, Fine Mechanics and Physics (CIOMP), we welcome you to participate in the International Conference on Micro/Nano Optical Engineering (ICOME2014). Thank you for giving us the opportunity to host the conference in our institute.

By attracting experts, researchers, investors and entrepreneurs in the field of laser processing from all over the world, ICOME2014 is providing an international forum for exchanging information on recent advances and future trends for researchers.

Our institute had been honored as “The Cradle of China’s Optics” due to its great contributions to China’s optical research and engineering, as well as its impact on science and technology development, economic construction and social progress. We have established extensive scientific collaboration and long term exchange programs with more than 30 countries, as well as multi-aspect cooperation with many organizations, such as OSA, SPIE, European Laser Institute, Russia Laser Association and NPG. We welcome all friends over the world to visit our institute. We believe that, through the visit, we can advance the future collaboration and promote the research and engineering for the laser processing community. Finally, we wish you a pleasant stay at CIOMP and in Changchun!

Prof. Ming Xuan

President of Changchun Institute of Optics, Fine Mechanics and Physics (CIOMP)

Welcome to Light Conference 2014

We, on behalf of the conference committee, sincerely welcome you to the Light Conference-International Conference on Micro/Nano Optical Engineering (ICOME2014), to be held in Changchun, China. This conference, sponsored by the Changchun Institute of Optics, Fine Mechanics and Physics (CIOMP), CAS, co-organized by State Key Laboratory on Integrated Optoelectronics, State Key Laboratory on Applied Optics, State Key Laboratory of Luminescence and Applications, Publication Department of CIOMP and Department of international Cooperation of CIOMP, supported by the National Natural Science Foundation of China (NSFC), Chinese Academy of Science (CAS), will bring together international leading experts with top Chinese scientists, young researchers, and students working in Micro/Nano optics.

The primary objective of this conference is to create a forum for scientists in Micro/Nano optics from universities and research institutions worldwide to present their latest research results in Micro/Nano optics, and to provide a networking platform for the Micro/Nano optics community to develop a roadmap for research and development in the future. 17 internationally well-recognized experts are invited to present their state-of-the-art work on various aspects in the rapidly growing Micro/Nano optics area. The conference will not only provide a venue for an in-depth scientific exchange, but also an opportunity to find potential collaborations and funding sources internationally, especially together with China.

We would like to express our gratitude to all invited speakers, researchers, and students for your participation and involvement. We acknowledge the financial support from National Natural Science Foundation of China (NSFC), and Changchun Institute of Optics, Fine Mechanics and Physics (CIOMP), Chinese Academy of Sciences (CAS).

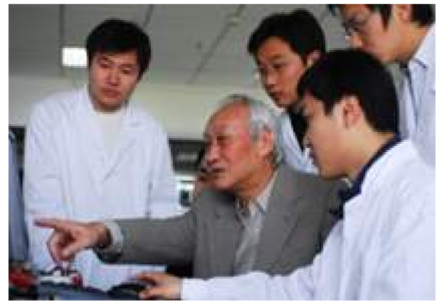
We hope that you will enjoy the talks as well as the social events, and take the conference as a great opportunity to establish collaborations and exchange ideas with colleagues in Micro/Nano optics all over the world. Have a wonderful time at this upcoming conference in Changchun!

Prof. Hongbo Sun
Jilin University, China

Prof. Mark I. Stockman
Georgia State University, U.S.A.

The Cradle of China's Optics





Changchun Institute of Optics, Fine Mechanics and Physics (CIOMP) is the largest institute of the Chinese Academy of Sciences (CAS). It was founded in 1952 and covered the research areas of luminescence, applied optics, optical engineering, and precision mechanics and instruments.

In the past 60 years, led by a group of scientists represented by Wang Daheng and Xu Xurong, CIOMP has developed more than a dozen advanced instruments as the “First of China”, such as the first ruby laser and the first large theodolite. There have been more than 900 research results patented and 1700 research projects accomplished since the establishment of CIOMP. Honored as “the cradle of China’s Optics”, CIOMP has organized and sponsored more than 10 research institutes, colleges, and enterprises such as Shanghai Institute of Optics and Fine Mechanics, Xi’an Institute of Optics and Precision Mechanics, and Changchun Institute of Opticsand Fine Mechanics. About 2200 professionals had worked or studied in CIOMP among whom, 22 have been elected as members of CAS or CAE (Chinese Academy of Engineering). Come out of CIOMP, many outstanding individuals, such as Jiang Zhuying, became the model of Chinese intellectuals. 3255 masters (MS) and doctors (PhD) have been trained and educated. CIOMP involved in many important national projects, such as the "Two bombs, One Star" projects (atomic and hydrogen bombs, and satellite) and space station engineering projects. CIOMP has made great contributions to China’s scientific and technological development, economic growth, and social progress.

Incorporating with Changchun Institute of Physics after entering the new century, with the strategy of “integrating research, production, and education together”, CIOMP has established five national key laboratories, research centers and two CAS key laboratories.

Having better developing potential, its creativity and productivity are significantly enhanced. By further combining research directions and optimizing the usage of resources, CIOMP has conquered many key technological barriers and obtained many achievements. These include the FY-3 solar irradiance monitor, solar backscattered ultraviolet spectroradiometer, and important test equipments for manual-control rendezvous and docking of ShenZhou 9. CIOMP has also received many awards, such as the National Labor Day Award in two consecutive years, 34 nationwide awards including 1 National Special Award in Progress in Science and Technology, as well as 14 National Awards in Progress in Science and Technology, National Innovation, and National Natural Science. The sales income of nine high-tech industries invested by CIOMP has been over 30 billion RMB. The national optoelectronic industry initiation base built in Optoelectronic-Park has been the main driving force to boost local optoelectronic industry.

Facing new tasks and challenges, CIOMP will continue its efforts to build one of the best scientific institutions in the world. With a complete innovative value chain, integration of research, production and education, and a group operation model, CIOMP will establish several new innovation units such as branch institutes, core enterprises, professional training centers and postgraduate educational centers, and become an internationally recognized research organization.

General Chairs & Committees

General Co-chairs:		
Prof. Hongbo Sun	Jilin University, China	Co-chair
Prof. Mark I. Stockman	**Georgia State University,U.S.A.**	Co-chair
Technical Committee:		
Prof. Che Ting Chan	Hong Kong University of Science and Technology, China	Co-chair
Prof.Tarik Bourouinas	Université Paris-Est, France	Co-chair
Steering Committee:		
Prof. Hans Zappe	University of Freiburg, Germany	Co-chair
Prof. Jingqiu Liang	CIOMP-CAS, China	Co-chair
Organizing Committee:		
Prof. Tao Zhang	CIOMP-CAS, China	Co-chair
Prof. Huaijiang Yang	CIOMP-CAS, China	Co-chair
Prof. Cheng Wang	CIOMP-CAS, China	Co-chair
Mr. Wenwu Liu	CIOMP-CAS, China	Co-chair
Program committee:		
Prof. Mark P Andrews	McGill University, Canada	Co-chair
Prof. Boris N. Chichkov	Laser Zentrum Hannover e.V,German	Co-chair
Dr.Maria Farsari	IESL-FORTH, N. Plastira,Greece	Co-chair
Dr. Laiming Zhang	CIOMP-CAS, China	Co-chair
Advisory committee:		
Academician Jiaqi Wang	CIOMP-CAS, China	
Academician Xingdan Chen	CIOMP-CAS, China	
Academician Lijun Wang	CIOMP-CAS, China	
General Secretary :		
Prof. Yuhong Bai	CIOMP-CAS, China	
Other members in Secretariat:		
Hui Wang	CIOMP-CAS, China	
Lingtong Zhang	CIOMP-CAS, China	
Yaobiao Li	CIOMP-CAS, China	

ICOME 2014 Agenda

Time	Content
Wednesday, July 2nd Registration (whole day 08:30-20:30)	
Thursday, July 3rd	
09:00-09:15	Welcoming remarks and opening of the conference (CIOMP President, Prof. Hong-Bo Sun)
09:15-09:30	Group Photo
Plenary Talks	
09:30-10:30	Session 1, Chair: Prof. H. B. Sun
09:30-10:00	Prof. Mark I. Stockman (Georgia State University,U.S.A.)
10:00-10:30	Prof. Peter R. Herman (University of Toronto, Canada)
10:30-11:00	Coffee break
11:00-12:30	Session 2, Chair: Prof. Mark I. Stockman
11:00-11:30	Prof. Hiroaki Misawa (Hokkaido University, Japan)
11:30-12:00	Prof. Eunkyoung Kim (Yonsei University, Korea)
12:00-12:30	Prof. Keiji Sasaki (Hokkaido University, Japan)
12:30-13:30	Lunch
13:30-14:30	Session 3, Chair: Prof. C. T. Chan
13:30-14:00	Prof. Shu Hotta (Kyoto Institute of Technology, Japan)
14:00-14:30	Dr. Maria Farsari (Institute of the Electronic Structure and Laser, Greece)
14:30-15:00	Coffee break

15:00-16:00	Session 4, Chair: Dr. M. Farsari
15:00-15:30	Prof. Che Ting Chan (Hong Kong University of Science and Technology, China)
15:30-16:00	Prof. Cunzheng Ning (Arizona State University, U.S.A)
16:00-16:30	Prof. Frank YS Chuang (University of California, Davis, USA)
16:30-17:00	Coffee break
17:00-18:00	Session 4, Chair: Prof. C. Z. Ning
17:00-17:30	Prof. Mark P Andrews (McGill University, Canada)
17:30-18:00	Prof. Maria Antonietta Loi (University of Groningen, Netherlands)
18:00-18:30	Dr. Su Lin (Arizona State University, U.S.A.)
Friday, July 4th	
09:00-10:00	Session 5, Chair: Prof. P. R. Herman
09:00-09:30	Prof. Nikolay I. Zheludev (University of Southampton, UK)
09:30-10:00	Prof. Tarik Bourouinas (Université Paris-Est, France)
10:00-10:30	Coffee break
10:30-11:30	Session 6, Chair: Prof. Nikolay I. Zheludev
10:30-11:00	Prof. Joseph J. Talghader (University of Minnesota, U.S.A.)
11:00-11:30	Prof. Hong-Bo Sun (Jilin University)
11:30-12:30	Award Ceremony
12:30-12:40	Closing Remarks
12:40-14:00	Lunch

LSA Editorial Board Meeting 2014 Agenda

Time	Content
July 2nd-3rd Registration (whole day 08:30-20:30)	
Friday, July 4th	
14:00-14:10	Welcoming remarks
14:10-15:00	Session 1 Chair: Stefan Kaierle
14:10-14:30	Brief introduction of CIOMP (Xuejun Zhang)
14:30-15:00	Progress report of “Light” in the last two years (Tianhong Cui)
15:00-15:15	Coffee break
15:15-16:30	Session 2 Chair: Hans Zappe
15:15-15:50	Perspective and strategy for the development of "Light" (Judy Bai)
15:50-16:30	Suggestion for the further development of “Light”
16:30-16:45	Coffee break
16:45-18:00	Session 3 Chair: Mark Stockman
16:45-17:10	Discussion on the regulations of editorial committee
17:10-17:30	Discussion on the plan of convening “Light Conference 2015” corresponding to “Year of Light” international programme
17:30-17:40	Award certificate of appointment of editors
17:40-18:00	Closing remark (Jianlin Cao)
18:30	Dinner

Young Scientists Forum 2014 Agenda

Time	Content
July 2nd-3rd Registration (whole day 08:30-20:30)	
Friday, July 4th	
13:20-13:30	Welcoming remarks
13:30-15:00	Session 1 Chair:Jingbo Li
13:30-14:45	Tien-Chang Lu(National Chiao Tung University)盧廷昌（台湾交通大学）
13:45-14:00	Yiming Zhu(University of shanghai for Science and Technology)朱亦鸣（上海理工大学）
14:00-14:15	Xiaofeng Fan(Jilin University)樊晓峰（吉林大学）
14:15-14:30	Quan Sun(Hokkaido University)孙泉（日本北海道大学）
14:30-14:45	Jianfa Zhang(University of Defense Technology)张检发（国防科学技术大学）
14:45-15:00	Yikun Liu(Sun Yat-sen University)刘忆琨（中山大学）
15:00-15:15	Coffee break
15:15-16:30	Session 2 Chair:Wenfei Dong
15:15-15:30	Baoquan Sun(Soochow University)孙宝全（苏州大学）
15:30-15:45	Chuanbo Li(Institute of Semiconductors, Chinese Academy of Science)李传波（中科院半导体所）
15:45-16:00	Changshui Huang(Qingdao Institute of Bioenergy and Bioprocess Technology, C AS)黄长水（青岛生物能源技术研究所）
16:00-16:15	Chunlai Xue(Institute of Semiconductors, Chinese Academy of Sciences)薛春来（中科院半导体所）
16:15-16:30	Xingjun Wang(Peking University)王兴军（北京大学）
16:30-16:45	Coffee break
16:45-18:00	Session 3 Chair:Lei Liu
16:45-17:00	Jingbo Li(Institute of Semiconductors, Chinese Academy of Science)李京波（中科院半导体所）
17:00-17:15	Zhipeng Wei(Changchun University of Science and Technology)魏志鹏（长春理工大学）
17:15-17:30	Jun Jiang(University of Science and Technology of China)江俊（中国科学技术大学）
17:30-17:45	Jinhui Wu(Northeast Normal University)吴金辉（东北师范大学）
17:45-18:00	Xinlong Xu(Northwest University)徐新龙（西北大学）
18:30	Dinner
Saturday, July 5th	
08:30-09:45	Session 4 Chair:Baoquan Sun
08:30-08:45	Peng Wang(Changchun Institute of Applied Chemistry, Chinese Academy of Sciences) 王鹏（中科院长春应化所）

08:45-09:00	Daoxin Dai(Zhejiang University)戴道锌（浙江大学）
09:00-09:15	Mingkui Wang(Huazhong University of Science and Technology)王鸣魁（华中科技大学）
09:15-09:30	Mingying Peng(South China Universityof Technology)彭明营（华南理工大学）
09:30-09:45	Bo Zou(Jilin University)邹勃（吉林大学）
09:45-10:00	Coffee break
10:00-11:15	Session 5 Chair：Peng Wang
10:00-10:15	Dongxu Zhao(Changchun Institute of Optics, Fine mechanics and Physics, Chinese Academy of Science)赵东旭（中科院长春光机所）
10:15-10:30	Haiyang Xu(Northeast Normal University)徐海阳（东北师范大学）
10:30-10:45	Hui Li(Suzhou Institute of Biomedical Engineering and Technology , Chinese Academy of Sciences) 李辉（中科院苏州医工所）
10:45-11:00	Wenfa Xie(Jilin University)谢文法（吉林大学）
11:00-11:15	Haizheng Zhong(Beijing Institute of Technology)钟海政（北京理工大学）
11:15-11:30	Coffee break
11:30-12:30	Session 6 Chair：Tien-Chang Lu
11:30-11:45	Li Song(University of Science and Technology of China)宋礼（中国科学技术大学）
11:45-12:00	Zhongyue Zhang(Shaanxi Normal University,)张中月（陕西师范大学）
12:00-12:15	Jiasheng Ye(Capital Normal University)叶佳声（首都师范大学）
12:15-12:30	Yen-Hsun Su(National Cheng KungUniversity)蘇彦勛（台湾成功大学）
12:30	Lunch
13:30-14:45	Session 7 Chair：Jun He
13:30-13:45	Zhenhua Ni(Southeast University)倪振华（东南大学）
13:45-14:00	Xueao Zhang(University of Defense Technology)张学骜（国防科技大学）
14:00-14:15	Shijain Chen(Chongqing University)陈世建（重庆大学）
14:15-14:30	Li Wang(Nanchang University)王立（南昌大学）
14:30-14:45	Haiming Fan(Northwest University)樊海明（西北大学）
14:45-15:00	Coffee break
15:00-16:30	Session 8 Chair：Dongxu Zhao
15:00-15:15	Guanghua Cheng(Xi'an Institute of Optics and Precision Mechanics, Academy of Sciences) 程光华（中科院西安光机所）
15:15-15:30	Zuoling Fu(Jilin University)付作岭（吉林大学）
15:30-15:45	Feng Qiu(Kyushu University)邱枫（日本九州大学）
15:45-16:00	Lei Liu(Changchun Institute of Optics,Fine Mechanics and Physics, Academy of Sciences) 刘雷（中科院长春光机所）
16:00-16:15	Yaobiao Li(Changchun Institute of Optics,Fine Mechanics and Physics, Academy of Sciences)李耀彪（中科院长春光机所）
16:15-16:30	Coffee break
16:30-17:30	Editor Board Meeting of Chinese Optics for young members《中国光学》第一届青年编委扩大会议
18:30	Dinner

Light Conference:

ICOME 2014

Plenary Talks

Prof. Mark I. Stockman

Center for Nano-Optics (CeNO) andDepartment of Physics and Astronomy, Georgia State University, Atlanta, GA 30302, USA

E-mail: mstockman@gsu.edu

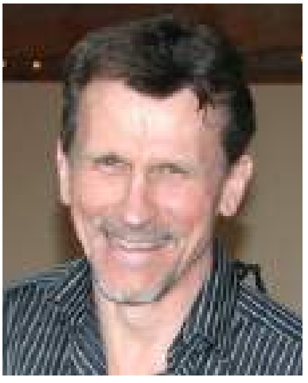
Mark I. Stockman received his PhD and DSc degrees from institutes of the Russian Academy of Sciences. He is a Professor of Physics and the Director of the Center for Nanooptics (CeNO) at Georgia State University, Atlanta, GA, USA. He is a Fellow of the American Physical Society (APS), Optical Society of America (OSA), and SPIE – The International Society for Optoelectronic Engineering. He has served as a Distinguished Visiting Professor at Ecole Normale Supérieure de Cachan (France) and as a Visiting Professor at Ecole Supérieure de Physique and de Chimie Industrielle (Paris, France), and also as a Guest Professor at University of Stuttgart (Germany), Max Plank Institute for Quantum Optics (Garching, Germany), and Ludwig Maximilian University (Munich, Germany). A major direction of his research is theoretical nanoplasmonics, in particular, ultrafast and nonlinear nanoscale optical phenomena. He is a co-inventor of spaser (nanoplasmonic laser). He is an author of over 180 major research papers and has presented numerous plenary, keynote, and invited talks at major international conferences. He taught courses on nanoplasmonics and related topics at many major international meetings and scientific institutions.

Quantum Nanoplasmonics and Spaser

Nanoplasmonics deals with collective electron excitations at the surfaces of metal nanostructures, called surface plasmons. The surface plasmons localize and nano-concentrate optical energy creating highly enhanced local fields. Nanoplasmonics has numerous applications in science, technology, biomedicine, environmental monitoring, and defense.

There is an all-important need in active devices capable of generating and amplifying coherent optical fields on the nanoscale analogous to lasers and amplifiers of the conventional optics or transistors of microelectronics. Such an active device is the spaser (surface plasmon amplification by stimulated emission of radiation). We will present quantum theory of spaser as an ultrafast quantum generator and amplifier of nanoplasmonic fields. We will review extensive experiments on spasers. We will focus on two new theoretical ideas in the field of spasers: spaser with electric pumping via quantum wire [D. Li and M. I. Stockman, *Electric Spaser in the Extreme Quantum Limit*, Phys. Rev. Lett. 110, 106803-1-5 (2013)] and quantum-cascade graphene spaser [V. Apalkov and M. I. Stockman, *Proposed Graphene Nanospaser*, arXiv:1303.0220 [cond-mat.mes-hall], 1-5 (2013); Light: Science and Applications (2014) (In Press)].

In perspective, the spasers will have applications as ultrafast nanoamplifiers for petahertz processors, nanoscale sources of coherent and intense optical fields, ultrabright nano-labels, and others.



Prof. Peter R. Herman

Department of Electrical and Computer Engineering, University of Toronto, Canada

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Peter R. Herman received the B.Eng. degree (1980) in Engineering Physics at McMaster University. He earned MASc (1982) and PhD (1986) degrees studying lasers and diatomic spectroscopy in the Physics Department at the University of Toronto that followed with a post-doctoral position at the Institute of Laser Engineering in Osaka University, Japan (1987) to the study of laser-plasma physics and x-ray lasers. He joined the Department of Electrical and Computer Engineering at the University of Toronto in 1988 where he holds a full professor position. Their mantra is: “We begin with light and we end with light devices.” To this end we are inventing new methods for processing internally inside optical materials that carve out highly compact and functional lightwave circuits, microfluidics, optofluidic systems, biophotonic sensors, and smart medical catheters. Our end goals are inventing new manufacturing processes and extending optical device and Lab-on-a-chip concepts towards more compact Lab-in-a-fiber and Lab-in-a-film microsystems.

Manipulating Femtosecond Laser Interactions for Integrated Optofluidics: Lab-in-Fiber and Lab-in-Film

Abstract: The manipulation of femtosecond laser light inside transparent media can be directed on varying interaction pathways of microexplosions, photochemistry, and self-focusing filamentation to open new directions for creating dense memory storage, three-dimensional (3D) optical circuits, 3D microfluidic networks and high-speed scribing tracks. The presentation follows these fundamental interactions towards controlling laser processes in transparent glasses, particularly in optical fibers and thin films that enable highly functional and compact devices to form with the benefits of seamless integration with single mode optical fibers or microelectronic chips. The concept of forming 3D optical circuits within the fiber cladding is presented together with the means for coupling light efficiently with the fiber core waveguide. Chemical etching of laser-generated nanogratings are further exploited to embed microfluidic channels, micro-optical devices and optical resonator components. The laser writing overall provides a flexible integration of fiber-cladding photonics and microfluidics on which to build 3D opto-fluidic microsystems in our common base of optical networks through to biomedical probes. The laser writing promises to greatly reduced fabrication and packaging costs while enabling highly functional all-fiber microsystems for optical communications, fiber lasers, and sensing and more compact and integrated approaches in lab-in-a-fiber devices, smart medical catheters and biomedical probes. Further, the talk introduces a new nanostructuring approach that drives high resolution femtosecond laser interferometric effects in transparent films to create thin planer micro-explosions. These explosions can be controlled to open nanovoids and ultrathin blisters within the film and offer quantum ejection of fractional film segments for marking and film colouring, as well as a new means for lab-in-film development.

Prof. Hiroaki Misawa

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Research and Professional Experience (part):

2000-2001 Representative Researcher, Community New Technology Creation Research Development, NEDO Community Consortium

Research Development:

2001-2007 Representative Researcher, Core Research for Evolutional Science and Technology, Japan Science and Technology Corporation.

2007-2011 Representative, Strong Photon-Molecule Coupling Fields for Chemical Reactions, Grant-in-Aid for Scientific Research (KAKENHI) on Priority Area, MEXT, Japan.

2007-2012 HINTS Hokkaido University Representative, Hokkaido Innovation through Nanotechnology Support (HINTS), Nanotechnology Network Project MEXT, Japan

2012-present Representative, The development of plasmonic antennae realizing light harvesting/localization and its application to solar cells, Grant-in-Aid for Scientific Research (S), MEXT, Japan.

Plasmon–Induced Water Splitting System

We have demonstrated plasmonic photocurrent generation from visible to near-infrared wavelengths without deteriorating photoelectric conversion using electrodes in which gold nanorods are elaborately arrayed on the surface of a TiO_2 single crystal.[1-3] We have also reported the stoichiometric evolution of oxygen via water oxidation by irradiating the plasmon-enhanced photocurrent generation system with near-infrared light.[4-6] In the present study, we developed a plasmon-induced water splitting system that operates under irradiation by visible light; the system is based on the use of two sides of the same strontium titanate ($SrTiO_3$) single crystal substrate. [7] The water splitting system contains two solution chambers to separate hydrogen (H_2) and oxygen (O_2), respectively. To promote water splitting, a chemical bias was applied by pH values regulations of those chambers. The quantity of H_2 evolved from the surface of platinum, which was used as a reduction co-catalyst, was twice of O_2 evolved from an Au nanostructured surface. Thus, the stoichiometric evolution of H_2 and O_2 was clearly demonstrated. The hydrogen evolution action spectrum closely corresponds to the localized surface plasmon resonance spectrum, indicating that the plasmon-induced charge separation at the Au/$SrTiO_3$ interface promotes water oxidation and the subsequent reduction of a proton on the backside of the $SrTiO_3$ substrate. We have elucidated furthermore that the chemical bias is dramatically reduced by plasmonic effects, which indicate the possibility of constructing an artificial photosynthesis system with low energy consumption.

References

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[3] X. Shi, K. Ueno, T. Oshikiri, H. Misawa, J. Phys. Chem. C 117, 24733-24739 (2013).
[4] Y. Nishijima, K. Ueno, Y. Kotake, K. Murakoshi, H., H. Misawa, J. Phys. Chem. Lett. 3, 1248-1252 (2012).
[5] X. Shi, K. Ueno, N. Takabayashi, H. Misawa, J. Phys. Chem. C 117, 2494-2499 (2013).
[6] K. Ueno, H. Misawa, NPG Asia Mater. 5, e61 (2013).
[7] Y. Zhong, K. Ueno, Y. Mori, X. Shi, T. Oshikiri, K. Murakoshi, H. Inoue, H. Misawa, Angew. Chem. Int. Ed., Accepted for publication.

Prof. Eunkyoung Kim

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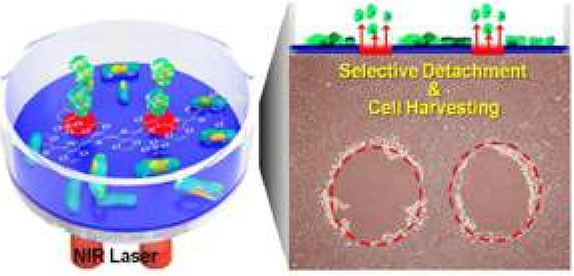
Eunkyoung Kim has primarily focused on functional organic molecules for development of functional polymers, including chromogenic polymers, photopolymers, and photovoltaic polymers. Motivated by the perspectives of organic molecules as the components of information carrier, nano-building block, and controllable device unit in polymer film, she has synthesized new organic materials for charge transport process including construction of organic devices to deliberately trigger molecules to undergo functional changes. The organic molecular units have been further functionalized to develop new methods to add multi-functionality such as fluorescent photochromism, electrochromic fluorescence and doping controlled energy conversion effect. Once these multifunctional organic materials are precisely controlled, they are integrated into the construction of organic electronics such as thin film on-off switches, flexible organic circuitry, and new energy systems.

Near IR Photothermal properties of conugated polymers for non invasive harvesting of stem cells

Conjugated polymers (CPs) of polythiophenes and polyselenophenes were explored as a flexible energy conversion film, taking advantage of their electrochemical tunability and intrinsic flexibility. CP films for photothermal conversion were prepared in a simple process through an oxidative polymerization and integrated easily into energy harvesting devices. Upon exposure to a near IR source, the CP films resulted in a high photothermal conversion of near IR light, leading to large temperature rise on the exposed area. The photothermal conversion efficiency from CP films could be tuned precisely by the morphology and doping state of CPs. From this, biocompatible photothermal films were prepared on a tissue culture substrate, to allow noninvasive photodetachment of stem cells. This light-induced cell detachment method based on CP films afforded temporal and spatial control of cell harvesting, as well as cell patterning. In addition, efficient photo-thermo-electric conversion was realized in a CP film that could benefit in exploiting a multifunctional flexible energy harvester.



Prof. Keiji Sasaki

Hokkaido University, Japan

E-mail:sasaki@es.hokudai.ac.jp

Research Interests:

- Laser manipulation of nanoparticles and potential analyses based on radiation pressure
- Microcavity quantum electrodynamic effects and its applications to near-field nanospectroscopy
- Quantum computing, quantum communication, and quantum lithography using photons

Research Activities:

~150 papers have been published, including 2 Science (IF=31.0), 1 Nano Letters (IF=13.0), 2 Advanced Materials (IF=14.8), 4 Journal of the American Chemical Society (IF=10.7), 3 Physical Review Letters (IF=7.9) papers, and 20 domestic and 15 international patents. For example,

1. “Beating the standard quantum limit with four entangled photons”, Science 316, 726 (2007)
2. “An entanglement filter”, Science 323, 483 **(2009)**
3. “Nanostructured potential of optical trapping using a plasmonic nanoblock pair”**,** Nano Lett. 13, 2146 (2013)

Nanomanipulation with Designed Plasmonic Nanostructures

In this presentation, we report super-resolution trapping where nanoparticles are optically manipulated in nanoscale space smaller than the diffraction limit [1]. We performed two-dimensional mapping of optical trapping potentials experienced by a 100-nm dielectric particle above a plasmon resonant gold nanoblock pair with a gap of several nanometers. The experimental results demonstrated that the potentials have nanometer-sized spatial structures that reflect the near-field landscape of the nanoblock pair. When an incident polarization parallel to the pair axis is rotated by 90°, a single potential well turns into multiple potential wells separated by a distance of approximately 230 nm (<□/2). We show that the trap stiffness can be enhanced by approximately 3 orders of magnitude compared to that with conventional far-field trapping. In addition, we propose new concept for controlling spatial profiles of gap-mode localized plasmonic fields toward the flexible nanomanipulation. We theoretically and experimentally show that the field distributions within hot spots are formed by constructive and destructive interferences of dipolar, quadrupolar, and higher-order multipolar plasmonic modes, which can be drastically altered by adjusting parameters of the excitation optical system [2-4]. Optical switching of hot spots separated by an 80-nm distance is also demonstrated using a double-nanogap plasmonic structure.

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Shu Hotta received his Doctor of Engineering degree at Kyoto University in 1988, while he was belonging to Matsushita Electric Industrial Co., Ltd. (currently, Panasonic Corporation). Since 2003, he has been a Professor of Laboratory of Polymer Physics, *Department of Polymer Science and Engineering (currently, Department of Macromolecular Science and Engineering),* Kyoto Institute of Technology (KIT). His research interests cover development of novel organic semiconductors and their optoelectronic device applications.

High–Performance Organic Light–Emitting Field–Effect Transistors

Various organic optoelectronic materials have been developed and applied to cutting-edge devices. Of these, organic light-emitting field-effect transistors are one of the most promising devices that have as display panels the great advantage of largely reducing both the number of devices and the circuit complexity [1]. If organic single crystals are used for the light-emitting layer, specific effects can be produced [1]. Meanwhile, organic materials contain a low carrier density as an intrinsic semiconductor, and so a large voltage has to be applied to the organic devices. This situation urged us to modify the device configuration by incorporating into the device a metal oxide that contains a large number of carriers (especially electrons) [2]. In the lecture device characteristics of the high-performance organic light-emitting field-effect transistors are highlighted.

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Maria Farsari received her first degree from the Physics, University of Crete and her PhD from the Physics Department, University of Durham, UK. The subject of her PhD was organic nonlinear optics.After graduating, Maria worked as a postdoctoral research fellow at the Universities of Durham and Sussex and as a Senior Optical Scientist for the security company DeLaRue Holographics. She is a founding member of Xsil Ltd, a Dublin-based company specializing in the design and manufacture of laser micro-machining equipment for the semiconductor industry.
Now Maria is a Researcher at the Institute of the Electronic Structure and Laser, Foundation for Research and Technology-Hellas, where she joined in 2003. Her main research interests are multi-photon lithography, laser-based nanofabrication, and materials processing using ultrafast lasers.

Direct Laser Writing: Principles, Materials and Applications

Direct Laser Writing (DLW) is a technique that allows the fabrication of three-dimensional structures with sub-100 nm resolution. It is based on multi-photon absorption; when the beam of an ultra-fast laser is tightly focused into the volume of a transparent, photosensitive material, polymerization can be initiated by non-linear absorption within the focal volume. By moving the laser focus three-dimensionally through the material, 3D structures can be fabricated. The technique has been implemented with a variety of materials and several components and devices have been fabricated such as photonic crystals (Fig. 1a), biomedical devices (Fig. 1b), and microscopic models (Fig. 1c).
The unique capability of DLW lies in that it allows the fabrication of computer-designed, fully functional 3D devices. Here, we summarize the principles of microfabrication, and present our recent work in materials processing and functionalization of 3D structures. Finally, we discuss the future applications and prospects for the technology.

Fig. 1: (a) A spiral photonic crystal. (b) Scaffold for cell growth (c) A micro-dancer

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C.T. Chan received his B. Sc. degree from the University of Hong Kong in 1980 and his PhD degree from the University of California at Berkeley in 1985. He is currently a Chair Professor of Physics at HKUST and the Executive Director of HKUST Institute for Advanced Study. He has been elected a Fellow of the American Physical Society since 1996. He received the Achievement in Asia Award of the Overseas Chinese Physics Association (2000) and Croucher Senior Research Fellowship (2010). He received the Michael Gale Medal for Distinguished Teaching at HKUST (1999) and is a co-recipient of Brillouin Medal for his research in phononic metamaterials (2013). His primary research interest is the theory and simulation of material properties. He is now working on the theory a variety of advanced materials, including photonic crystals, metamaterials and nano-materials.

Using Light To Push And Pull And Rotate

Light can exert radiation pressure on any object it encounters and that resulting optical force can be used to manipulate particles. It is commonly assumed that light should move a particle forward. Is it possible to pull an object using a beam of light, as a "tractor beam" does in Sci-Fi fictions and movies? It turns out that for some special "non-diffraction beams", the Poynting vector can be opposite to the k-vector, but we find that a reversed Poynting vector is not a sufficient condition for realizing an "attractive" photonic force. Our results indicate that using light to attract is difficult, but not impossible and light can indeed attract an object if the object has some special properties. For example, non-diffracting beams can attract particles with simultaneous electric and magnetic responses. For dielectric particles, such attractive forces can happen in the Mie regime. For metamaterial particles with both electric and magnetic resonances, it is possible to attract particles even in the Rayleigh regime.

In addition to negative optical force, we will also discuss the possibility of realizing "negative optical torque", meaning that incoming photons carrying angular momentum rotate an object in the opposite sense. Surprisingly this can be realized quite straightforwardly in simple planar structures. Field retardation is a necessary condition and discrete rotational symmetry of material object plays an important role. The optimal conditions will be explained.

We will show that the optical force acting on a chiral particle is qualitatively different from an achiral particle due to chirality dependent terms which couple mechanical linear momentum and optical spin angular momentum. We show that such chirality induced coupling can serve as a new mechanism to achieve optical pulling force. We also show that an anomalous lateral force can be induced in a direction perpendicular to that of the incident phonon momentum if a chiral particle is placed above a substrate that does not break any left-right symmetry. Analytical theory shows that the lateral force emerges from the coupling between structural chirality (the handedness of the chiral particle) and the light reflected from the substrate surface. Such coupling induces a sideway force that pushes chiral particles with opposite handedness in opposite directions.

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Cun-Zheng Ning received his PhD in Physics from the University of Stuttgart, Germany. He has published over 170 papers in the areas of laser physics, geometric phases, quantum optics, semiconductor optoelectronics, many-body physics in semiconductors, nanophotonics and nanolasers. He was a senior scientist, nanophotonics group leader, and nanotechnology task manager at NASA Ames Research Centre from 1997 to 2007. Since 2006, he has been professor of electrical engineering and affiliate professor in physics and in materials science and engineering at Arizona State University. He was winner of several awards including NASA and NASA contractor Achievement Awards, NASA Space Act Patent Awards, CSC Technical Excellence Award, and IEEE/Photonics Society Distinguished Lecturer Award.

Plasmonic and Metallic Cavity Nanolasers: A New Semiconductor–Laser Paradigm for Ultimate Miniaturization

In this talk, we will present a summary overview of mainly our efforts since 2006 in developing the metallic cavity nanolasers. We will start with a brief overview of short history and a background introduction to the plasmon-photon interactions, showing how such interactions might lead to a nanolaser of ever shrinking size. Recent progress in theoretical1-3 and experimental studies4-6 will then be presented, including the demonstration of the first nanolaser with size below the diffraction limit7, our recent efforts in raising the operating temperature of such nanolasers,4,5 and the eventual realization of the first CW operation of subwavelength size nanolasers at room temperature.6

Throughout the presentation, special emphasis will be placed on the unique features of such nanolasers that distinguish them from the conventional semiconductor lasers of pure dielectric cavities. We will also discuss some of attracting features that are yet to be realized experimentally, including the possibility of giant modal gain2 and interesting features of confinement factor.3 Finally, we will discuss new designs towards further miniaturization to resolve several issues of current nanolasers.8

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Frank Chuang is an assistant adjunct professor in the department of biochemistry and molecular medicine at uc davis, as well as associate director of research at the center for biophotonics. His role at the Center has been to provide in-house expertise in basic biosciences and clinical medicine – and to facilitate multidisciplinary and multi-institutional collaborations with top biomedical researchers in cancer, neuroscience, cardiovascular medicine and infectious disease, nutrition and stem cell research. His current work is directed towards the broader application of advanced live cell imaging and enabling correlative analysis with ultrahigh-resolution electron microscopy and tomography.

Biophotonic Applications in Molecular Medicine

Abstract: While the advent of biotechnologies including polymerase chain reaction, gel electrophoresis, DNA/protein microarrays, and informatics have been been critical for identifying molecular mechanisms of health and disease – further progress has been limited by the inability to visualize live biological processes at the subcellular and molecular (e.g., micron to nano-) scale. The Center for Biophotonics (C4B, headquartered at the University of California, Davis Medical Center) was originally established in 2002 by the National Science Foundation to research, develop and apply new optical and photonic technologies for the advancement of medicine and the life sciences. We present two examples in which advanced live-cell fluorescence imaging (including structured-illumination superresolution microscopy) has led to important discoveries in cancer biology and in infectious disease:

Role of Cellular Autophagy in Treatment of Prostate Cancer [1]. Autophagy, or programmed cell recycling, is a process that occurs when cells undergo nutritional starvation. Based on previous research which shows that autophagy plays an important role in modulating breast and prostate tumor cell killing by arginine demininase (ADI) – we used quantitative 3D fluorescence microscopy to image treated prostate tumor cells and study the physical changes associated with cell death. Through this approach, we were not only able to compare the relative efficacy of candidate chemotherapeutic drugs that act through stimulation of autophagy, but also discover a new mechanism of cell death mediated by autophagy.

Endocytic Mechanism of HIV Transfer between T Lymphocytes [2]. The global AIDS epidemic and continued failure (despite international efforts) to develop an effective vaccine against HIV strongly suggests that the basic mechanisms of viral infection and proliferation are still not completely understood. Utilizing a competent, highly-fluorescent modified clone of HIV, we performed high-speed spinning disk 3D scanning confocal microscopy of live infected T cells to visualize for the first time ever, the effective transmission of HIV through direct cell contact (rather than by cell-free mechanisms) Our observations support a model in which HIV gains entry into uninfected cells through direct endocytosis – and the measurements we have obtained may be useful for analyzing the effects of drugs meant to inhibit HIV infection and transmission.

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Andrews graduated with his doctorate from the Department of Chemistry, University of Toronto in 1985. He then joined AT&T Bell Laboratories as a Principal Investigator in the Materials Research Division. At Bell Labs, he worked on nanoscale materials, molecular bases of electronic packaging reliability, and nonlinear optics for communications. He joined the Department of Chemistry at McGill University in 1990.

Andrews' research is broadly based in the field of photonic and electronic materials chemistry. His research is divided between bio-derived materials and inorganic and polymer materials. In the former area, he explores synthesis, process development and applications of biopolymers and functional hierarchies of nanoscale structures derived from biology. Studies with biopolymers are concerned with optical properties for encryption, optical devices, and synthetic protocols to modify surface chemistry for hybrid polymer nanocomposites with enhanced properties. Bio-silica recruited from phytoplankton is used by the Andrews group to produce nanoscale optical devices, sensors and new kinds of mesoporous silica for catalysis. Research into inorganic and polymer materials focuses on applications in optics and electronics, optical device design and fabrication, optical sensors and printed electronics. In the area of optical materials, he develops new kinds of glasses for passive and active integrated optics, including wave division multiplexing and active light modulation. He has developed techniques for fabricating II-VI semiconductor transistors on plastic film for color liquid crystal display applications. Recently, he has developed a printable digital plastic poster that uses electroluminescence to display images at video frame rates. He has received the Premio Venezia Award for his work on plastic liquid crystal displays, and the Nano-Science and Technology Institute Award for his research and applications of nanoscale materials in image technologies.

Hybrid Materials for Photonics: Harvesting from Diversity for Optical Communications

Abstract : Photons are somewhat agnostic with respect to the medium in which they travel. Provided certain boundary conditions are fulfilled, a rather heterogeneous material base of photonic media can be recruited for optical communications. When properly conceived, this broader material base can significantly supplement, and in some case supplant, the classical hegemony of silicon and silica photonics. This talk explores some of the opportunities and challenges posed by combining hybrid materials with silicon and silica for photonics. We illustrate these by drawing on examples of optical constructs as diverse as III-V nano-rod arrays, periodic nano-structured biomaterials, and organic polymers for data- and telecom. We offer a critique of the model that would template the microelectronic manufacturing paradigm onto photonics manufacturing, and call attention to the strategic role that standardization and packaging must play in enabling the practical implementation of hybrid materials for photonics.

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Maria Antonietta Loi is the professor of Photophysics and Optoelectronics, Coordinator major in physics for the University College Groningen. She engaged in the fields of Photophysics and Optoelectronics of organic semiconductors and nanomaterials

The group of Prof. Loi studies photophysical and optoelectronic properties of unconventional semiconductors by using a multidisciplinary approach characterized by a combination of optical spectroscopy and electrical measurements. The focus of the group are new semiconducting nano-materials, with an emphasis on understanding the fundamental material properties by using optical excitation (ultrafast photoluminescence, non-linear optics, optical microscopy etc.) and electrical measurements by using the semiconductors as active elements of optoelectronic devices. Optoelectronic devices of interest concern both photon-to-charge (photodetectors and solar cells) and charge-to-light (light emitting diodes and light emitting transistors) conversion.

Singlet and Triplet exciton diffusion in organic semiconductors

Abstract: The exciton diffusion length is a very important parameter for any organic semiconductors materials used in light emitting diodes and solar cells.

This report will present two new methods for the measurement of the singlet and triplet exciton diffusion. The method to determine the singlet exciton diffusion length is based on time resolved photoluminescence and Montecarlo simulations of a polymer matrix, which contains quenchers distributed in a random fashion [1]. The method not only provides values for the exciton diffusion coefficient and length but has also the possibility to predict in which state of aggregation is the quencher [1]. Precise values of the triplet exciton diffusion coefficient are obtained by mean of heterojunctions, where triplet excitons are injected into a thin film of the material to study by a phosphorescent thin film (injector), which is optically excited and forms a sharp interface with the material under investigation. The penetration profile of the triplet excitons density is recorded by measuring the emission intensity of another phosphorescent material (detector), which is deposited on top of the material under investigation at variable distances from the injecting interface [2].

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DNA-Directed Light-Harvesting Antenna to Engineer the Optical Absorption Cross-Section forLight-to-Electrical Energy Conversion

Abstract: An artificial nanostructured antenna system is developed to study the effects of pigment position, spectrum and orientation on light-harvesting efficiency for enhancing the light conversion in photosynthetic reaction center proteins. A structurally well-defined and spectrally tunable light-harvesting system is constructed, where multiple dye molecules are conjugated to a three-arm DNA nanostructure. The complex is then attached to the reaction center protein, which converts the absorbed photonic energy into a chemical form via a cross-membrane electron transfer reaction. The key parameters that dictate the efficiency of dye-to-reaction center energy transfer and subsequent electron transfer reaction were examined using steady state and time-resolved fluorescence spectroscopy, as well as transient absorbance spectroscopy techniques. This work demonstrates the ability of DNA-templated technology to study the optimization of spectral properties, energy transfer efficiency and photo-stability of the system. This nano-scaled device has future applications in electrical energy production and light driven bio-catalysis.

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Optical Properties on Demand: From Metamaterial to Metadevices

Abstract: Metamaterials, artificial electromagnetic media achieved by structuring on the subwavelength scale, were initially suggested as negative index material for the “superlens” and for transforming electromagnetic space to control propagation of waves. The research agenda is now shifting to achieving tunable, switchable, nonlinear and sensing functionalities using metamaterails. We show how engaging the changing balance of forces, structural transformation, light confinement, coherent control and quantum effects at the nanoscale brings about the emerging field of metadevices that we define as devices with unique and useful functionalities achieved by structuring of functional matter on the subwavelength scale.

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Tarik Bourouina was born in 1967. He holds a Master of Science (Physics), a Master of Engineering (Electronics) and the Ph.D. degree (1991), and the Habilitation Degree (2000) from Université Paris-Sud, Orsay. His entire career was devoted to the field of MEMS and Lab-On-Chip micro-instrumentation. He started research at ESIEE Paris in 1988 among the pioneers in MEMS-based silicon microphones, which he extended to acoustic-based gyroscopes. He then had several significant contributions in the area of optical MEMS and micro-photonics, among which the smallest MEMS-based FTIR Optical Spectrometer, jointly developed with Si-Ware-System and Hamamatsu Photonics, which was awarded best product of the year of Japan in 2013 and the 2014 Prism award on photonics innovation in 2014.

Dr. Bourouina took several academic positions in France and in Japan, at the Université Paris-Sud Orsay, at the French National Center for Scientific Research (CNRS) and at The University of Tokyo. Since 2008, he is the representative of Université Paris-Est in the international research network on Nano and Micro Systems (NAMIS), gathering research groups from 12 universities http://namis.iis.u-tokyo.ac.jp/

Dr. Bourouina is now full Professor at ESIEE Paris, Université Paris-Est since 2002, appointed as Dean for Research since 2012 and Deputy Director of the ESYCOM Laboratory since 2009. His current interests include optofluidics and analytical chemistry on-chip, seeking new opportunities for MEMS in the areas of Sustainable Environment and Smart-Cities. He is the Co-Laureate of the French Excellence Grant for Large Equipments (EquipEx 'Sense-City'), gathering researchers from ESIEE Paris, IFSTTAR, CSTB and Ecole Polytechnique. Dr. Bourouina was also actively involved in the development of several companies launched by his former students and colleagues from ESIEE Paris, which include Si-Ware Systems, Fluidion, Memscap and MEMS-Schlumberger. http://www.esiee.fr/en/recherche/

He is Senior Member of the IEEE since 2005.

Optomechanical and Optofluidic Micro-instrumentation Based on Free-space Light

Recent trends of Optical MEMS, which consists of the on-chip co-integration of microphotonics with movable micromechanical parts, address new directions of research with considerable momentum towards miniaturized instrumentation in biology, chemistry, physics and materials science. The most recent target applications include handheld optical spectrometers for fluid composition analysis, swept laser source and non-invasive biomedical-imaging technique.

On the other hand, Lab-on-Chip is already a well-established technology, whose main application area relates to biology and medical diagnosis. But recently, 'Sustainable Environment' and 'Smart Cities' appeared as other important emerging application areas with potentially a global impact.

In this presentation, we elaborate on micro-instrumentation for the study of the environment and the measurement of fluidic natural resources, with focus on air quality, water quality and complex fluids. Illustration is given of merging optical MEMS with microfluidics technologies, leading to optofluidic devices, with increased capabilities, raising in the same time new questions on the related science and technological challenges in micro and nanofabrication.

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Joseph Talghader obtained his B.S. in electrical engineering from Rice University in 1988. He was awarded an NSF Graduate Fellowship and attended the University of California at Berkeley where he received his M.S. in 1993 and Ph.D. in 1995. In graduate school, Dr. Talghader studied semiconductor lasers and microfabrication techniques and developed assembly techniques for vertical-cavity surface-emitting lasers. From 1992 to 1993 he worked at Texas Instruments as a Process Development Engineer, where he investigated EEPROM memory design and reliability issues. After graduating from Berkeley in 1995, he joined Waferscale Integration where he developed microfabrication processes for high-density nonvolatile memory devices. In 1997 Dr. Talghader joined the faculty at the University of Minnesota as an Assistant Professor and was later promoted to full Professor.

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High-performance organic optoelectronic devices enabled by micronanostructures

Abstract: Micronanostructures show excellent efficiency in manipulating the generation and propagation of photons in materials and have played important roles in optical and optoelectronic devices. We have investigated systematically the fabrication of micronanostructures in organic optoelectronic devices and their effects on improving the device performance. The waveguide and surface plasmon-polariton (SPP) modes that were generally lost in conventional bottom-emitting OLEDs have been successfully recovered by employing the micronanostructures, and a much enhanced light extraction has been observed. The introduction of the periodic corrugation into the top-emitting OLEDs (TOLEDs) is effective in relieving the tradeoff between device lifetime and efficiency, through the coupling of the SPPs associated with the Ag cathode and the microcavity mode. A microstructured cavity with periodically and gradually changed cavity length has been introduced into the TOLEDs and exhibited its effects in eliminating the angular dependence of the emission wavelength and intensity. Dual-periodic corrugations which excite the SPPs resonance at two separate wavelengths have been introduced into the metallic electrodes of the white organic light-emitting devices (WOLEDs) to realize a broadband light extraction. Moreover, the enhanced light absorption has also been realized by integrating micronanostructures in organic solar cells.

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Andrews graduated with his doctorate from the Department of Chemistry, University of Toronto in 1985. He then joined AT&T Bell Laboratories as a Principal Investigator in the Materials Research Division. At Bell Labs, he worked on nanoscale materials, molecular bases of electronic packaging reliability, and nonlinear optics for communications. He joined the Department of Chemistry at McGill University in 1990.

Andrews' research is broadly based in the field of photonic and electronic materials chemistry. His research is divided between bio-derived materials and inorganic and polymer materials. In the former area, he explores synthesis, process development and applications of biopolymers and functional hierarchies of nanoscale structures derived from biology. Studies with biopolymers are concerned with optical properties for encryption, optical devices, and synthetic protocols to modify surface chemistry for hybrid polymer nanocomposites with enhanced properties. Bio-silica recruited from phytoplankton is used by the Andrews group to produce nanoscale optical devices, sensors and new kinds of mesoporous silica for catalysis. Research into inorganic and polymer materials focuses on applications in optics and electronics, optical device design and fabrication, optical sensors and printed electronics. In the area of optical materials, he develops new kinds of glasses for passive and active integrated optics, including wave division multiplexing and active light modulation. He has developed techniques for fabricating II-VI semiconductor transistors on plastic film for color liquid crystal display applications. Recently, he has developed a printable digital plastic poster that uses electroluminescence to display images at video frame rates. He has received the Premio Venezia Award for his work on plastic liquid crystal displays, and the Nano-Science and Technology Institute Award for his research and applications of nanoscale materials in image technologies. His accomplishments in technology transfer include two companies that have employed some 120 individuals in the optical communications domain.

Professor Andrews is a co-founder of the McGill Institute for Advanced materials. He has over 180 publications in peer reviewed journals and conference proceedings. His research is also recorded in 10 patents, granted or pending. His 80 invited lectures stand against a backdrop of over 100 contributed lectures. His laboratory has 6 active PhD/MSc students, 1 visiting professor, 2 postdoctoral fellows and 3 undergraduate students. He currently serves on the editorial board of the Nature Journal, Light Science and Applications.

Dr. Laura Bellia

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Laura Bellia was born in Vicenza on 03/05/1960, she graduated with honors in Architecture at the University of Naples on 29/03/1984; member of the Order of Architects of the Province of Naples since September 1984; In 1984-1989 she attended some courses at the Faculty of Mathematics of the University of Naples and cooperated to some research projects about energy saving in buildings;
in 1990 she was admitted to the PhD School in "Building Physics" at the University of Ancona; In 1993 she obtained a PhD degree, with a thesis dealing with" Daylighting availability: survey of algorithms, procedures and experimental methods for the evaluation and acquisition of data. Experimental validation of a numerical simulation model".

Research Activity:

Her interests of research are about environmental controls with particular attention towards thermal and hygrometric conditions and lighting. Her researches deal with the thermal behavior of the building envelope, analysis of innovative strategies for energy savings in heating and air conditioning of buildings as evaporative cooling techniques, use of desiccant wheels for hygro-thermal control and technical-economical convenience of earth-to-air heat exchangers applied to Italian climate. Moreover she carried out researches about environmental controls in museums and lighting. Lighting represents today her main interest and her research activity is focused on analysis of visual environment, visual comfort, color quality and non visual effects of light. Her researches about measurements of glare are now focused on luminance maps analysis and on luminance-brightness relationships. With this aim, she has set up a video luminance meter system based on HDR (High Dynamic Range) technique in order to evaluate the effects of spectral distribution of light sources on visual and color perception and acceptance of environments. At the same time she is investigating, in cooperation with the Department of Psychology, about the circadian impact of light on humans and in particular the effects of different spectral irradiances at the eyes' level in educational and office environments in presence of light sources as LED, fluorescent and daylight. Furthermore, she is now carrying out experimental researches about perceived and measured colors under LED sources with different correlated color temperature.

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Prof. Che Ting Chan

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C.T. Chan received his B. Sc. degree from the University of Hong Kong in 1980 and his PhD degree from the University of California at Berkeley in 1985. He is currently a Chair Professor of Physics at HKUST and the Executive Director of HKUST Institute for Advanced Study. He has been elected a Fellow of the American Physical Society since 1996. He received the Achievement in Asia Award of the Overseas Chinese Physics Association (2000) and Croucher Senior Research Fellowship (2010). He received the Michael Gale Medal for Distinguished Teaching at HKUST (1999) and is a co-recipient of Brillouin Medal for his research in phononic metamaterials (2013). His primary research interest is the theory and simulation of material properties. He is now working on the theory a variety of advanced materials, including photonic crystals, metamaterials and nano-materials.

Prof. Jianlin Cao

Ministry of Science and Technology of the People´s Republic of China, China

Jianlin Cao is Professor in Optics and Vice Minister of the Ministry of Science and Technology of China. He graduated from the Department of Physics at Fudan University in 1982, and obtained his PhD degree from the joint-training program at the Changchun Institute of Optics and Fine Mechanics (CIOFM), Chinese Academy of Sciences (CAS), and Tohoku University in Japan in 1989. From 1989 to 1992, he undertook postdoctoral research at CIOFM, later working as a research professor, supervisor of PhD students, Executive Deputy Director (legal representative) and Director of CIOFM, as well as Director of the Changchun Institute of Optics, Fine Mechanics and Physics. He served as an assistant to the President of CAS, head of the preparatory CAS Opto-Electronics Group, and President of the CAS Academy of Opto-Electronics. In January 2005, he was nominated for Vice President of CAS, President of the CAS Academy of Opto-Electonics, and Director of the State Key Laboratory of Applied Optics. In September 2006, he was appointed as Vice Minister of the Ministry of Science and Technology of China. He is also Editor-in-Chief of the journal Optics and Precision Engineering and holds editorial positions with several other academic journals.

Cao has been working in the area of soft x-ray multilayer technology research and has received recognition both domestically in China and internationally for his outstanding achievements. He was one of the first researchers to be selected for the “CAS 100 talents” in 1994; he received first grade awards for young scientists from CAS in 1995 and the National Science Fund for Distinguished Young Scholars of China in 1997.

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Tianhong Cui is currently a Professor of Mechanical Engineering and an Affiliate Senior Member of the graduate faculty in Department of Electrical and Computer Engineering and Department of Biomedical Engineering at the University of Minnesota. He joined the faculty of the University of Minnesota in 2003. From 1995 to 2003, he held research or faculty positions at Tsinghua University, University of Minnesota, National Laboratory of Metrology in Japan, and Louisiana Tech University, respectively. He was also a visiting professor at University of Freiburg in Germany in 2006-2007.

His current research interests include MEMS/ NEMS and nanotechnology. He has more than 240 publications and 5 patents in MEMS and nanotechnology. His research has been sponsored by NSF, DARPA, NASA, DOE, etc. He received research awards including the STA & NEDO fellowships in Japan, the Alexander von Humboldt Fellowship in Germany, the Research Foundation Award from Louisiana Tech University, the Richard & Barbara Endowed Chair from the University of Minnesota, and numerous best paper awards. He is serving as an associate editor for Journal of Nanoscience & Nanotechnology and Journal of Nano Research, a past associate editor for IEEE Sensors Journal. He is an Executive Editor-in-Chief for Light: Science and Applications.

Prof. Kin-Seng Chiang

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Kin Seng Chiang received the B.E. (first-class Honours) and Ph.D. degrees in electrical engineering from the University of New South Wales, Australia, in 1982 and 1986, respectively. After spending six months in the Department of Mathematics, Australian Defence Force Academy, Canberra, he joined the Division of Applied Physics, Commonwealth Scientific and Industrial Research Organization (CSIRO), Sydney, Australia, in 1986, and worked there as a Research Scientist/Senior Research Scientist till 1993. In 1987, he received a Japanese Government Research Award for Foreign Specialist and visited the Electrotechnical Laboratory in Tsukuba City, Japan, for six months. From 1992 to 1993, he worked concurrently for the Optical Fiber Technology Center of the University of Sydney. He joined the City University of Hong Kong in 1993, where he is a Chair Professor of Electronic Engineering and Director of CityUHK-UESTC Joint Research Center on Optical Fiber Sensing and Communications.He has published over 440 papers in international journals and conference proceedings, as well as several book chapters. His research areas cover various aspects of the optical fiber and waveguide technology, including theory and modelling, measurement and characterization, device and sensor development, and nonlinear effects.

ProfessorChiang is a Fellow of the Optical Society of America, a recipient of the Croucher Award for 2000–2001, a Chang Jiang Chair Professor (2007–2010) and a Thousand Talents Program Professor(2012 – present) at the University of Electronic Science and Technology of China. He is an Associate Editor of Light: Science & Applications and IEEE/OSA Journal of Lightwave Technology and is serving on the advisory/editorial boards of several international journals, includingOptics Communications, International Journal of Optics, and Photonic Sensors. He has participated in the organizing of more than 30 international conferences in different capacities.

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Daoxin Dai received the B. Eng. degree from the Department of Optical Engineering of Zhejiang University in 2000 and obtained his Ph. D. degree from the Royal Institute of Technology (KTH), Sweden, in 2005. He joined ZhejiangUniversity as an assistant professor in 2005 and became an associate professor in 2007, a full professor in 2011. He worked at the University of California at Santa Barbara (UCSB) as a visiting scholar from Nov. 2008 till Sept. 2011. Dr. Dai is a recipient of the award for Outstanding Young Scientist of Zhejiang Province (in 2009), Jin-Guofan Fellowship for Young Scholars (in 2008), and the first-class Zhejiang Provincial Prize of Science & Technology (in 2007). He has been supported by the Qiang-Jiang Talent Program (in 2006), and Zhejiang Provincial Outstanding Youth Foundation (in 2008). His current research interest is silicon micro-/nano-photonics for optical communications, optical interconnects, and optical sensing. He has published more than 110 refereed international journals papers (including 7 invited review papers), and has received 11 patents. Dr. Dai has been invited to give more than 10 invited talks and served as the TPC member or session chair for some international conferences (including OFC 2013, 2014 and 2015). He is serving as the Associate Editor of the Journals of "Optical and Quantum Electronics"and "Photonics Research".

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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.

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Min Gu is an elected Fellow of the Australian Academy of Science, the Australian Academy of Technological Sciences and Engineering, the Australian Institute of Physics, the Optical Society of America, the International Society for Optical Engineering and the Institute of Physics (UK).

Professor Min Gu is a Laureate Fellow of the Australian Research Council, a University Distinguished Professor and Director of the Centre of Micro-Photonics at Swinburne University of Technology. He was appointed as Pro Vice-Chancellor for International Research Collaboration (IRC) at Swinburne in 2009 and Pro Vice-Chancellor for Research Capacity in 2012. Professor Gu was a member of Prime Minister's 2014 Trade Delegation (Education) to China. He is a member of the Pawsey Medal Award Committee of the Australia Academy of Science and was a council member of the Australian Optical Society (AOS). He was also President of the International Society of Optics within Life Sciences and Vice President of the International Commission for Optics (ICO) (Chair of the ICO Prize Committee, member of the ICO Galileo Galilei Award Committee, the Young Scientist Prize Committee in Optics of the International Union of Pure and Applied Physics (United Nations)). He serves on the Board of Directors of the Optical Society of America (OSA) (Executive committee, the finance committee, Chair of the International Council, Chair of the Working Group on Asia).

He is a pioneer and an internationally-leading authority on three-dimensional optical imaging science. He is a sole author of two standard reference books and the first author of the book published by Cambridge University Press. He has over 800 publications (over 400 papers in internationally refereed journals including Nature, Nature Photonics and Nature Communications) in nano/biophotonics. He is a member of the 15 Editorial Boards of top international journals. He has been a member of the Advisory/Steering/Organizing committees as well as a plenary/invited/keynote speaker of many international conferences (more than 250). Professor Gu's ground-breaking research work in the area of nano/biophotonics has been featured more than 2500 times in media reports. His inventions in high-density optical data storage, nanoplasmonic solar cells and nonlinear optical endoscopy, has led to the establishment of six spin-off companies and industrial joint R&D projects with international leading companies.

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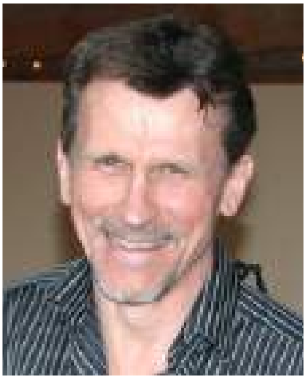
Chunlei Guo is a professor in The Institute of Optics at University of Rochester. His research is in the area of femtosecond laser-matter interactions at high intensities. He received his Ph.D. in Physics from University of Connecticut, and was later named one of the University's 40 Under 40 Outstanding Alumni. His postdoctoral training was at Los Alamos National Laboratory, where his work was awarded the Postdoctoral Publication Prize in Experimental Sciences. He joined the faculty of University of Rochester in 2001. His research at Rochester led to the discoveries of the so-called Black and Colored Metals, which may find a broad range of technological applications and have been covered extensively by the media. He is an elected Fellow for both American Physical Society and Optical Society of America. He has authored well over 100 refereed journal articles and has been playing an active role in serving the scientific community.



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Stefan Kaierle studied electrical engineering and went on to do his PhD in mechanical engineering at RWTH Aachen University. In 1998 he entered Fraunhofer ILT as a department head for system technology. In this role, his main research was focused on laser system technology, laser materials processing, laser process control and optics, as well as related fields like eco-efficiency, automation and laser engineering. He published more than 150 scientific papers in journals and conferences in that field. Also, he holds more than 10 patents. He had been appointed to two guest professorships at Changchun University (in 2005) and at Beijing University of Technology (in 2007), China. In 2012, he moved to Laser Center Hannover (LZH) and assumed responsibility for the department of Materials and Processes. Stefan Kaierle has been the President of the European Laser Institute (ELI) for 10 years (2003-2013) and is now member the Board of Directors of the Laser Institute of America (LIA). He has been chairman and board member of many international conferences. His academic achievements have been honored by the Laser Institute of America (Fellow), the European Laser Institute (Fellow) and the CIOMP (Honorary Professor).

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Byoungho Lee received his B.S. and M.S. degrees from Seoul National University (SNU) in 1987 and 1989, respectively. He received his Ph.D. degree from the Department of Electrical Engineering and Computer Science, University of California at Berkeley in 1993. He has been a faculty member in the School of Electrical Engineering, SNU since September 1994. Prof. Lee is a Fellow of SPIE, OSA and IEEE, and a Member of the Korean Academy of Science and Technology. He has served as a Director-at-Large of OSA and the Chair of the Member and Education Services Council of OSA. Currently, he is serving on the editorial boards of Optics Letters, Light: Science and Applications and the Journal of the Society for Information Display. He is also a Vice-President of both Optical Society of Korea (OSK) and Korean Information Display Society. He has received several distinguished awards including the Scientist of the Month Award of Korea (Sep. 2009), The Academic Award of OSK (2006) and the Academic Award of SNU (2013). His research fields are digital holography, 3D display and plasmonics.

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Lin Li, Fellow of Royal Academy of Engineering (FREng),holds a chair of laser engineering, Director of Laser Processing Research Centre at The University of Manchester UK. He has over 550 publications in peer reviewed journals and conference proceedings and 47 patents related to laser processing photonic engineering. In addition to FREng, he has been elected to Fellow of International Academy for Production Engineering (CIRP), Fellow of Institute and Technology (IET), and Fellow of Laser Institute of America (LIA), Fellow of International Academy of Photonic Science and Laser Engineering (IAPLE) and Fellow of International Association of Nano-manufacturing. He serves on the editorial boards of 11 international journals and is a director of Laser Institute of America, member of Executive Committee of Association of Laser Users (AILU), a member of UK Advanced Design and Manufacturing National Technical Committee, President of International Academy of Photonic Science and Laser Engineering. Professor Li received Sir Frank Whittle Medal from the Royal Academy of Engineering, UK in 2013 for his outstanding and sustained achievements in engineering innovations in manufacturing that has led to wide commercial applications in the aerospace, automotive, medical, energy and security industries. In 2014 he received Wolfson Research Merit Award from the Royal Society for his research on laser nano-fabrication and nano-imaging. He was elected as the Researcher of the Year at The University of Manchester, UK, in 2014. He has been the chairman of 36th and 37th MATADOR international conferences on advanced manufacturing. Professor Li obtained his BSc degree in electrical engineering from Dalian University of Technology in 1982 and a PhD in laser engineering from Imperial College, London in 1989.

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Xingde Li received his PhD degree in Physics and Astronomy from the University of Pennsylvania in 1998, and is now a full professor of Biomedical Engineering, Electrical and Computer Engineering at the Department of Biomedical Engineering, Johns Hopkins University. His research interest/expertise centers on Biomedical Photonics technology development and applications. He has been chairing many national and international conference sessions and conferences such as the recent Gordon Research Conference on Laser in Biomedicine 2012, OSA Biomedical Optics Topical Meetings 2012, and Photonics Asia 2012 etc. In addition, Dr Li also served as the Chair of the Emerging Technologies Committee of IEEE - EMBS Society between 2006-2010. He is currently serving on the editorial board of several international journals in the area of biomedical photonics including the Journal of Biomedical Optics (SPIE), Biomedical Optics Express (OSA), and the IEEE Transactions on Biomedical Engineering etc. He is a Fellow of OSA, SPIE and AIMBE.

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Gui Lu Long is a professor at Tsinghua University. He received his B.Sc. from Shandong University in 1982, and Ph.D. from Tsinghua University in 1987 respectively. He has been working in Tsinghua since 1987. During 1989-1993 he was a research fellow in the University of Sussex in UK.

His research interests include quantum communication, quantum computing and optical microcavity. In 2000, he proposed the first quantum secure direct communication protocol in the world and opened a new area of research, which remains a hot topics of study for more than 10 years. He also proposed first multi-party high dimensional quantum dense coding protocol and other protocols, and made important contribution to distributed quantum communications. He established the important phase matching condition in quantum search algorithm, designed an exact quantum search algorithm that improves the success rate Grover algorithm to 100%. His team has experimentally demonstrated world's first nonadiabatic holonomic quantum computing last year, and completed the first experimental digital simulation of quantum tunnelling in a small-scale quantum computer.

He is a fellow of IoP and fellow of APS. He is the current vice president of Associations of Asian Pacific Physical Societies, a member of C13 of IUPAP. He is the deputy-director of quantum optics group of Chinese Physics Society. In 2009, he received the Yao Yutai Physics Award of Chinese Physics Society, the top award in atomic, molecular and optical physics of CPS. He won a national award for progress in natural science in 2013.

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Dongge Ma studied semiconductor device physics at Liaoning University and Jilin University (China), where he received his BSc in 1989 and PhD in 1995, respectively. After additional years as a visiting professor and research fellow in Universidade Federal do Paranál, Brazil, and Durham University and St. Andrews University, UK, he joined Changchun Institute of Applied Chemistry, CAS, as a professor in 2001. Now he is a group leader of organic optoelectronic device physics in Research Center for Advanced Organic Optoelectronics, State Key of Polymer Physics and Chemistry. His research is focusing on the studies of organic optoelectronic devices, including white organic light-emitting diodes, organic photovoltaic cells and photodetectors and organic lasers, and the physics processes in organic semiconductors. Up to now, he has published over 200 papers on organic electronics, and the cited numbers in published papers are over 1000 times. He also has patents of over 30.

Prof. Herve Maillotte

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Hervé Maillotte, CNRS 1st class Research Director, is Head of Optics Department (90 people) and member of the management committee of FEMTO-ST Institute (the largest French research institute in Engineering Sciences, > 700 people) in Besançon, France since 2006. PhD in Nonlinear Optics from Franche-Comté Univ. in 1990, CNRS Researcher at Lab. Optique P.M. Duffieux in 1991, Nonlinear Optics Group leader at FEMTO-ST from 1997 to 2005, he has initiated research on parametric amplification in optical fibers and also launched several other topics in nonlinear guided or self-guided wave optics, like spatio-temporal control of stimulated scattering, spatial Kerr & photorefractive soliton dynamics, 3rd-order nonlinear organic materials and Z-scan measurements, supercontinuum generation in conventional & microstructure fibers, and more recently optoacoustics in microstructure fibers and photonic micro-nanowires and distributed Brillouin sensing applications. Since 2012 he is a working group leader and executive committee member of the Excellence Laboratory ACTION gathering FEMTO-ST and 2 other multidisciplinary French research institutes. Hervé Maillotte has authored or co-authored > 180 international publications and supervised 19 PhD students and 7 post-docs. He holds 2 European patents, was awarded the “Gold Photon 2005” of OPTO Fair in Paris along with a SME for a compact supercontinuum source prototype, and is currently recipient of the CNRS scientific excellence bonus. He has been scientific coordinator of > 20 academic and industrial research contracts or cooperation programs, has served in various scientific and organization committees of conferences and summer schools, and as a scientific advisor or evaluator in various funding, prospective and evaluation bodies, all these activities being at nat. & internat. levels. Hervé Maillotte has launched a collaborative regional technology transfer platform on Development and Integration of Optical Systems in 2006, of which he is boardof directors’ member, and he is vice-chairman and board ofdirectors’ member of FEMTO-Engineering, a technology development unit he contributed to the creation in 2012.He is also regularly involved in scientific dissemination and vulgarization, currently contributing to the regional preparation of the International Year of Light 2015 (promulgated by UNESCO and the United Nations). He is currently holding several editorial positions in academic journals (Light: Science & Applications – Nature Publishing Group, Journal of Optics - IOP).

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Ting MEI got his Bachelor's and Master's Degrees from Zhejiang University and his Ph.D. Degree from the National University of Singapore. He is presently a professor in School of Science, Northwestern Polytechnical University. In his early career, he subsequently worked as an assistant research in Zhejiang University and a research engineer in the Institute of Microelectronics, Singapore. During 2000-2013, he was Assistant Professor, tenured Associate Professor, and Visiting Professor successively in the School of Electrical and Electronic Engineering, Nanyang Technological University, where he was the founding supervisor of Nanophotonics Laboratory and the principal investigator for a 10M-dollar competitive research program funded by the National Research Foundation, Singapore. He worked as the Director of the Institute of Optoelectronic Materials and Technology, South China Normal University during 2009-2013. His research interests include nanophotonics, photonic integrated circuit technology, low-dimensional semiconductor structures and devices and infrared detection. He has published over 100 journal papers and co-authored one book. He is a senior member of IEEE and served as Vice President of IEEE-LEOS/Photonics Society Singapore Chapter for 2004 and 2005 and a member of IEEE EDS Optoelectronic Devices Committee for 2014 and 2015. He organized the 2nd and the 4th OSA topical conferences of Advances in Optoelectronics and Micro/nano-optics (AOM) as a conference co-chair.

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Min Qiu received the Ph.D. degree in Condense Matter Physics from Zhejiang University, China, in 1999. He received his second Ph.D. degree in Electromagnetic Theory from the Royal Institute of Technology (KTH), Stockholm, Sweden, in 2001. In 2001 he joined the School of Information and Communication Technology, KTH, as an assistant professor. He became an associate professor in 2005, and a full professor (Professor of Photonics) in 2009. In 2010, he became a special-term distinguished professor at the Zhejiang University, China. He is an author or co-author of more than 160 international refereed journal papers, and more than 150 conference contributions. His research interests include nanofabrication method, optical metamaterials, photonic crystals, plasmonic optics, and integrated optical circuits. Prof. Qiu is a Fellow of the Optical Society of America (OSA) and a Fellow of the International Society for Optics and Photonics (SPIE).