中科院长春光机所 CIOMP 1952-2012

Celebrate CIOMP 60th anniversary

Photonics Trend 2012

Sep.17–18, 2012, Changchun, China

Optics and Fine Mechanics China 2012 Symposium

Sep. 19–20, 2012, Sanya, China

Organizers:

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

Optical Society of America (OSA)

Laser Association of Russia

China–Russia Technology Park in Changchun

Sponsor:

Bureau of International Co-operation Chinese Academy of Sciences

1952–2012

Contents

Welcome to CIOMP

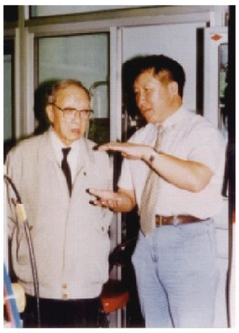
On behalf of the Changchun Institute of Optics, Fine Mechanics and Physics (CIOMP), we welcome your participation in this International Conference on Photonics Trend 2012. In a golden autumn time of harvest and achievement, on a day of glory and celebration, the 60th anniversary of our Institute has arrived. Thank you for giving us the opportunity to host this conference in our Institute on a very special occasion.

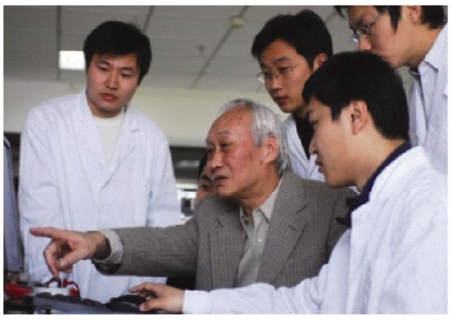
In attracting specialists, researchers, investors and entrepreneurs in the field of Photonics from all over the world, Photonics Trend 2012 will provide an international forum for exchanging information on recent advances and future trends between us all.

Our Institute has been honored with the title "The Cradle of China's Optics" due to its major contributions to China's optical research and engineering prowess, as well as its impact on scientific and technological development, economic expansion and social progress. We have established many scientific collaborations and long-term exchange programs with more than 30 countries, as well as multi-group cooperation with leading organizations, including the OSA, the SPIE, the Nature Publication Group, and the Russia Laser Association. We welcome our friends from all over the world who are visiting our Institute. We believe that, through the activities, we can advance future collaborations and promote the research and engineering to the Photonics community. Finally, we wish you a rewarding experience at CIOMP and pleasant stay in Changchun!

Prof. Ming Xuan

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





The cradle of China's Optics

——CIOMP celebrates 60th anniversary

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.

Prof. Leo Esaki
President, Yokohama College of Pharmacy
Chairman, The Science and Technology Promotion Foundation of Ibaraki
E-mail:leoesaki@epochal.or.jp

Reona Esaki also known as Leo Esaki (江崎 玲於奈 Esaki Reona, born March 12, 1925) is a Japanese physicist who shared the Nobel Prize in Physics in 1973 with Ivar Giaever and Brian David Josephson for his discovery of the phenomenon of funneling. He is known for his invention of the Esaki diode, which exploited that phenomenon. This research was done when he was with Tokyo Tsushin Kogyo (now known as Sony). He has also contributed as a pioneer of the semiconductor superlattice while he was with IBM. All empires fall, you just have to know where to push.

Congratulation on the occasion of the 60th Anniversary of the Changchun Institute of Optics, Fine Mechanics & Physics (CIOMP)

To President and Professor XUAN Ming

I would like to contribute my version of congratulation on the occasion of the 60th Anniversary of the Changchun Institute of Optics, Fine Mechanics & Physics (CIOMP). My career began with the recognition of tunneling in solids due to the wave nature of electrons, and subsequent extending to man□ made solids in collaboration with Professor Tsu, that resulted in opening of the field of superlattices including resonant tunnelingand subsequently leading to metamaterials, an important field of endeavor in optical science.Drawing on the parallelism of my scientific endeavor with the development of CIOMP in scientific and technological ramifications, I recognize the important contribution of your institute with successfully introducing the science and technology of lasers in no more than few years after the discovery of lasers. Furthermore, today CIOMP is considered as an institute of prominence, not just in China, but also in the world as a majorInstitute of optical Science and Technology.

President, Yokohama College of Pharmacy
Chairman, The Science and Technology Promotion Foundation of Ibaraki
E-mail:leoesaki@epochal.or.jp

Prof. Xi-Cheng Zhang

Director of the Institute of Optics, University of Rochester

M. Parker Givens Professor of Optics

Xi-Cheng.zhang@rochester.edu

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). He received 26 US patents, published 23 books and book chapters, authored and co-authored over 300 reviewed scientific papers, delivered over 400 colloquia, seminars, invited conference presentations, and 300 contributed talks (since 1990). He is a Lifetime Fellow of IEEE, OSA, and APS. Dr. Zhang's honors and awards include: IEEE Photonics Society William Streifer Scientific Achievement Award (2011); Rensselaer William H. Wiley 1866 Award (2009); the Japan JSP Fellowship and Canadian NRC-CIAR Distinguished Visiting Scientist (2004); International Commission for Optics Traveling Lecturer Award, OSA representative for LASER EXPO, Germany Heinrich Rudolf Hertz Lecturer (2003), and OSA Fellow Lecturer (2002). He also served two years as Distinguished Lecturer of IEEE/LEOS. He received Rensselaer's Early Career Award (1996), Research Corporation Cottrell Scholar Award (1995), NSF Early Career Award (1995), Hong Kong K.C. Wong Prize (1995), and NSF Research Initiative Award (1992).

THE INSTITUTE OF OPTICS
Xi-Cheng Zhang
Director and Professor of Optics

HAJIM SCHOOL OF ENGINEERING & APPLIED SCIENCES
UNIVERSITY of ROCHESTER

August 31, 2012

Professor Ming Xuan
President
Changchun Institute of Optics, Fine Mechanics and Physics, CAS
3888 Dong Nan Hu Road
Changchun 130033 China

Congratulations from The Institute of Optics, University of Rochester on the 60th Anniversary of Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Science

Dear President Xuan Ming and colleagues:

In a golden autumn time of harvest and hope, on a day of glory and joy, the 60th anniversary of Changchun Institute of Optics, Fine Mechanics and Physics (CIOMP), has arrived. I hereby represent The Institute of Optics, University of Rochester to send our sincere congratulations!

CIOMP has become the major base of scientific research and product development?in fine remote sensing in space optics, airborne photoelectric platform and large-scale radiometry system in all of China. For its great contributions to China's Optics development, science and technology progress, economic construction and the training of hi-technology talents, CIOMP had been honored as "The Cradle of China's Optics."

Founded in 1929 as the first Optics education program in the United States of America, The Institute of Optics, University of Rochester, is the origin of American modern Optics. It is my genuine hope that both institutes, CIOMP and UR Optics, joining together, will strengthen our innovative contributions to the world's Optics development and the education of high-technology talents!

X.-C. Zhang
Director of the Institute of Optics
M. Parker Givens Professor of Optics

College of Optical Sciences
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Professor Ming Xuan
President
Changchun Institute of Optics, Fine Mechanics and Physics, CAS
3888 Dong Nan Hu Road
Changchun 130033 China

September 6, 2012

Dear Prof. Ming,

I am writing on behalf of the College of Optical Sciences at the University of Arizona to offer our heartiest congratulations to the Changchun Institute of Optics, Fine Mechanics and Physics (CIOMP) and the Chinese Academy of Sciences as you celebrate the 60th anniversary of CIOMP.

CIOMP is recognized around the globe for its remarkable research accomplishments and for the quality and impact of its educational programs. Speaking for all of us involved in the field of optics, it is rewarding to see that the pace of advances in optics and optical technologies continues to accelerate. I am certain that CIOMP will enjoy great success in its continuing role of educating tomorrow's technology leaders to face this challenge, and can look forward to another 60 years of scientific and technological innovations!

Congratulations!

Sincerely,

Thomas L. Koch
Dean, College of Optical Sciences

General Information

Photonics Trend 2012:

Date: Sept. 17-18, 2012

Conference Venue: Research and Development Building, Changchun Institute of Optics, Fine Mechanics and Physics (CIOMP), 3888 Dongnanhu Road, Changchun, China.

Optics and Fine Mechanics China 2012 Symposium:

Date: Sept. 19-20, 2012

Conference Venue: Palm Beach Resort & Spa, Sanya bay tourist resort, China

Schedule of the conference Photonics Trend 2012		
Date	**Time**	**Content**
Sep. 17	9:00-9:10	Opening of the CIOMP 60 anniversary celebration meeting and introducing VIP guests & congratulatory organizations
	9:10-10:00	Prof. Ming Xuan, CIOMP president
	10:00-10:10	Prof. Jianlin Cao, Vice President of MOST
	10:10-10:20	Leadership from Jilin Province
	10:20-10:30	Leadership from CAS
	10:30-10:40	Elizabeth A. Rogan (CEO of Optical Society of America)
	10:40-10:50	Prof. Bingkun Zhou, CAS academician
	10:50-11:00	Young researcher representative
	11:00-11:15	Introducing the discovery process of a planet named after CIOMP and issuing the certificate
	11:15-11:30	Closing of the celebration meeting
	11:30-13:00	Lunch
Sep. 17	**Section 1 Chair: Prof. Xuejun Zhang (Vice president of CIOMP)**	
	13:30-13:35	Opening of the international conference by CIOMP President (Prof.Ming Xuan)
	13:35-13:40	Congratulations from Nobel Prize Winners
	13:40-14:10	Invited talk 1 (Prof. Jianlin Cao)
	14:10-14:40	Invited talk 2 (Prof. Donna Strickland, OSA president in 2013,University of Waterloo, Canada)
	14:40-15:00	Group photo
	15:00-15:20	Coffee break
	Section 2 Chair: Prof. Tony Heinz (OSA president, Columbia University, USA)	
	15:20-15:50	Invited talk 3 (Prof. Stephen Chou, Princeton University, Member of National Academy of Engineering, USA)
	15:50-16:10	Invited talk 4 (Prof. Yurij N. Kulchin, Institute of Automatics and Controlling Processes in the Far East Branch of RAS, Academician)
	16:10-16:40	Invited talk 5(Prof. Joseph H. Eberly, University of Rochester, USA)
	16:40-17:10	Invited talk 6 (Prof. Raphael Tsu, University of North Carolina at Charlotte, USA)
	17:10-19:00	Dinner
	19:30-21:30	A Show Celebrating CIOMP 60 anniversary

Sep. 18	**Section 3** **Chair: Prof. Ivan B. Kovsh (President of Russia Laser Association,Russia)**	
	8:30-9:00	Invited talk 7 (Prof. James Wyant, University of Arizona, member of the National Academy of Engineering, USA)
	9:00-9:30	Invited talk 8 (Prof. Min Gu, Swinburne University of Technology, elected Fellow of the Australian Academy of Science and the Australian Academy of Technological Sciences and Engineering, Australia)
	9:30-10:00	Invited talk 9 (Prof. Viacheslav Puzikov, National Academy of Sciences of Ukraine, Academician)
	10:00-10:30	Invited talk 10 (Prof. Hans Zappe, University of Freiburg, Germany)
	10:30-10:50	Coffee break
	Section 4 **Chair: Prof. John Love（The Australian National University, Australia）**	
	10:50-11:20	Invited talk 11 (Prof. Valentin A. Orlovich, BelNAS Institute of Physics, Council Chairman of the Belarus Republican Fondation for Fundamental Research, Academician)
	11:20-11:50	Invited talk 12 (Prof. Tony Heinz, OSA president, Columbia University, USA)
	11:50-12:20	Invited talk 13(Prof. Byoungho Lee, Seoul National University, member of the Korean Academy of Science and Technology, Korea)
	12:20-12:50	Invited talk 14 (Prof. Thomas L. Koch, University of Arizona, member of the National Academy of Engineering, USA)
	12:50-13:00	Closing Remark (Prof. Ping Jia, Vice president of CIOMP)
	13:00-14:00	Lunch

Optics and Fine Mechanics China 2012 Symposium		
Date	**Time**	**Content**
Sep. 19	**Section 1 Prof. Nikolay Kuleshov(Research Center of Optical Materials and Technology in Belarusian National Technical University)**	
	14:00-14:05	Opening Ceremony by Prof. Kovsh Ivan Borisovich Laser Association, Russia
	14:05-14:35	Invited talk 1 (Prof. Kovsh Ivan Borisovich, Laser Association, Russia)
	14:40-15:10	Invited talk 2 (Academician Leonid Yatsenko Institute of Physics, National Academy of Sciences of Ukraine Prospect, Ukraine)
	15:15-15:45	Invited talk 3 (Prof. Uladzimir Matsiushkou, KBTEM-OMO Republican Unitary Scientific and Production Enterprise of Planar Corporation, Belarus)
	15:50-16:10	Group Photo and Coffee break
	Section 2 Prof. Leonid Yatsenko(Director of Institute of Physics of NAS of Ukraine)	
	16:10-16:40	Invited talk 4 (Academician Efim Khazanov, Institute of Applied Physics of RAS, Russia)
	16:45-17:15	Invited talk 5 (Prof. Viktor Taranenko International Center “Institute of Applied Optics” AS of Ukraine)
	17:20-17:50	Invited talk 6 (Prof. Cunzhu Tong, CIOMP, China)
	18:00-19:00	Reception Dinner
Sep. 20	**Section 3 Prof. Efim Khazanov(Laser Division in the RAS Institute of Applied Physics)**	
	09:00-09:30	Invited talk 7 (Academician, Nikolay Kuleshov, Center for Optical Materials and Technologies, Belarusian National Technical University)
	09:35-10:05	Invited talk 8 (Sergey SOKOLOV, Deputy Director General, INJECT Enterprise OJSC, Russia)
	10:10-10:40	Invited talk 9 (Prof. Nazar Kovalenko,Institute for Single Crystals of the National Academy of Science of Ukraine)
	10:45-11:15	Invited talk 10
	11:40-12:40	Lunch
	12:40-14:00	Break
	14:00-17:00	Discussion
	17:30-18:30	Dinner

Prof. Jianlin Cao

Vice Minister of the Ministry of Science and Technology of China.

Jianlin Cao 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.

Prof. Donna T. Strickland
Department of Physics and Astronomy
Guelph-Waterloo Physics Institute
University of Waterloo, Canada

Donna Strickland received her B. Eng. from McMaster University and her PhD from the University of Rochester. Along with her PhD supervisor, Dr. Gerard Mourou, Donna Strickland co-invented Chirped Pulse Amplification.Dr. Strickland was a research associate at the National Research Council of Canada, a physicist at Lawrence Livermore National Laboratory and a member of technical staff at Princeton University. Dr. Strickland joined the physics department of the University of Waterloo in 1997. At Waterloo, Dr. Strickland's ultrafast laser group develops high-intensity laser systems for nonlinear optics investigations. She is a recipient of a Sloan Research Fellowship, a Premier's Research Excellence Award, a Cottrell Scholars Award and is a Fellow of the Optical Society of America.She was elected vice-president of the OSA and will serve as President in 2013.

Long-Wavelength Mid-Infrared from Two-Color Fiber Laser System

We are developing a two-color laser source to generate coherent mid-infrared radiation in what is known as the fingerprint spectroscopy region of the spectrum from 5 to 20 μm.Currently we can generate radiation from 16 to 20 μm with 1 mW of power by difference frequency mixing in GaSe.

Prof. Stephen Y. Chou
NanoStructure Laboratory, Department of Electrical Engineering
Princeton University, Princeton, NJ 08544

Stephen Y. Chou, Joseph C. Elgin Professor of Engineering and the head of the NanoStructure Laboratory at Princeton University, is a world leader, pioneer, and inventor in a broad range of nanotechnologies. Dr. Chou received his PhD from MIT in 1986. He was a Research Associate and Acting Assistant Professor at Stanford University (1986-1989), and a faculty member at the University of Minnesota (1989-1991, Assistant Prof, 1991-1994, Associate Prof, and 1994-1997 Full Prof), and joined Princeton University in 1998. As an entrepreneur, Dr. Chou founded Nanonex (1999) and NanoOpto (2000) Corporations.

Dr. Chou's pioneering research and inventions in a broad spectrum of nanotechnologies and nanodevices has helped shape new paths in the fields of nanofabrication, nanoscale electronics, optoelectronics, magnetics, and materials. Dr. Chou's graduate work used X-ray lithography to scale MOSFETs to the 60 nm range, and since 1985 he has demonstrated various ultra-small MOSFETs, quantum devices, and single electron transistors. In early 1990's, he began pioneering work in exploring sub-wavelength optical elements (SOEs) and bringing nanofabrication into magnetic data storage media. He originated quantized magnetic disks (QMDs), a new paradigm in magnetic data storage in 1993. In 1995, he pioneered his best-known work, nanoimprint lithography (NIL), a revolutionary nanoscale patterning method that allows sub-10 nm patterning over large areas with high throughput and low cost. He is also a key inventor of lithographically induced self-assembly (LISA) and laser-assisted direct imprint (LADI) and applications of NIL, LISA and LADI in a wide range of disciplines, from electronics and optics to magnetics, biotech, and materials. Since 1999, he has been applying unique and extensive expertise in nanofabrication, nanoelectronics, nanooptics, nanomagnetics and nanomaterials to biology for developing innovative biological manipulators, separators, detectors and analyzers for DNAs, proteins and cells.

Dr. Chou's inventions and pioneer work have brought significant impacts to industry. Nanoimprint lithography is regarded as one of the "10 emerging technologies that will change the world" (MIT Technology Review); is selected as a next generation lithography for semiconductor ICs; and is becoming an enabling manufacturing platform for multiple multi-billion-dollar industries ranging from semiconductor ICs, magnetic data storage, displays, optics, biotech to nanomaterials. Furthermore, SOEs and QMDs are being developed by industries aggressively as a future of integrated optics and magnetic data storage.

Dr. Chou was elected to the National Academy of Engineering in 2007 and received the 2004 IEEE Brunetti Award for the invention and development of tools for nanoscale patterning, especially nanoimprint lithography, and for the scaling of devices into new physical regimes. Other awards he received include IEEE Fellow, Packard Fellow, an Inductee of New Jersey High Technology Hall of Fame, Pioneer Award of Nanoimprint and Nanoprint Technology, the Joseph C. Elgin Professorship, the McKnight-Land Grant Professorship, the George Taylor Distinguished Research

Award at the University of Minnesota, DARPA ULTRA program Significant Technical Achievement Award, and three best paper awards. Dr. Chou has published more than 280 papers, has given over 100 invited presentations at conferences and workshops, and holds 15 patents and over 40 patent applications.

Now, Dr. Chou's group, the NanoStructure Laboratory (NSL) at Princeton, has two primary missions: (A) to develop new nanotechnologies for fabricating structures substantially smaller, better, and cheaper than current technology permits; and (B) to explore innovative nanodevices and advanced materials in electronics, optics, optoelectronics, magnetics and biology, by combining cutting-edge nanotechnology with frontier knowledge from different disciplines.

Subwavelength Nanophotonics and Nanoimprint Technology -A Unique Path to Engineering New Optical Materials and Devices

Subwavelength nanophotonics (SNP's) are the optical structures/devices with feature size less than wavelength of light and in nanoscale. SNP's, which have no non-zero-order diffraction, differs fundamentally in principle from bulk (i.e. ray) or diffractive optics, offering three unique advantages: (i) creation of new optical functions that are unavailable in bulk or diffractive optics; (ii) performing an optical function with a form factor (i.e. device size) over three orders of magnitude smaller; and (iii) performing different optical functions using different feature geometries (i.e. shape and size) but the same materials, rather than different materials as in bulk optics. These properties make SNPs particularly suited for miniaturizing an entire bulky optical system into a thin film or a chip.

A variety of intriguing new optical functions of subwavelength nanophotonics can be created through intelligent engineering of permittivity, and permeability, at nanoscale. Hence, to explore and harvest the potential of subwavelength nanophotonics, ultra-high-resolution. large-area nanopatterning with high-throughput and low-cost is essential. Among all current nanopatterning methods, nanoimprint lithography (NIL) [1] is one of most promising technologies for such patterning, already having demonstrated the large area patterning of 6 nm half-pitch, sub-2 nm feature size, and 1 nm fidelity. Therefore nanoimprint is one of the key technologies for SNPs fabrication [2], as well as many other disciplines [3].

The talk will present principles, applications and commercialization in SNP's and nanoimprint, particularly those invented and developed by author's research group. Using SNP's as optical elements and NIL as the manufacturing technology, our dream of optical systems on a thin film or a chip -- a revolution similar to the vacuum-tube-to-transistor revolution in electronics will be greatly accelerated.

[1] S.Y. Chou, P.R. Krauss, and P.J. Renstrom, Appl. Phys. Lett. **67** (21), 3114 (1995), and Science, **272**, 85 (1996).
[2] S.Y. Chou, S. Schablitsky and L. Zhuang, "Subwavelength Transmission Gratings and Their Applications in VCSELs," Invited Paper, SPIE, Vol. 3290, 73-81, 1997
[3] S.Y. Chou, Material Research Society Bulletin, Vol: 27, No. 7, 512-517, 2001.

Prof. Yu. N. Kulchin
Institute of Automation and Control Processes,
Far Eastern Branch of Russian Academy of Sciences,Vladivostok, Russia
E-mail:kulchin@iacp.dvo.ru

Prof. **Yuri Nikolaevich Kulchin** is the member of United Physical Society of Russian Federation (UPS), International Society "Optics Within Life Sciences" (OWLS), International Society for Optical Engineering (SPIE) and International Society "Laser Biology". He has published 6 Books, 427 papers and 25 patents. He is the member of editorial board of four scientific journals:Quantum Electronics (Russia);Optical Instrumentation and Data Processing (Russia);Laser Biology (China);Optoelectronic Information-Power Technologies (Ukraine). And he is also the Chief Editor of the International scientific journal Pacific Science Review (Korea).

Present position(s):

Since 2005 Director, Institute of Automation and Control Processes, Far-Eastern Branch of Russian Academy of Sciences, Vladivostok, Russia.

Since 2004 Vice-President, Far-Eastern Branch of Russian Academy of Sciences, Vladivostok, Russia

Since 2010 Deputy Director of School of Natural Sciences, Far-Eastern Federal University, Vladivostok, Russia

Research interests:

Fiber-optic sensors and distributed measuring systems; nonlinear optics; holography; optical data processing; optical neural networks; photonics; nanotechnologies; femtosecond optics.

Prof. Yuri Nikolaevich Kulchin has been honored with:

Academic rank-Professor(1993)
National Award "Honored Scientist of Russia Federation" (1999)
Award of Primorski Region Governor(1999)
Fellow member of SPIE(2000)
National Award "Honored Worker of High Education of Russia" (2002)
Gold Medal and Diploma with Distinction at 51-th Exhibition "Brussels-Eureka-2002" for development the Optoelectronic Measuring Intelligence System (2002)
Corresponding Member of Russian Academy of Sciences (2003)
Academician of Russian Academy of Sciences (2011)

Invited Report outline: Smart- GRID fiber-optic monitoring systems

- Smart- GRID structure principles
- Fiber optic sensors for Smart- GRID monitoring systems
- Principles of fiber optic sensors
- Principles of fiber optic Smart- GRID monitoring systems
- Intensity and phase fiber optic sensors for Smart- GRID monitoring systems
- Tomography fiber optic Smart- GRID systems for structural health monitoring
- Neural like fiber-optic distributed Smart- GRID monitoring system

Prof. Joseph H. Eberly
Andrew Carnegie Professor of Physics and Professor of Optics
University of Rochester, USA

Joseph Eberly earned his Ph.D. in Physics at Stanford University and has been a member of the University of Rochester physics faculty since 1967, where he is currently the Andrew Carnegie Professor of Physics and Professor of Optics. A Fellow of OSA and APS, Professor Eberly has served as President of OSA, Chair of the APS Division of Laser Science, and member of the AIP Governing Board. He is the recipient of the Frederick Ives Award, the Townes Award and the Smoluchowski Medal, and has been elected a Foreign Member of the Academy of Sciences of Poland.

Professor Eberly's research interests include: cavity QED; dynamics of quantum entanglement; light polarization theory; response of atoms to high-intensity laser pulses; coherent control of optical interactions; multi-soliton propagation; and time-dependent spectra.

Professor Eberly and his research group discovered spontaneous revival effects in cavity QED, identified the effect of entanglement sudden death in quantum information science, invented the so-called Rochester atomic potential for model ionization studies, predicted and first observed Bessel beams, introduced Schmidt analysis to down conversion entanglement, and discovered the STIRAP excitation method.

These and related quantum optical phenomena are the subjects of theoretical and experimental study in Rochester.

Classical Entanglement and Optical Polarization

J. H. Eberly and Xiao Feng Qian,
University of Rochester

Non-quantum entanglement exists in all classical light fields. Its overlooked properties provide an alternate approach to optical polarization theory. Entanglement leads to a new view of both the degree of polarization of light and the concept of polarization itself.

Prof. Raphael Tsu
University of North Carolina at Charlotte, NC USA
E-mail: tsu@uncc.edu

Raphael Tsu (Ray Tsu, with Tsu replaced by Zhu in pinyin) is known in the areas of quantum properties of materials and device physics. He co-invented and developed with Esaki, the man-made semiconductor superlattice and resonant tunneling in quantum wells, fundamental building blocks of modern electronic and opto-electronic devices. The 'Superlattice Story', written by the US Army Research Office for the White House played an important role in the 90's for the US National Nanoscience Initiative (NNI). Recent years, he is concerned with exploring the role of symmetry in nanoscale systems with few electrons, for example, capacitance depends on the number of electrons quite similar to the periodic table of elements. At present he is concerned with the fundamental difference between superlattices and metamaterials, including nanocomposites. His role contributing to the opening of China, following his trip where he met Premier Zhou constituted his life-long focus besides Physics, in the pursuit of the rise of mankind'.

He is a fellow of the American Physical Society; winner of: Outstanding Contribution Award-IBM 1975; Alexander von Humboldt Award-1975; Co-winner Am. Phys. Soc. International New Materials Prize 1985.

40 Years of China-US Relationships in Science and Technology and the 60th Anniversary CIOMP, Changchun, China

My great uncle, an industrialist in Shanghai, said to me on his death bed before I left Shanghai in 1951, "I have no more than few weeks to live. The best relationship between two persons or two nations is mutual admiration. And to succeed needs the best tools!" After Henry Kissinger's trip to China in July 1971, I called up few friends to join me on a trip to China. And we agreed to wait after Nixon's trip in Feb. 1972. Historically, few principles guided the relationships between China and United States: Americans admired Chinese for arts, crafts and their ancient philosophers, while Chinese admired Americans for their machinery, ingenuity and their dynamic natures of life. Driven by the importance of commercial relationship I succeeded in getting IBM to go to China after Premier Zhou asked in 1972 if IBM was interested in having a relationship with China. I wrote 'High Technology in China', December Issue of 1972 Scientific American,and participated in China - US Committee of the US National Academy of Science, to welcome the First Scientific Delegation of CAS's visit to USA in November 1972. I convinced the CEO of IBM World Trade, Jacque Maisonrouge, to visit China in 1973, and collaborating with US-NAS to invite the Chinese Delegation of Electronic Experts, with logistic supports of the US State Department. Science and technology, as entropy, always march forward, represent the best insurance for the development of mankind. Today China is first in the number of foreign graduate students in US universities, particularly in science and engineering disciplines. The destination of one quarter of all Chinese export last year is to the US, ~ $400B. Among the items exported, China has included machinery rather than simply toys!

On this 60th anniversary of Changchun Institute of Optics, Fine Mechanics and Physics, an organization participated in playing a pivotal role of lifting a nation to modernity. This role, through science and technology must be accelerated and coordinated nationally in providing even better directions and convictions for leading China's peaceful rise in playing an important role for the development of prosperity for mankind.

Prof. James C. Wyant
University of Arizona, USA

James C. Wyant is professor at the College of Optical Sciences at the University of Arizona, where he was Director (1999-2005) and Dean (2005-2012).He received a B.S. in physics from Case Western Reserve University and M.S. and Ph.D. in optics from the University of Rochester. He was a founder of the WYKO Corporation and served as its president and board chairman from 1984 to 1997 and he was a founder of the 4D Technology Corporation and currently serves as its board chairman. Wyant is a member of the National Academy of Engineering, a Fellow of OSA (Optical Society of America), SPIE (International Society of Optics and Photonics), and the Optical Society of India, an honorary member of the Optical Society of Korea, and former editor-in-chief of the OSA journal Applied Optics.He was the 2010 president of OSA and the 1986 president of SPIE. Wyant has received several awards for his technical work, including the OSA Joseph Fraunhofer Award; SPIE Gold Medal; SPIE Technology Achievement Award; and the SPIE Chandra Vikram Award.

Precision Interferometric Optical Testing in the Presence of Vibration and Atmospheric Turbulence

Precision optical components are essential for modern optics/photonics systems. Until recently, a major limitation of interferometric optical testing of precision optical components was the sensitivity to the environment. Fortunately, many of these limitations have recently been solved and this talk discusses the best-known solutions for reducing the effects of vibration and atmospheric turbulence on interferometric measurements.

Prof. Min Gu
Centre for Micro-Photonics
Swinburne University of Technology
Hawthorn, Victoria 3122, Australia
E-mail:mgu@swin.edu.au

Professor **Min Gu**, a Laureate Fellow of the Australian Research Council, is Director of the Centre for Micro-Photonics at Swinburne University of Technology. In 2009, he was appointed as Pro Vice-Chancellor (Research Innovation). He is an elected Fellow of the Australian Academy of Science and the Australian Academy of Technological Sciences and Engineering. In 2011, he was awarded the most prestigious W. H. (Beattie) Steel Medal of the Australian Optical Society to recognise his strong and sustained record of authority, enterprise and innovation in the field of optics in Australia.

All empires fall, you just have to know where to push.
Nanophotonics for Harnessing Solar Light with Nano-antennas

Photonics has transformed massively our everyday life and global economy for a sustainable future. Nanophotonics is a new frontier of green technology for information storage, renewable energy, early cancer detection, cellular engineering, and clean water resources, providing a better environment and a healthier life to our community. In this talk, all empires fall, you just have to know where to push. How to develop an entirely new kind of nano-antennas, lumpy metallic nanoparticles, to efficiently harness the solar energy and transform it into the world's most efficient broadband nanoplasmonic solar cells.

Prof. Viacheslav Puzikov
Director of the Institute for Single Crystals, Ukraine,
Academician of the National Academy of Sciences of Ukraine
E-mile:puzikov@isc.kharkov.ua

Viacheslav Puzikov is Director of the Institute for Single Crystals of the National Academy of Science of Ukraine. His area of expertise is the development of fundamental investigations of crystal growth processes; search for new crystalline media with functionally significant properties, investigations of physical phenomena in optical single crystals and of their physical-chemical properties; development of technologies for the growth and treatment of crystals meant for optics, laser facilities, microelectronics, medicine.

His most significant achievements are the development of a new technology for the growth of large-size sapphire crystals (350 × 5000 × 70 mm^3) by a method of horizontally oriented crystallization, the development methods for the growth of spectrometer-grade CdZnTe crystals and technologies for the obtaining of KDP/DKDP crystals with a cross-section of 60× 60 mm^2.

The Stepanov (EFG) method of the shaped sapphire crystal growth

Recent years have seen active development of the methods for the growth of bulk sapphire crystals to be used mainly for production of light diodes. Now this market is close to saturation. However, there permanently arise other fields of sapphire application.

Due to its high hardness, sapphire is difficult for treatment. In some cases the cost of treatment exceeds that of the material itself. The Stepanov method (EFG) permits to minimize the treatment expenses, since sapphire profiles can be grown at a minimum treatment allowance. The said method and the developed growth facilities make it possible to obtain sapphire articles shaped as tubes, rods, ribbons or more complicated profiles (crucibles, boats, etc.).Moreover, one can simultaneously grow a group of sapphire profiles.

Crystal growth equipment of SPEKTR type is represented by modern automated growth machines exported from Ukraine to many countries.

Prof. Hans Zappe
Laboratory for Micro-optics
Department of Microsystems Engineering
University of Freiburg, Germany

Hans Zappe is Professor of Micro-optics and Associate Dean of Engineering in the Department of Microsystems Engineering at the University of Freiburg, Germany. He earned his Bachelor's and Master's degrees from MIT and his PhD from the University of California, Berkeley, all in Electrical Engineering. After pursuing research activities in electronics, integrated optics and semiconductor lasers at IBM, the Fraunhofer Institute for Applied Solid State Physics and the Centre Suisse d'Electronique et de Microtechnique, he joined the University of Freiburg in 2000. His current research interests focus on tunable micro-optics, optical micro-systems for medical applications and novel nano-optics.

***In vivo* micro-optics**

The size of optical components and systems is steadily decreasing; concomitantly, their functionality is continually increasing. One applications area which has benefitted strongly from these developments is that of medical diagnostics: advanced optical sensor and imaging systems may now be deployed in vivo, allowing a spectrum of clinically-relevant measurements heretofore not possible.

We will demonstrate three in vivo micro-optical concepts which employ recent developments in optical microsystems to allow sensing and imaging inside the body. Implantable oximeters and blood pressure monitors may be used to perform continuous measurements of these physiological parameters, giving doctors a wealth of vital information from their patients requiring critical care. Furthermore, an endoscopic scanning optical coherence tomography system, permitting minimally-invasive three-dimensional imaging inside the gastrointestinal or cardiovascular networks, will be shown to be useful for non-destructive, sub-surface tissue imaging in areas not presently accessible using macroscopic technologies.

Prof. Valentin Orlovich
B.I. Stepanov Institute of Physics,
Belarusian Republican Foundation for Fundamental Research,
National Academy of Sciences of Belarus
Nezhalezhnasti Ave, 68, 220072, Minsk, Belarus
E-mail: fond@it.org.by;

Professor **Valentin A. Orlovich** started investigations on the development of polarization-sensitive techniques in the frequency nondegenerate version of Coherent anti-Stokes Raman Scattering (CARS) and Resonance CARS (RCARS). The developed techniques were applied to investigations of metalloporphyrins in solutions under electronic resonance conditions. Simultaneously he worked on the development and designing of high-performance solid-state and dye-lasers for nonlinear spectroscopy and quantum optics. He also continued working in the field of SRS, in particular, on developing methods of radiation frequency conversion into various spectral ranges.

Now he is Head of the Laboratory of Nonlinear Optics of the Institute of Physics, National Academy of Sciences of Belarus and Council chairman-director of the Belarussian republican foundation for fundamental research.

Research fields:

- quantum effects in SRS and their influence on the reproducibility of energy and time characteristics of SRS radiation pulses;
- creation of the all-solid-state tunable laser systems for the spectroscopic applications;
- applications of Surface enhanced Raman scattering (SERS) to biological and medical subjects investigation;
- optical parametrical oscillators and amplifiers;
- investigation, development and creation picosecond, nanosecond and continuous-wave all solid-state laser sources based on diode-pumped lasers with intracavity and outcavity Raman conversion for applications in spectroscopy, life sciences, environmental control and instrumentation;
- impulsive SRS in crystals.

Stimulated Raman Scattering in Crystals: Recent Achievements and Outlook for Practical Applications

The results of experimental and theoretical investigations of stimulated Raman scattering (SRS) in crystals, including intracavity Raman conversion of pulsed and continuous-wave end-diode-pumped microchip- and mini lasers, extracavity Raman conversion of pulsed (pulse duration from 100 ns to 100 fs, repetition rates from several Hz to kHz) lasers will be described. Results of measurements of crystals nonlinear-optical properties will be also presented. Possibilities of development of laser and nonlinear-optical systems, based on SRS and combination SRS with other noulinear effects, for applications in life sciences, spectroscopy, environmental control and range finding will be demonstrated.

Prof. Tony F. Heinz
Departments of Physics and Electrical Engineering
Columbia University, USA

Tony F. Heinz is the David Rickey Professor in the Departments of Physics and Electrical Engineering at Columbia University. Heinz's research, as documented in more than 150 technical publications and 17 US patents, has centered on the application of nonlinear and time-resolved spectroscopy to probe the fundamental properties of surfaces, interfaces, and nanoscale materials, such as carbon nanotubes and graphene. Heinz's research accomplishments have been recognized by the Optics Prize of the International Commission for Optics (ICO), a Research Award of the von Humboldt Foundation, and the Julius Springer Prize for Applied Physics (jointly with Phaedon Avouris). Heinz is a Fellow of OSA and APS. He was recently a recipient of the Great Teacher Award at Columbia University.

Optical Properties of Single- and Few-Layer Graphene

Graphene, a monolayer of sp^2-hybridized carbon atoms in a honeycomb lattice, has proven to be a material with many unique properties, ranging from the mechanical to the chemical to the electronic. In this paper, we will describe another facet of graphene that has recently come to command much attention, namely, the material's distinctive optical characteristics.Recent advances in growth of large-area, high-quality graphene samples by chemical vapor deposition and other techniques has heightened interest not only in fundamental studies, but in diverse applications in photonics.

We will describe the optical response of single-layer graphene, a zero-gap semiconductor, from the far-infrared to the ultraviolet. Some of the key properties are the extremely strong light-matter interaction in the far-infrared, where one monolayer can almost completely attenuate light, the distinctive spectrum in the optical range associated with interband transitions of the massless carriers, and the tunability of the optical absorption by electrical gating. Current applications for single-layer graphene range from transparent conductive electrodes to nonlinear materials for stabilization of modelocked lasers to plasmonic far-infrared filters.

Further flexibility in the electronic properties of graphene is achieved through the use of crystallographically stacked samples of a few-layers thickness. We will show how the corresponding infrared optical properties can be dramatically modified by the interlayer interactions. Of particular importance is the demonstrated ability to induce an electrically tunable band gap in the bilayer and appropriately stacked trilayers.Such tunable gaps suggest many interesting properties for infrared optics.

Prof. Byoungho Lee
Seoul National University, Korea

Byoungho Lee received his PhD degree in 1993 from EECS, University of California at Berkeley. In September 1994 he joined the School of Electrical Engineering, Seoul National University as a faculty member, where he became a full professor in 2005.He is a fellow of the Optical Society (OSA) and SPIE, and a member of the Korean Academy of Science and Technology.He served as a topical editor of Applied Optics for six years and currently is an associate editor of the Journal of the Society for Information Display. Currently, he is the chair of OSA Holography and Diffractive Optics Technical Group, the chair of the OSA Members and Education Services Council and a member of the OSA Strategic Planning Committee. He is currently Director of Academic Affairs of both the Optical Society of Korea and the Korean Information Display Society.

He received many awards including The Presidential Young Scientist Award of Korea (2002) and the Scientist of the Month Award of Korea (Sep. 2009).

His research field is 3D display, digital holography and plasmonics. His research group has published more than 300 international journal papers and presented more than 510 international conference papers, including more than 90 invited talks.

Next Generation 3D Display Technologies

After a short review on current status of 3D display, next generation 3D display technologies such as integral imaging, holographic display using spatial light modulators and see-through 3D display will be discussed. Human factor study for 3D display will also be briefly explained.

Prof. Thomas L. Koch
College of Optical Sciences,
University of Arizona, USA

Thomas L. Koch is the Dean of the College of Optical Sciences at the University of Arizona, and Professor of Optical Sciences and Electrical Engineering. After receiving an A.B. in physics from Princeton in 1977 and a Ph.D. in applied physics from CalTech in 1982, he worked for 13 years at Bell Labs where he led research and prototyping of semiconductor lasers and advanced photonic devices for optical communications. From 1995 to 1996, Dr. Koch was VP of research and development at SDL, before he returned to Bell Labs and Lucent to become CTO of optoelectronic products and director of semiconductor photonics research. In 2000, he became VP of technology platforms at Lucent and then Agere, where he managed the research and development of optoelectronics and integrated circuit devices during the telecommunications boom. Dr. Koch joined Lehigh in 2003 where he was the Daniel E. '39 and Patricia M. Smith Chair and professor of electrical and computer engineering and of physics, as well as the Director of the Center for Optical Technologies.

Dr. Koch's research interests have focused on semiconductor optoelectronics and optical fiber communications, including photonic integrated circuits and recently silicon photonics. He was an early pioneer in photonic integration technology at Bell Labs, including applications in tunable lasers, WDM, and the first operating coherent balanced heterodyne receiver PIC. He holds 36 patents and has authored more than 335 papers and presentations. He is a member of the National Academy of Engineering and a Fellow of IEEE, the Optical Society, and Bell Labs. In 1991, he won the IEEE Photonics Society's William Streifer Award for Scientific Achievement. He was awarded IEEE's Eric E. Sumner Award in 2008, for pioneering contributions to optoelectronics and optical communications.

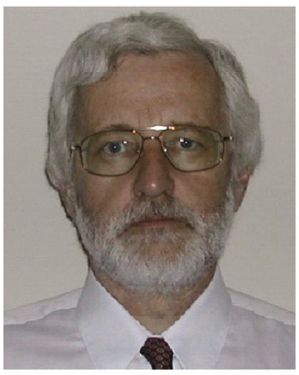
Photonic Integrated Circuits

Photonic Integrated Circuits are finally realizing their potential for compact, low power, highly reliable and cost-effective optical solutions. This talk will review recent progress in both III-V and silicon-based PIC technologies, including strengths and probable application domains of each, and also discuss challenges and opportunities that remain.

Prof. Tianhong Cui

Department of Mechanical Engineering, University of Minnesota

Tianhong Cui is Professor at the Department of Mechanical Engineering, and an Affiliate Senior Member of the graduate faculty of the Department of Electrical & Computer Engineering and Department of Bioengineering at the University of Minnesota. He joined the faculty of the University of Minnesota in 2003 and was tenured in 2007. From 1995 to 2003, he held research or faculty positions at Tsinghua University, the University of Minnesota, the National Laboratory of Metrology in Japan, and Louisiana Tech University. He received his BSc from Nanjing University of Aeronautics and Astronautics in 1991, and his PhD from the Chinese Academy of Sciences in 1995. He has more than 180 publications in scientific journals and prestigious conferences. His research has been sponsored by NSF, DARPA, NASA and DOE. He has received research awards including the STA and NEDO fellowships in Japan, the Alexander von Humboldt Fellowship in Germany, the Research Foundation Award from Louisiana Tech University, and the Richard & Barbara Endowed Chair from the University of Minnesota. He is serving as an associate editor for the IEEE Sensors Journal, the Journal of Nanoscience and Nanotechnology, and the Journal of Nano Research.



Prof. Michael A. Fiddy
University of North Carolina at Charlotte
9201 University City Blvd., Charlotte, NC 28223-0001
E-mail: mafiddy@uncc.edu

Michael Fiddy received his Ph.D from the University of London in 1977, and was a research fellow in the Department of Electronic and Electrical Engineering at University College London before becoming a faculty member at London University (Kings College) in 1979. He moved to the University of Massachusetts Lowell in 1987 where he was ECE Department Head from 1994 until 2001. In January 2002 he was appointed the founding director of the newly created Center for Optoelectronics and Optical Communications at UNC Charlotte. He has been a visiting professor at the Inst. of Optics Rochester NY, Math. Dept. Catholic University, Washington DC, Nanophotonics Laboratory Nanyang Tech. University Singapore and ECE Dept. U. of Christchurch NZ. He has also been the editor-in-chief of the journal Waves in Random and Complex Media since 1996, and holds editorial positions with several other academic journals. He was the topical editor for signal and image processing for the journal of the Optical Society of America from 1994 until 2001 and currently serves as Chair-elect of OSA's Meetings Council. He has chaired 20 conferences in his field, and is a fellow of the OSA, IOP and SPIE and senior member IEEE. His current research interests are inverse problems related to superresolution and metamaterial design.

Appointments:

2010	Visiting Professor, Nanophotonics Laboratory, Nanyang Technological University, Singapore and Erskine Visiting Fellow, Electrical Engineering, University of Canterbury, Christchurch, New Zealand.
2002-	Professor, Physics & Optical Science and of ECE, UNC Charlotte
2002-2010	Founding Director, Center for Optoelectronics & Optical Communications, UNC Charlotte
1994-2001	Head of Department of Electrical & Computer Engineering, UML
1991-2001	Professor, Department of Electrical Engineering, UML
1987-1991	Associate Professor, Department of Electrical Engineering, UMass Lowell
1985-1986	Visiting Associate Professor in Mathematics Department, Catholic University of America, Washington, D. C.
1982-1983	Visiting Associate Professor, Institute of Optics, U. of Rochester
1979-1987	Faculty in Physics, Kings College, London University (tenured)

Prof. Efim A. Khazanov

Vice-Director of the Laser Division in the RAS Institute of Applied Physics

Efim A. Khazanov was born in 1965 in Gorky (now Nizhny Novgorod), USSR (now Russia). In 1988 he graduated from Gorky Polytechnic University. In 1992 he received the PhD degree (phase conjugation and laser beam combining via stimulated Brillouin scattering) from the Institute of Applied Physics of the Russian Academy of Science. He was awarded by Russian Federation President's Award for young scientist (1995) and by Medal of Russian Academy of Science for young scientist (1999). In 2005 he received the Doctor of Science degree (investigation and suppression of thermal effects in solid-state laser) from the Institute of Applied Physics of the Russian Academy of Science. In 2008 he was elected to corresponding member of the Russian Academy of Science. His research is in the field of phase conjugation, diffraction-limited solid-state pulsed laser with high average power, thermo-optics of solid state lasers, optical parametrical chirped pulse amplification, femtosecond lasers. He took part in the scientific experiments in the University of Florida, California Institute of Technology. He is author of more than 100 papers. Now he is a deputy Director of the Institute of Applied Physics and professor of Nizhny Novgorod State University.

Mega-science Project Exawatt Center for Extreme Light Studies (XCELS)

Efim Khazanov, Institute of Applied Physics of RAS, Nizhny Novgorod

The goal of the Project is establishing a large research infrastructure-the Exawatt Center for Extreme Light Studies (XCELS) using sources of laser radiation with giant (exawatt) peak power. The project rests upon the considerable advance made in the recent years in Russia and worldwide on creating petawatt lasers with intensity up to 10^{22} W/cm^2 and ultrashort pulse duration. The core of the planned infrastructure will be a new unique source of light having the power of about 0.2 Exawatt that exceeds the currently available ones by hundreds of times. The fundamental processes of such laser-matter interaction belong to an absolutely new branch of science that will be the principal research task of the infrastructure. There will open up opportunities for studying the space-time structure of vacuum and unknown phenomena at the interface of the high-energy physics and the physics of high fields. The envisaged applications of results of these studies will include among others development of compact charged-particle accelerators with sizes hundreds times less that the available ones, creation of sources of ultrashort pulses of hard X-ray and gamma radiation for diagnosing materials with unprecedented spatial and temporal resolution, elaboration of new sources of radiation and particles for clinical applications, and others.

The subexawatt laser will be based on the technique of optical parametric chirped pulse amplification (OPCPA) to the petawatt power developed at the Institute of Applied Physics RAS. The complex will comprise 12 identical channels, each of which will generate a pulse with the energy of 300-400 J, duration of 20-30 fs, maximum intensity at focusing more than 10^{23} W/cm^2

(Fig. 1.). The channels operate by the scheme of parametric amplification in KD*P crystals with the aperture of final cascades of 30× 30 cm^2.

It is supposed that optical pulses in laser modules of the subexawatt complex will be phased to an accuracy of hundredths fractions of a light wave period. The first phase of the project will be creation of two such modules with the power of 15 PW each based on parametric amplification in KD*P crystals. This will not only allow creating a reliable prototype of an XCELS module, but will also enable solving fundamental problems associated with phasing of channels, as well as completing diagnostic equipment for applications. Further, 12 channels of the main XCELS laser complex will be assembled by the proven technology in a newly constructed building of the international center. The resulting radiation at the output of the laser complex will have the following parameters: power 200 PW, pulse duration 25 fs, wavelength 910 nm, divergence not more than 3 diffraction limits.

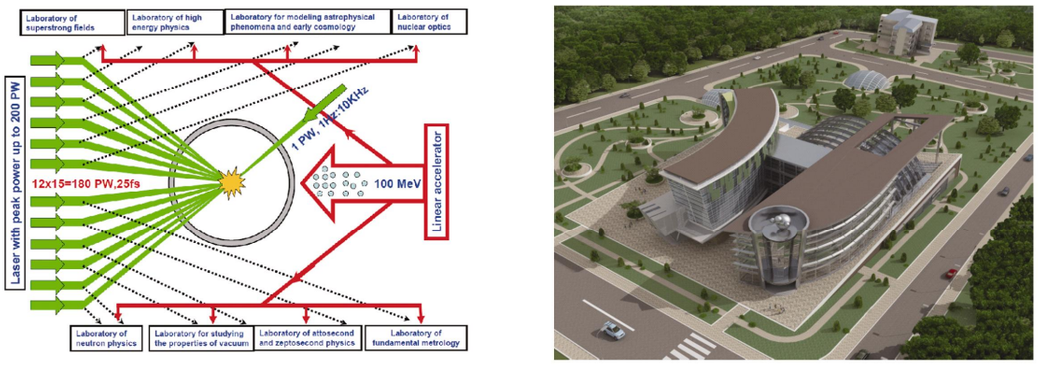
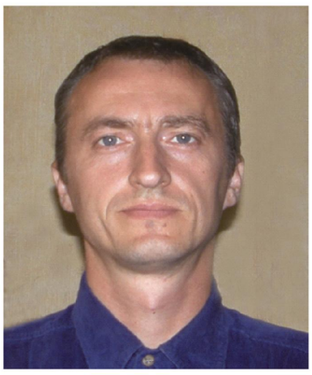


Fig.1. General layout and prospective view of XCELS

Along with the subexawatt laser XCELS will house a 100 MeV linear accelerator of electrons and unique laboratories for experiments on the physics of strong fields, high-energy physics, laboratory astrophysics and cosmology, nuclear optics, neutron physics, laboratories for studying the properties of vacuum, attosecond and zeptosecond physics, and fundamental metrology. XCELS will also comprise a powerful center for data processing and computer modeling of the interactions of extreme light fields.



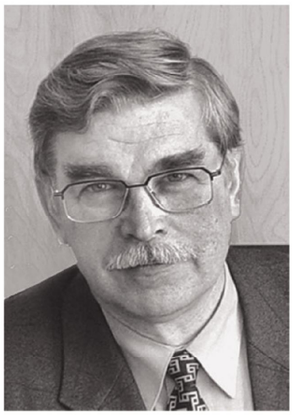
Prof. Nazar Kovalenko
Department of semiconductor optical crystals Institute for Single Crystals NASof Ukraine
E-mail: nazar@isc.kharkov.ua

Nazar Kovalenkois, an acting head of the department of optical semiconductor single crystals of the Institute for Single Crystals of the National Academy of Sciences of Ukraine, the Institute being situated in Kharkov, Ukraine.

Scientific career of N.Kovalenko has started in the Institute for Single Crystals in 1997 and is developing successfully. Since 1997 N. Kovalenko received his diploma in Quantum Electronics in 1998 and the Ph.D. degree in Physics of Semiconductors and Dielectrics in 2003. From 1997 and up to now he works in the field of growth and investigation of single crystals of $A^{II}B^{VI}$-type, semiconductor compounds and its solid solutions. His major interests include passive laser optics and active media for tunable middle-IR lasers based on $A^{II}B^{VI}$ single crystals doped with TM^{2+}. N. Kovalenko is a co-author of more than 40 scientific publications and patents.

Abstract: Institute for Single Crystals has extensive experience in growing single crystals of compounds AIIBVI for optical applications and radiation spectroscopy. Over recent years, we develop the technology for obtaining by Bridgman method active media, based on crystalline compounds AIIBVI:TM^{2+} for tunable mid-IRlasers withtuningrange2-3.6 μ mforCr^{2+}-doped and 4-6.5 μm for the doped by Fe^{2+}. Broadband amplification of such materials allows assemble a system from continuous tunable lasers with an output power of several watts to femtosecond oscillators with pulse duration of ~ 100 fs. To date, the literature contains a number of promising applications of such systems: parametric oscillators with a wideband tuning in the mid-IR range; the system for intracavity laser spectroscopy, where the use of fs-laser reduces the measurement time by 2 orders of magnitude in comparing with tungsten lamp; systems for medical diagnostics based on the analysis of human breath, generators of super continuum in the mid-IR range, eye-safe range finders, etc.

Bridgman method that we use for growing of AIIBVI compounds, compares favorably to the other techniques. The crystals obtained by PVT method grow slowly, and CVD-method requires further diffusion doping, which negative affect to the uniformity of distribution of active impurities. Bridgman method allows produce large single crystalline ingots of sufficiently high quality with a homogeneous distribution of the dopant, suitable for producing active elements of tunable lasers. Grown in our Institute crystals can operate in pulse mode, continuous, and femtosecond mode of lasing.



Prof. Ivan B. Kovsh

President of Laser Association

Prof. **Ivan B. Kovsh** graduated from Moscow Institute for Physics and Technology in 1970 and received the degree of Candidate of Sci. (Ph.D.) in Physics and mathematics in 1975, the degree of Doctor of Sci. in physics and mathematics in 1992, the degree of Professor in laser physics in 1997.

The USSR State prize in science and technology laureate (1978);
Honored Scientist of the Russian Federation (2001);
Fellow member of the European Optical Society (2011);
1970-1986 Lebedev Physical Institute of the USSR Academy of Sci. (junior researcher, senior researcher, head of sector, vice-director of division),
1986-1990 Leading researcher in Blagonravov Institute for Study of Machines of the USSR Academy of Sci.,
1990 Elected to the position of the President of Laser Association (re-elected in 1994, 1998, 2002, 2006 and 2010).
More than 150 scientific publication, 17 inventions.

Laser Industry Branch in CIS Countries

There are about 1000 “laser active” institutions in CIS countries-R&D institutes, companies, universities, small enterprises, etc. They produce annually many hundreds of scientific articles, train specialists of all levels, and suggest more than 2000 models of laser devices and units at the internal market. This equipment is used practically in all areas of the real sector of economy and in medicine, communication systems, and transportation systems as well. The rate of annual renovation of laser products in CIS is about 30% . Laser Association was established by the domestic laser community in 1990 and since then acts as a non-governmental and non-commercial organization assisting its members in their professional activity. The composition and structure of laser industry branch of CIS countries will be presented, Laser Association work will be described with the accent on the international cooperation, some recent scientific and technical results of the domestic laser centers will be pointed out.

Prof. Nikolay V. Kuleshov
Center for Optical Materials and Technologies, Belarusian National Technical University, Minsk, Belarus,
E-mail: nkuleshov@bntu.by

List of Academic and Professional Achievements:

1974-1979- studied at Physics Department of Belarus State University (Minsk).

1979 - graduated from Belarus St.Univ. and received University Degree as a Physicist.

1980-1984 - Postgraduate courses of Belarus State University (Minsk).

1991 - defended Thesis, "Spectroscopy of laser materials and saturable absorbers based on the crystals doped with transition and post-transition metal ions" and was awarded Scientific Degree-Candidate of Science (Ph.D.).

1998 -defended Doctorate, "Spectroscopy of excited states of transition metal ions and rare earth elements in crystalline materials for solid state lasers"and was awarded Scientific Degree - Doctor of Sciences.

Ultrafast solid state lasers

There has been a growing interest in the development of ultrafast laser sources in the 1~2 μm spectral region for applications in 3-D microstructuring of semiconductor materials, time-resolved spectroscopy, nonlinear frequency conversion, mid-IR supercontinuum generation, etc. We report on mode-locked solid state lasers based on Yb:$KY(WO_4)_2$, Er,Yb:$YAl_3(BO_3)_4$, and Tm:$KY(WO_4)_2$ laser crystals for ultrashort pulse generation in the spectral ranges near 1 μm, 1.5~1.6 μm and 2 μm, respectively.

Yb-doped potassium double tungstates ($KRe(WO_4)$, where Re is Y, Gd, or Lu) were shown to be very promising laser crystals for directly diode-pumped femtosecond lasers emitting near 1 μm. Here Yb:$KY(WO_4)_2$ femtosecond laser with output power of 1.7 W and pulse duration of 150 fs are reported. Yb-regenerative amplifier with pulse energy up to 0.36 mJ, pulse duration of 330fs, and repetition rate 1-10 kHz is demonstrated.

Er,Yb:$YAl_3(BO_3)_4$ crystal (Er,Yb:YAB) was demonstrated to be efficient laser material [1]. In continuous wave regime the output power achieves as high as 1.5 W at 1520 nm with 36% slope efficiency. In Er,Yb:YAB-laser mode-locked with InGaAsN quantum-well SESAMs the pulses of 3.8 ps duration with an average output power of 270 mW and repetition rate of 166 MHz are demonstrated. Efficient CW laser operation was demonstrated also at several wavelengths in the range from 1520 nm to 1602 nm.

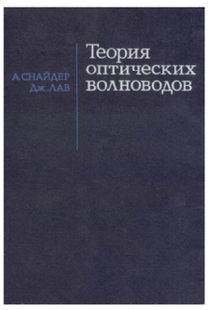
Efficient mode-locking in a Tm:$KY(WO_4)_2$ laser is demonstrated by using InGaAsSb quantum-well SESAMs. Self-starting ultrashort pulse generation was realized in the 1979-2074 nm spectral region. Maximum average output power up to 411 mW was produced around 1986 nm with the corresponding pulse duration and repetition rate of 549 fs and 105 MHz respectively. Optimised pulse durations of 386 fs were produced with an average power of 235 mW at 2029 nm.

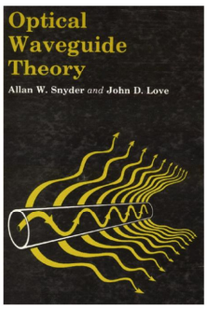
[1] N. A. Tolstik, V. E. Kisel, N. V. Kuleshov, V. V. Maltsev,N. I. Leonyuk "Er,Yb:$YAl_3(BO_3)_4$ — efficient 1.5 μm laser crystal" Applied Physics B, Vol. 97, No 2, P.357 - 362, 2009.

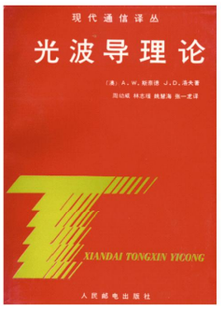
Prof. John Love
The Australian National University
Canberra, Australia
E-mail: John.Love@anu.edu. au

Professor **John Love** holds the MA, DPhil and DSc degrees in mathematics from Oxford University and the MA and MMath degrees from Cambridge University. He was a Research Fellow in Physics at the University of California at San Diego, USA, from 1969-1971 and then at the University of Toronto, Canada, from 1971-1973.

He moved to the Institute of Advanced Studies at the Australian National University in 1973 and started his long research career in the theory of propagation in optical fibres and fibre-based light processing devices. The culmination of the first 11 years of research resulted in the publication of the definitive text Optical Waveguide Theory in English, Chinese and Russian editions, followed by Silica-Based Buried Channel Waveguides & Devices in 1996.







He inaugurated photonics teaching in the Departments of Physics and Engineering at ANU in 1989 and developed extensive courses in guided wave photonics and its multiple everyday applications for both undergraduate and master students.

His current research interests are in passive few-mode fibre devices for increasing the capacity of e.g. the Internet, as well as the compilation of an informal history of fibre optics research and development in Australia.

Professor Love is an annual visitor to CIOMP and has helped to enhance links with the ANU and the Optical Society of America. He also provides support for editorial work and has lectured Research Students on the preparation of higher-quality research papers for international journals, such as the new journal Light originating at CIOMP.

Prof. Uladzimir Matsiushkou
KBTEM-OMO Republican Unitary Scientific and Production Enterprise of Planar Corporation, Belarus.

Professor **Uladzimir Matsiushkou** is the Chief Engineer of KBTEM-OMO Republican Unitary Scientific and Production Enterprise of Planar Corporation and the Chief Officer in charge of the development of some types of opto-mechanical equipment. He got The USSR State Prize Winner (1986) and the Republic of Belarus State Prize Winner (2000) for the development of the set of precision equipment used in the production of high precision pattern structures of electronic devices. His Photomask laser repair systems and pattern generators were created and mastered in full scale production a few years ahead of foreign analogues.

Laser optical tools for mask manufacturing in microelectronics

Technologies of opto- and laser-based lithography are widely used in the production of ICs with various degrees of integration, hybrid ICs and precision PCBs.
The opto- and laser-based equipment used in the production of photomasks (reticles) can be delivered in sets (so called complete sets for the production of defectless photomasks) as well as separate tools. The main groups of such equipment are as follows:

- multichannel laser pattern generators of raster type, designed to generate submicron size patterns;
- single-channel laser microphotosetting pattern generators, designed to generate patterns sized 1 μm and below;
- Automatic mask inspection systems;
- Laser mask repair systems;
- unified scheme in the development of coordinate systems;
- realization of common principles for the development of the systems to compensate errors of coordinate systems;
- realization of unified algorithms of vector-bitmap conversion for multichannel laser pattern generators and for mask inspection systems;
- realization of common interfaces of mask inspection and repair systems, as well as realization of flexible modification of these interfaces;
- realization of unified principles for the development of control systems for the complete set of equipment;
- realization of analogous software interfaces to control and test the equipment;
- reduction of costs in the development and manufacture of the sets of the equipment;
- operational advantages related to the simplification and cost reduction in staff training, preparation of spare parts, accessories and so on.

Elizabeth A. Rogan

Chief Executive Officer of OSA and the OSA Foundation

Elizabeth A. Rogan has spent 30 years working in the corporate, federal and non-profit industries. She worked on Capitol Hill for the Architect of the Capitol, spent time on a successful re-election senate campaign and with a political action committee. In Washington, she gained first-hand experience in the unique way things get accomplished in the world of government. She also learned the importance of grassroots advocacy and the value of listening and responding to constituent needs and interests, a skill that has served her well over the years. She held corporate positions in the real estate, public accounting and banking industries before she transitioned to the non-profit world as the Asst. Controller of the John F. Kennedy Center for the Performing Arts. She has a BA in Accounting from the University of Connecticut, is a CPA, and an alumnus of an executive business program from the Wharton School at the University of Pennsylvania.

Elizabeth A. Rogan has been at OSA for more than 19 years in positions initially focused on operations, the last position being Chief Operating Officer. Beginning in 2002, she was honored with the role of Chief Executive Officer of OSA and the OSA Foundation. As OSA CEO, she reports to the Board of Directors and is responsible for the oversight, strategic direction and fiscal soundness of programs and activities of this $30M, 135+ staff Society. The OSA Foundation's $2M+ budget includes both fundraising and program development. In addition, she is the Society's spokesperson and advocate to a wide range of OSA constituencies, including its members, volunteers, co-sponsors and customers, throughout the global optics community.

Prof. Sergey N. SOKOLOV
Deputy Director General, INJECT Enterprise OJSC, Saratov, Russian Federation
E-mail:inject@overta.ru

Sergey N. SOKOLOV, born February 17, 1952 in Saratov (USSR), Deputy Director General of INJECT Research and Manufacturing Enterprise OJSC. Physicist. In 1974 graduated from the Physics Department of N. G. Chernyshevsky Saratov State University, specialty "physics of semiconductors and dielectrics". In 1981 graduated post-graduate course from P. N. Lebedev Physical Institute USSR Academy of Sciences (FIAN), Moscow of the specialty "Radio physics" (quantum radio physics). Highly qualified expert in the field of research of reliability and degradation of laser diodes, of optoelectronic components and laser systems, marketing of high-tech industry, international trade, technology transfer and quality systems (certificated from European Quality Centre). S.SOKOLOV was head-designer of several models of LD emitters.

Duties in INJECT: new scientific, business and innovation cluster and regional co-operation projects and export-import operations.

Secretary of 1.3 sub-group LEDs, LDs, linear and matrix light emitters of Russian Technology Platform PHOTONICS. Secretary of Saratov Regional Centre of Laser Association (Moscow).

Author of over 40 scientific papers published in periodicals of scientific and technical publications and 6 patents of the Russian Federation. He is a member of the European Optical Society. Member of expert group of the European Technology Platform "Photonics-21."Senior Lecturer at N.G.Chernyshevsky Saratov State University.

High Power Diode Laser for Direct Material Treatment

This presentation describes current situation and actual problems of direct material treatment by high power diode laser. Main prospective areas are discussed: nano-medicine-diode laser exposure of nanoparticles, nanoshells; direct material diode laser treatment in industrial application-cladding, hardening, welding. Conclusion discusses prospective of widening of the market and applications as well as forecast of development of high power diode laser.

Prof. Victor B. Taranenko

International Center “Institute of Applied Optics” NAS of Ukraine

Victor B. Taranenko received his Doctor of Physical and Mathematical Sciences degree from the Institute of Physics National Academy of Sciences of Ukraine and is currently a director of the International Center "Institute of Applied Physics" National Academy of Sciences of Ukraine in Kiev. His research activity has been in the fields of nonlinear optics, optical solitons, and holography. He carried out a set of pioneering experiments on fundamental aspects of spatial self-organization in nonlinear optical cavities. Major results concern observation, control and interaction of dissipative solitons in lasers and degenerate optical parametric oscillators. His early work involved the development of holographic optical elements and their application for lasers with tunable frequency. He is author/co-author of about 150 scientific papers and 6 book chapters. He is currently performing research projects on microlaser dynamics, laser material modification/processing, and photonic crystals.

Spatial solitons in lasers and degenerate optical parametric oscillators

We provide an overview of self-organized formation inside bistableactive multimode cavities of optical structures, both extended and localized.Due to particle-likeproperties of localized optical structures,which have been called cavity solitons, they arestructures of particular interest. We give theoretical background for the structure formation/stability and demonstrate experimentally existence, control and interactions of fundamental/vortex solitons in lasers, domain walls and spirals in degenerate optical parametric oscillators.

Prof. L. P. Yatsenko
Institute of Physics, National Academy of Sciences of Ukraine
Prospect, Nauki 46, Kiev-39, 03650, Ukraine

Leonid P. Yatsenko, Doctor of Science, Professor, Corresponding member of National Academy of Sciences of Ukraine. He earned degree of candidate of sciences from Lebedev Physical Institute, Moscow, Russia in 1989 (Igor I. Sobel'man, advisor, thesis "The theoretical investigation of macroscopic parameters influence on the characteristics of optical frequency standards") and degree of doctor of science from Institute of Physics, Kiev, Ukraine in 1996 (thesis "Resonance phenomena in gas lasers").

Principal Research Interests (recent):
Laser physics and non-linear interaction of laser radiation with atoms and molecules;
Laser frequency stabilization;
Deceleration and cooling of atoms with laser light;
Coherent exchange of momentum between atoms and light;
Coherent laser control.

Frequency Shifted Feedback Lasers: From Basic Physics to Applications

We discuss basic concepts of the frequency-shifted feedback (FSF) laser and present our approach to modelling the physics of this device. Such apparatus offers potential for length measuring with micrometer accuracy over tens meter distances. We present experimental results, obtained using a Yb^{3+} and Er^{3+} fiber ring laser, that demonstrate the usefulness of such a device.

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If you have any question about the conference, please feel free to contact with us!

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Contribution Invitation

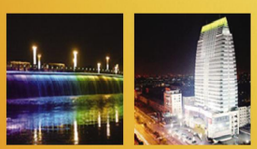
The Editorial Department at Changchun Institute of Optics, Fine Mechanics, and Physics (CIOMP) of Chinese Academy of Sciences (CAS) currently publishes five journals in optics including Chinese Optics, Chinese Journal of luminescence, Optics Precision and Engineering, Chinese Journal of Liquid Crystals and Displays, Light: Science &Applications. There are 20 staff members at the CIOMP Editorial Department including 4 professors, 10 staff with doctoral degrees, and 5 staff with master degrees.

To follow the fast pace of the economic and scientific development in China, the Chinese government encourages and supports the science and technology publications to seek innovations and international collaborations. The CIOMP Editorial Department has been exploiting this opportunity to collaborate with internationally renowned organizations. In Year 2012, We launched an international journal, Light: Science & Applications. The new journal, a publishing partnership with Nature Publishing Group, will provide an international forum for scientists from universities and research institutions internationally to present their latest research achievements and innovations in optics. By choosing some topics from the scope of the journal, each year international conferences will be held to create a networking platform for the optics community to communicate and exchange new discoveries in optics.

We welcome researchers worldwide to contribute their articles to the new journal and to join the editorial work of the journal through peer-reviewing process and providing ideas to well manage the journal for scientists in optics. We expect the journal to be an international forum to well serve the global optics community. Your participation in the new journal is highly critical and cordially welcome!

http://www.nature.com/lsa/index.html

Welcome to Photonics Trend 2012, Changchun!



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