

2007 Japan – Italy Bilateral Workshop on Photonics for Communication



July 5 – 7, 2007

Senri-Hankyu Hotel, Osaka Japan

Abstracts and Brief Biographies

PROGRAM

Wednesday, July 4, 2007

17:00-19:30	Registration Desk Open (in front of Cristal Hall)
18:00-19:30	Welcome Reception (in Cristal Hall)

Thursday, July 5, 2007

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18:10-18:30	O. Ishida	NTT	Terabit LAN Challenges in Japan	-
19:00-21:00	Social Dinner with interventions of P.Ancilotti Director of Scuola Superiore Sant'Anna, H. Miyahara President of Osaka University, A. Volpi Scientific Attaché Embassy of Italy (in Cristal Hall)			

Friday, July 6, 2007

8:30-17:00

Registration Desk Open (in front of Senju-no-Ma)

Time	Speaker		Presentation	Page
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10:15-10:35	K. Hagimoto	NTT	Penetration of Photonic Network in Japan	-
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11:00-11:20	M. Murata	Osaka University	Bio-Inspired Approaches Towards New-Generation Network Architecture	69
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13:00-14:00	Lunch Break (on your own)			
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14:20-14:40	P. Ghiggino	Marconi	New Generation Fiber in Access: Can Optical Technology Rise to the Challenge?	81
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15:20-15:40	G. Cincotti	Roma 3 University	Single-Chip Encoder for Optical Router : Packet Switching, Burst Switching and WDM-OCDMA Transmission	93
15:40-16:00	X. Wang	NICT	High Capacity Asynchronous OCDMA System with Advanced Modulation Techniques	97
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16:30-16:50	K. Inoue	Osaka University	Differential-Phase-Shift Quantum Key Distribution	101
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17:10-17:30	G. Prati	Scuola Superiore	Closing Remarks	-

Saturday, July 7, 2007

9:00 Tour bus is waiting for you in front of the Hotel.

9:00-17:30	Excursion to Kyoto
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Chair Persons

Ken-ichi Kitayama
Osaka University

Biography of Ken-ichi Kitayama :



Ken-ichi Kitayama received the B.E., M.E., and Dr. Eng. degrees in communication Engineering from Osaka University, Suita, Japan, in 1974, 1976, and 1981, respectively. In 1976 he joined the NTT Electrical Communication Laboratory. During 1982-1983, he was a Research Fellow with the University of California, Berkeley. In 1995, he joined the Communications Research Laboratory (Currently NICT). Since 1999, he has been a Professor with the Department of Electrical, Electronic, and Information Engineering, Graduate School of Engineering, Osaka University. He has published more than 200 papers in referred journals, written two book chapters, and translated one book. He is also the holder of more than 30 patents. His research interests are in photonic networks, radio-on-fiber communications, and photonic signal processings. He has published about 180 papers in refereed journals.

Prof. Kitayama was a recipient of the 1980 Young Engineer Award from the Institute of Electronic and Communication Engineers of Japan, the 1985 Paper Award of Optics from the Japan Society of Applied Physics, and the 2004 Achievement Award from the Institute of Electronics, Information, and Communication Engineers (IEICE) of Japan. He is currently and Associate Editor of the IEEE PHOTONICS TECHNOLOGY LETTERS and the IEEE TRANSACTIONS ON COMMUNICATIONS, *Optical Switching, and Networking*. He is a Fellow of the IEICE of Japan.

Giancarlo Prati

Scuola Superiore Sant'Anna and CNIT

Biography of Giancarlo Prati:



Current positions : President of CNIT, a non-profit consortium of 34 Italian universities for applied research in telecommunications. Vice President of Scuola Superiore Sant'Anna in Pisa, one of the three Universities of Excellence in Italy, where he is Professor of Telecommunications Engineering. Director of the Centre of Excellence for Communication Networks Engineering (CEIRC) in Pisa Italian Representative in the European Union (EU) Technical Committee for the Information Society Priority in the 6th Framework Research Program 2002-2006, IEEE Fellow, Member of the Technical Program Committee of the European Conference on Optical Communication (ECOC).

Curriculum vitae : Prof. Prati was born in Rome in 1946. He graduated in 1972 at Pisa University in electronic engineering "*cum laude*", *alumnus* of Scuola Superiore Sant'Anna. In 1978-79 he was Visiting Scientist at USC (University of Southern California), working in optical communications with Robert M. Gagliardi, renowned scientist. His activity has developed since then: in 1982 he was Visiting Associate Professor at University of Massachusetts at Amherst, until 1986 he was Researcher with the CNR Center for Radio Transmission in Pisa, since 1986 he was professor of telecommunications at Genoa University in Italy, then since 1988 at Parma University in Italy. In 1992-98 he was Dean of Engineering at Parma University. In 1993-95 he was member of the CNR Feasibility Committee for "Photonics" project. In

1997-99 he was a member of the Scientific Committee of the Italian Space Agency. From 1995 to 2004 he was Director of CNIT, a Consortium of 34 Universities for Telecommunications he promoted. In 2000 moved to Scuola Superiore Sant'Anna in Pisa to create a new research center on Photonic Networks, which counts now (2005) 50 researchers. From 2002 to 2004 he was Director of the Research Division and Vice Director of the same School. Since 1999 he is a member of the TPC of ECOC. In 2004 he was elected to the IEEE Fellow grade.

Professor Prati pioneered the area of free space optical communications for deep space applications in the late Seventies and early Eighties at the University of Southern California. Since then Prof. Prati has promoted and managed several national/international projects on optical communications and co/authored more than 70 papers and 5 patents. He has also worked in the Seventies on Digital RadioLinks, becoming co-recipient of the "W. Bennett" Prize Paper Award for his work on blind equalization of fading radio channels.

Execution Committee Members

Akihiro Maruta

Osaka University

See page 14.

Giampiero Contestabile

Scuola Supriore Santa'Anna

Biography of Giampiero Contestabile :



Giampiero Contestabile holds a Laurea degree in Physics (1998) from "La Sapienza"; University of Rome, Italy, and a Ph.D. in Electrical Engineering-Telecommunications (2001) from "Tor Vergata" University of Rome, Italy. Between 1996 and 2000 he was with the Semiconductor Devices Group of "Fondazione Ugo Bordonì", Rome, Italy. In 2001 he was with Optospeed Italia. Since September 2002 he is Assistant Professor at Scuola Superiore Sant'Anna of University Studies and Doctoral Research of Pisa, Italy. Dr. Contestabile co-authored around fifty papers published in international peer-reviewed journals and presented in leading international conferences. His main research interests are advanced WDM systems, Optical Packet Switched Networks and, in general, applications of Semiconductor Optical Amplifiers.

Antonella Bogoni

CNIT

See page 11.

[Keynote speaker : July 5, 9:15-10:10]

Silicon Photonic : the Emerging Technology

Giorgio Grasso

Pirelli Labs

Abstract : Silicon photonics is an emerging technology for the integration of optical and electronic functionalities on silicon chip. Telecommunication and optical interconnect for data communication are the most attractive markets for this technology.

An overview of the status of worldwide activity on the research on the passive and active devices is presented together with an analysis of the critical path to the complex integration process.

A status report on Pirelli silicon photonics technology is presented. Results on well performing basic building blocks, as submicron waveguides, couplers, resonators, tapers, and microheater based thermo optic tuning are demonstrated. Starting from these elements various optical functionalities such as widely tunable filters, polarization diversity schemes to permit the handling of the generic state of polarization in single polarization waveguide structures, hitless switching, have been developed with success. Further on an OADM functionality is reported on as an example of integration of various functionalities on the SOI platform and a roadmap exploitation of the SOI technology for complex components is illustrated.

Biography of Giorgio Grasso :



Giorgio Grasso, CEO of Pirelli Labs Optical Innovation, has over 30 years of experience in the research field, especially in the sector of photonic technologies. After an Engineering Degree in the University of Bologna, in 1974 he started his activity in Pirelli, R&D Division, Optical Fibers Department. In 1987 he founded the Photonic Research in Pirelli, developing the optical amplifier technology, the WDM transmission systems and the optical device crossconnect. These breakthroughs were followed by many successes both industrial and commercial, as the first installation of optical amplifiers on world scale (MCI 1993), the deployment in large scale of the WDM systems (Sprint 1995) and the first solitonic transmission at 10 Gbit/s. He moved to Cisco, after the

acquisition of Pirelli's Photonics Division. In Cisco, Mr Grasso gave an important contribution in the IP desing in optic network, thus integrating photonic transmission and commutation with IP routers. In April 2001, he returned in Pirelli to direct the development of photonic technologies in Pirelli Labs. Grasso is author of many patents and of numerous publications in the area of photonic transmission and optical commutation.

[Invited speaker : July 5, 10:10-10:30]

Nanophotonics for Networks : from Telecom to LSI

Keishi Ohashi
NEC

Biography of Keishi Ohashi :

Keichi Ohashi is currently a Senior Manager of Nanotechnology Group at Fundamental & Environmental Res. Labs. in NEC Corp., where he is conducting research activities on nanophotonics and nanoelectronics. He is also a Program Manager of LSI Chip Optical Interconnect Program in Semiconductor Leading Edge Technologies, Inc, since 2006. He received the M.E. and Ph.D. degrees in Engineering from Nagoya University, Nagoya, Japan in 1979 and 2004, respectively. He joined NEC Corp. in 1979, where he had developed computer storage devices. After having engaged as a Senior Design Manager, he moved to NEC Res. Labs. in 1998, where he worked on spintronics, plasmonics, and electrochemistry. He was a Guest Professor of Nagoya University from 2004 to 2005. He was also a Team Leader of Long-Wavelength Photon Sensing Lab. in The Institute of Physical & Chemical Res. (RIKEN) from 2004 to 2005. He received The JJAP (Japanese Journal of Applied Physics) Best Paper Award in 2006 and the Technical Award of The Surface Finishing Society of Japan in 2006.

[Invited speaker : July 5, 11:00-11:20]

Waveguide Quasi-Phase-Matched Nonlinear-Optic Devices for Photonic Communications

Toshiaki Suhara
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Abstract : The work of the author's group is reviewed on quasi-phase-matched (QPM) nonlinear-optic (NLO) devices using LiNbO₃ waveguides. The applications in optical communications and quantum information include wavelength converters for wavelength-division-multiplexing (WDM) photonic network, optical gate switches for ultrafast photonic signal processing, wavelength converters for single-photon detection, twin-photon generation devices and entangled photon generation devices.

Biography of Toshiaki Suhara :



Toshiaki Suhara received the B.S., M.S., and Dr.Eng degrees in electronic engineering from Osaka University, Osaka, Japan in 1973, 1975, and 1978, respectively. He joined the Department of Electronics Engineering, Faculty of Engineering, Osaka University, in 1978, and has been a Professor since 2002. His research interests include integrated optics, nonlinear optics, quantum optics, integrated semiconductor lasers, holography, optical memories, and applications of electron beams. He stayed in Technical Research Centre of Finland as a Guest Research Scientist (1980), in Glasgow University, U.K., as a Guest Research Fellow (1986-1987), and in Chalmers University of Technology, Sweden as a Guest Professor (1997). He

published more than 170 refereed journal papers, and is the author of *Optical Integrated Circuits* (Jpn, Eng. and Chin. versions), *Semiconductor Laser Fundamentals* (Jpn, Chin. and Eng.), *Waveguide Nonlinear-Optic Devices*, *Quantum Electronics*(Eng.), and *Optical-Wave Engineering* (Jpn.), and several other book chapters.

He received the Paper Award in 1977, 1986, 1994 and 2001 from the Institute of Electronics, Information and Communication Engineers (IEICE), and the Paper Award in 1990 from the Laser Society of Japan. In 1995, he was awarded the IBM Japan Science Prize. He is a member of the IEEE, the OSA, the IEICE of Japan, and the Japan Society of Applied Physics. In 2006-2007 he served as the chairman of the Laser and Quantum Electronics Technical Committee of IEICE.

[Invited speaker : July 5, 11:20-11:40]

Finite Element Modelling of Silicon Nanoclusters Sensitized Erbium Doped Waveguide Amplifiers

Fabrizio Di Pasquale, Veronica Toccafondo, Stefano Faralli
 Scuola Superiore Sant'Anna, Via G. Moruzzi 1, 56124, Pisa, Italy
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Abstract : Finite-Element modeling of Silicon-Nanoclusters sensitized Er^{3+} doped waveguide amplifiers will be described, considering both longitudinal and top pumping schemes using low cost LEDs in the visible. Comparison between the two pumping schemes, based on propagation and population-rate equations for the coupled Er^{3+} - Si nanoclusters system, points out that longitudinal pumping by evanescent multimode pump light coupling provides much higher pumping efficiency and gain per unit length, demonstrating the potential for low cost integrated amplifiers.

Biography of Fabrizio Di Pasquale :



Fabrizio Di Pasquale received the degree in Electronic Engineering from University of Bologna in 1989 and the PhD in Information Technology from University of Parma in 1993. From 1993 to 1998 he was with the Department of Electrical and Electronic Engineering, University College London, UK, as a Research Fellow, working on optical amplifiers, WDM optical communication systems and liquid crystal displays. After two years with Pirelli Cavi e Sistemi and two years with Cisco Photonics Italy he is now associate professor in telecommunications at the Scuola Superiore Sant'Anna, Pisa, Italy. His current research interests include optical amplifiers, WDM communication systems and networks, and optical fiber sensors. He has filed 15 international patents and he is the author and co-author of over than 90 scientific journal and conference papers in the area of optical amplifiers, optical communications systems and liquid crystal displays.

He is the Scuola Superiore Sant'Anna scientific representative in the European Project (STREP) LANCER ("*Light Amplifiers with Nanoclusters and Erbium*", FP6-033574) and the Italian scientific coordinator of the project entitled: "Design , realization and characterization of Raman and Brillouin based distributed fiber optic temperature sensors ", within the bilateral agreement between Italy and Republic of Korea (2007-2009),

He is in the board of reviewers of IEEE/OSA Journal of Lightwave Technology, IEEE Photonics Technology Letters, IEEE Journal of Quantum Electronics and Optics Communications (Elsevier).

[Invited speaker : July 5, 11:40-12:00]

Photonic Devices toward New Generation Networks

Yoshio Itaya

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Abstract : The number of Internet users is increasing very rapidly, and data traffic is growing dramatically. We are changing the network from a legacy telephony network to a new network, which is a broadband network based on Internet Protocol (IP). It provides high quality, high security, flexibility and a low cost transmission provision. Photonic devices are key technologies with which to construct the new networks. This paper describes recent progress on new photonic devices.

Biography of Yoshio Itaya :

Yoshio Itaya received the B.S., M.S., and Ph.D degrees in electronics engineering, all from the Tokyo Institute of Technology, Tokyo, Japan, in 1976, 1978, and 1981, respectively. In 1981, he joined the Nippon Telegraph and Telephone Public Corporation, where he was engaged in research on semiconductor lasers for optical fiber communications. He was a Visiting Researcher in the Integrated Optics Group of the Heinrich Hertz Institute, Berlin, Germany from 1983 to 1984. From 1997 to 1999, he was dispatched to NTT Electronics Corporation as a Technical Manager. He developed the laser diodes and modulator. From 2001 to 2003, He was an Executive Manager of Planning Department in NTT Science and Core Technology Laboratory Group. He was responsible for research planning, the budget and personal matters in NTT Science and Core Technology Laboratory Group. He was an International Fellow of the Stanford Research Institute, California, USA in 2004. He is now a Director of NTT Photonics Labs. He manages research of optical device, package and module for photonic network system.

He is a member of the Institute of Electronics, Information and Communication Engineers (IEICE) and the Japan Society of Applied Physics. He is a Fellow of the IEEE.

[Invited speaker : July 5, 12:00-12:20]

Chracterization, modeling and reliability of compound semiconductor microelectronic and optoelectronic devices

Enrico Zanoni

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Abstract : The talk will review reliability issues currently limiting lifetime and performances of advanced compound semiconductor devices for high-speed telecommunication systems, high-efficiency light sources for solid-state lighting and displays, high density data storage. The paper will review research results obtained in the framework of international cooperations, concerning failure modes and mechanisms of InP-based HEMTs, GaN HEMTs, GaN-based LEDs and lasers, and process/technology modifications which can reduce their effects.

Biography of Enrico Zanoni :



Enrico Zanoni graduated in Physics at the University of Modena in 1982, became full professor in Electronics at the University of Padova in 1993, in Industrial Electronics at the University of Modena in 1996, in Microelectronics at the University of Padova in 1997, where is currently full professor of Digital Electronics. He has conducted research on electron device physics, device modeling, reliability and failure mechanisms of Si and compound semiconductor devices. He has participated to five european research projects, and has been the prime coordinator of the project PROPHECY of the 4th framework. He has published approximately 200 papers on international journals and conference proceedings. He coordinates the microelectronics lab team at the Dept. of Information Engineering of the University of Padova, composed by 2 full professors, 2 associate professors and 4 assistant professors, carrying out research work on: advanced analog and rf CMOS and BICMOS design, reliability of ultra-scaled CMOS technologies, radiation testing of electronic devices, ESD protection circuits, MEMS reliability, compound semiconductor devices characterization and reliability.

[Invited speaker : July 5, 12:20-12:40]

Parametric Tunable Dispersion Compensation for Future Dynamic Optical Networks

Shu Namiki

National Institute of Advanced Industrial Science and Technology (AIST),

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Abstract : An intrinsically ultra-fast, wide-band and -range tunable dispersion compensation, suitable for future dynamic optical network, is realized through parametric wavelength conversion in conjunction with dispersion slope fibers. The proposed scheme operates in a truly colorless manner and produces two orders of magnitude larger bandwidth-dispersion product than conventional ones.

Biography of Shu Namiki :



Shu Namiki received B. E., M. S., and Dr. Sci. in physics and applied physics from Waseda University, in 1986, 1988, and 1998, respectively. He joined Furukawa Electric Co., Ltd. in 1988 where developed award-winning high-power pump laser packaging technologies. From 1994 to 1997, he was a visiting scientist at the Massachusetts Institute of Technology, where he studied mode-locked fiber lasers. From 1997 to 2005, he was engaged, as a principal research scientist, in research on next generation devices for optical networks such as ultrashort optical pulse sources, fiber Raman amplifiers, EDFAs, and nonlinear fiberoptic devices. In 2005, he joined the National Institute of Advanced Industrial Science and Technology (AIST). His current research interests include nonlinear fiberoptic signal processing, ultra-high speed photonics, and optical networks. He served as a general co-chair to OAA conference in 2004, technical program committee member for OFC 2005-2007, and editor of IEICE Transactions on Communications until May 2007. He currently serves as an associate editor for Optics Express. He is also currently a technical

program committee member for ECOC, CLEO, and OECC. Dr. Namiki has co-authored more than 170 conference presentations, papers, book chapters, articles, and patents. He is an OSA Fellow, and member of IEICE, Japan Society of Applied Physics, and IEEE LEOS/ComSoc.

[Invited speaker : July 5, 12:40-13:00]

Advanced Transmission Techniques for Optical Communications

E. Forestieri, G. Prati and M. Secondini

Abstract : The robustness of various modulation formats and equalization techniques is investigated and a novel MLSD strategy for high-order modulation is proposed. The analytical and simulation methods adopted for performance evaluation are also presented.

Biography of Marco Secondini :



Marco Secondini was born in Rome, Italy, in 1975. He received the Dr. Ing. degree in electronics engineering from the University of Roma Tre, Rome, in 2000, and the Ph.D. degree from Scuola Superiore Sant'Anna, Pisa, in 2006. During 2001, he was with QPlus Networks Inc, developing _ber optic systems for ultra long-haul communications. Since 2002, he has been with Scuola Superiore Sant'Anna, Pisa, where he is currently an Assistant Professor. He also collaborates with the National Photonic Networks Laboratory of the CNIT in Pisa. During 2005, he was a Visiting Faculty Research Assistant in the Photonics Group, University of Maryland Baltimore County, Baltimore. His current research interests are in the area of optical communication theory and include: fiber nonlinearities, chromatic and polarization mode dispersion, optical equalization techniques, and Monte Carlo

methods for simulations.

[Invited speaker : July 5, 14:00-14:20]

Transmission Control and Regeneration of Multi-Level Phase-Modulated Optical Signals

Masayuki Matsumoto and Kenichi Sanuki

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Abstract : In this paper we present analysis and experiment on (1) reduction of nonlinear phase noise in PSK transmission by the use of phase-preserving amplitude limiter based on saturation of four-wave mixing in a fiber, and (2) DQPSK signal regeneration in which phase regeneration is performed in the amplitude domain by the use of fiber-based 2R regenerators.

Biography of Masayuki Matsumoto :

Masayuki Matsumoto received the B. E, M. E, and Ph. D degrees in communications engineering from Osaka University, Suita, Osaka, Japan, in 1982, 1984, and 1988, respectively.

Since 1985, he has been with the Department of Communications Engineering, Osaka University, where he is now an associate professor. He spent one year from 1996 to 1997 at the Research Laboratory



of Electronics, Massachusetts Institute of Technology, Cambridge, MA, as a visiting scientist. He has authored or coauthored more than one hundred refereed journal and conference papers. He is also a coauthor of a book entitled "Optical Solitons in Fibers" (Springer-Verlag). His research activity is in the areas of analysis and design of millimeter-wave and optical integrated circuit devices, long-distance optical fiber transmission, polarization-mode dispersion and its compensation, and optical signal processing using nonlinear effects in fibers. He served and serves as a program committee member at conferences: OAA2000, 2001, 2002, IEEE/LEOS Annual Meeting 2001, 2002, 2003, 2004, OECC2000, 2002, 2007, and CLEO/Pacific Rim 2001, 2003, 2005. He also served as a guest editor for Journal of Lightwave Technology Special Issue on Polarization Effects in Fiberoptic Networks issued in November 2006. He is a member of the IEEE/LEOS, OSA, and IEICE.

[Invited speaker : July 5, 14:20-14:40]

Time-to-Wavelength conversion for all-optical label processing of DPSK packets

M. Presi, N. Calabretta, G. Contestabile and E. Ciaramella

Scuola Superiore Sant'Anna University. Via Moruzzi, 1 – 56124 – Pisa (ITALY)

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Abstract: We review an all-optical header processing system for dpsk packets suitable for hybrid photonic integration; it is based on the time-to-wavelength conversion and requires only two switches independently on the number of the headers.

Biography of Ernesto Ciaramella :

Ernesto Ciaramella has been Associate Professor at Scuola Superiore S. Anna in Pisa since 2002. He was born in Rome in 1967. He achieved his laurea degree cum laude at La Sapienza University, Rome, in 1991. In 1992 Alcatel awarded him a scholarship on optical communication systems. In 1992-1994 he was a contract researcher at Fondazione Ugo Bordoni, where he investigated nonlinear optical effects. In 1994-1998 he was with CSELT in Turin, where he was concerned with linear and nonlinear propagation effects in optical fibers and with numerical modeling of optical systems. In this period, he contributed to the CSELT-Telecom Italia working group on WDM systems. In 1998-2000 he was scientific researcher at Fondazione Ugo Bordoni, working group on optical systems and optical network architectures. In 2001-2002 he was Research Manager at CNIT National Photonic Networks Lab, in Pisa. His research activity covers various issues in optical communications (components, systems, networks). He participated into various European research projects (OPEN, PHOTOS, ATLAS). He published approximately 90 papers and he is author/coauthor of five international patents.

Presently, he is leading a research group on optical transmission systems and is the Scuola Superiore Sant'Anna scientific representative in the European Integrated Project (IP) NOBEL ("Next generation Optical networks for Broadband European Leadership"). He is the national coordinator of PRIN 2004-2006 Project TOSCA ("Transmission of Optical Signals exploiting Competitive Amplification techniques").

He is serving as reviewer for IEEE Photonics Technology Letters, Journal of Lightwave Technology, IEEE Journal of Quantum Electronics, Optics Communications. He is also serving in the Technical Program Committees (TPC) of Fotonica and of the Optical Fiber Communication Conference (OFC2007).

[Invited speaker : July 5, 14:40-15:00]

Advanced Optical Modulation Techniques for Ultra-High Capacity Transmission

Tetsuya Kawanishi

*Advanced Communications Technology Group,
New Generation Network Research Center,
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Abstract : We describe high-speed differential quadrature-shift-keying modulators based on LiNbO₃ waveguide device technologies, which can be applicable for ultra high capacity transmission systems. Bias condition monitor technique is also investigated for automatic bias stabilization scheme.

Biography of Tetsuya Kawanishi :



Tetsuya Kawanishi received the B.E., M.E. and Ph.D. degrees in electronics from Kyoto University, in 1992, 1994 and 1997, respectively. From 1994 to 1995, he worked for Production Engineering Laboratory of Matsushita Electric Industrial (Panasonic) Co., Ltd. In 1997, he was with Venture Business Laboratory of Kyoto University, where he had been engaged in research on electromagnetic scattering and on near-field optics. He joined the Communications Research Laboratory, Ministry of Posts and Telecommunications (from April 1, 2004, National Institute of Information and Communications Technology), Koganei, Tokyo, in 1998. He was a Visiting Scholar at the Department of Electrical & Computer Engineering, University of California at San Diego, USA, in 2004. He is now a Senior Researcher of National Institute of Information and Communications Technology, and is currently working on high-speed optical modulators and on RF photonics. He received URSI Young Scientists Award in 1999. Tetsuya Kawanishi is a Senior member of IEEE/LEOS.

[Invited speaker : July 5, 15:00-15:20]

Photonics Interconnection Networks fully based on All-Optical Cascaded SOA-based Ultrafast Module

N. Andriolli ⁽¹⁾, M. Scaffardi ⁽¹⁾, G. Berrettini ⁽¹⁾, P. Castoldi ⁽¹⁾, L. Potì ⁽²⁾, and A. Bogoni ⁽²⁾

1 : Scuola Superiore Sant'Anna, Pisa, Italy

2 : CNIT, Pisa, Italy (antonella.bogoni@cnit.it)

Abstract : We exploit cascades of a single SOA-based module working up to 160Gb/s to perform photonic subsystems that can be used for ultra-fast all-optical control and switching operations in different photonic interconnection network architectures.

Biography of Antonella Bogoni :



Antonella Bogoni was born in Mantova, Italy in 1972. She received the M.S. Degree in electronics engineering in 1997 and the Ph.D. degree in 2004 from University of Parma, Italy. From 1998 to 1999 she was grantee of Marconi S.p.a. at the University of Parma, in the optical communications laboratory. From 2000 to 2006 she was researcher of CNIT (Consorzio Nazionale Interuniversitario per le Telecomunicazioni) at the Parma University up to 2001 and then at Photonic Networks National Laboratory in Pisa, Italy. Currently she is head of research in the digital photonics subsystems area at CNIT in the Integrated Research Center for Photonic Networks and Technologies.

She is co-author of more than one hundred of publications on international journals and conference proceedings, and of twenty patents. Her research interests are in the area of fiber optical transmissions, especially in ultra-fast all-optical signal processing and pulsed source generation.

[Invited speaker : July 5, 15:20-15:40]

Link Technologies Towards Ultra-efficient from Ultra-fast

Tetsuya Miyazaki

Photonic Network Group, New Generation Network Research Center

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Abstract: I would like to introduce recent research activities in my group of NICT, regarding link technologies which have been migrating from ultrafast OTDM to multi-level modulation formats.

Biography of Tetsuya Miyazaki :



Tetsuya Miyazaki received the B.S. degree in physics from the University of Tsukuba, Ibaraki, Japan, in 1985 and the M.S. and Dr. Eng. degrees in information processing from the Tokyo Institute of Technology, Tokyo, Japan, in 1987 and 1997, respectively.

In 1987, he joined KDDI Research and Development (R&D) Laboratories, Saitama, Japan, where he worked on coherent optical communications. From 1993 to 1996, he was with ATR Optical and Radio Communications Research Laboratories, where he worked on fiber amplifier for optical inter-satellite links. From 1996 to 2002, he was with KDDI R&D Laboratories, where he was engaged in WDM optical networks. Since 2002 April, He has been with

National Institute of Information and Communications Technology (NICT) where he has been involved in research on ultra-fast photonic networks and multi-level modulation techniques. Since 2005 January, he has been a group leader of Photonic Network Group.

Dr. Miyazaki is a member of the IEEE Laser and Electro-Optic Society (IEEE LEOS), and Institute of Electronic, Information, and Communication Engineering (IEICE) of Japan.

[Invited speaker : July 5, 15:40-16:00]

High spectral efficiency optical communication systems

M. Martinelli, P. Boffi, L. Marazzi, P. Martelli, P. Parolari, A. Righetti, R. Siano

Abstract : The contribution discusses WDM optical communication systems characterized by high spectral efficiency for the transport network . System performances are both theoretically and experimentally analyzed for WDM RZ-DQPSK, PoDM RZ-DQPSK and Time-polarization interleaved RZ-DQPSK signals. In particular, the impact of a polarization stabilizer based on a novel algorithm for polarization demultiplexing is considered.

Biography of Mario Martinelli :

Mario Martinelli is Full Professor in Optical Communications at Politecnico di Milano, Director of CoreCom and OSA Fellow. He received the Laurea Degree in Nuclear-Electronics Engineering from Politecnico di Milano in 1976. In 1997 he joined the Quantum Electronics Division of CISE Laboratories in Segrate (Milano). Since 1980 he started new research activities regarding the optical fibers which led him to the position of Director of the Coherent Optics Dept. In 1981 he was Visiting Researcher at the London University College (UK). In 1992, he was appointed Professor of Optical Communications by Politecnico di Milano, where he activated the first Italian related course; in 1993 he funded the Photonic Lab at the Electronics and Information Dept and in 1995 was involved in the foundation of CoreCom, a Research Consortium between Politecnico di Milano and Pirelli Cables and Systems established to develop researches in Optical Processing and Photonic Switching. In the 2004 the Optical Society of America elected him Fellow of the Society for the contributes given in the domain of the optical communications, of the optical fiber sensors and the discovery of the Faraday mirror effect. He is author of more than 80 scientific papers on the most important Journals and of more than 100 communications presented at international Congresses. He is also assignor of 35 patents.

[Invited speaker : July 5, 16:30-16:50]

Latent potential of Optical Signal Processing for Optical Label Recognition

Tsuyoshi Konishi

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Abstract : Opportunities of optical signal processing for improvement in the power in label recognition based on correlation processing are described. To solve crosstalk issue in label recognition, one of effective approaches by using optimization of correlation filter is reviewed. Compared with a generic matched filtering method, considerably high ACR (Auto-correlation peak to cross-correlation signal ratio) is achieved by using this approach.

Biography of Tsuyoshi Konishi :

Tsuyoshi Konishi received B.E., M.E., and Dr. E degrees in Applied Physics from Osaka University, Osaka Japan, in 1991, 1993 and 1995, respectively. He became an Assistant Professor of the Graduate School of Engineering in 1996, and is an Associate Professor there. He now belongs to the Division of Advanced Science and Biotechnology of the GSE. He is currently interested in the field of ultrafast optical signal processing and ultrafast measurement and their applications including photonic networks. He received the Optics Prize for Excellent Papers in 2005 from the Japan Society of Applied Physics (JSAP). His contributions to ultrafast optics and optics for photonic networks extend to organizing and co-organizing several workshops and conference technical sessions, serving on several committees of international conferences, co-authoring a couple of books. Dr. Konishi is a member of the Institute of Electrical and Electronics Engineers (IEEE), the Institute of Electronics, Information and Communication Engineers (IEICE), the Japan Society of Applied Physics (JSAP), the Optical Society of Japan (OSJ), the Optical Society of America (OSA) and the International Society for Optical Engineering (SPIE). He serves as an international relation representative of optical society of Japan (OSJ) and a chairman of research group (optics for photonic networks), now.

[Invited speaker : July 5, 16:50-17:10]

Compensation of Nonlinearity in an Optical-Communication Link by using Optical Phase Conjugation

P. Minzioni, I. Cristiani, V. Degiorgio

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C. Langrock, M.M. Fejer

Edward L. Ginzton Laboratory, Stanford University, 450 Via Palou, 94305 Stanford, CA, USA

Abstract : We experimentally demonstrate that a good compensation of fiber nonlinearity, and a strong improvement of system performance, can be achieved by using a properly designed optical phase conjugator, even in presence of strongly asymmetrical power profiles. The proposed method is expected to be transparent with respect to the channels' number and bit-rate.

Biography of Vittorio Degiorgio :

Vittorio Degiorgio is a Full Professor at the University of Pavia, Italy. His research activity has been devoted to laser physics, laser-light scattering, nonlinear optics, ultrashort-pulse nonlinear propagation, and optical-communication devices. He published about 200 papers on international journals, and edited 4 books. He organized several international Conferences and Schools, including the Enrico Fermi International School on "Nonlinear Optical Materials" in 1993 and the ICTP Winter College "Optics and Photonics in Nanoscience and Nanotechnology" in 2005. V.D. is a Fellow of the Optical Society of America.

[Invited speaker : July 5, 17:10-17:30]

All-optical signal processing based on fiber nonlinearity

Akihiro Maruta

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Abstract : Fiber nonlinearity provides us attractive functions for all-optical signal processing. In this paper, we review the recent progress on all-optical analog-to-digital converter, digital-to-analog converter, and tunable delay line in which fiber nonlinearity plays the leading role.

Biography of Akihiro Maruta :



Akihiro Maruta received the B.E., M.E., and Ph.D. degrees from Osaka University, Suita, Japan, in 1988, 1990, and 1993, respectively, all in communications engineering. In 1993, he joined the Department of Communications Engineering, Osaka University. Since 2005, he has been an Associate Professor in the Department of Information and Communication Technology. His current research interests include optical fiber communication systems and all-optical signal processing. Prof. Maruta is a member of the IEEE/LEOS, OSA and IEICE.

[Invited speaker : July 5, 17:30-17:50]

Anomalous Polarization Properties of Single-Mode Randomly Birefringent Spun Fibers

A. Galtarossa⁽¹⁾, **M. Guglielmucci**⁽²⁾, **L. Palmieri**⁽¹⁾, and **L. Schenato**⁽¹⁾

(1) DEI, University of Padova, Italy

(2) ISCOM, Roma, Italy

Abstract : We compare the different polarization properties of spun fibers considering both unidirectional and period spin functions. We consider in particular the statistical properties and correlation length of the signal state of polarization and of the differential group delays.

Biography of A. Galtarossa :

Andrea Galtarossa received the degree in electronic engineering in 1984 from University of Padova, Italy. Since 1990 he has been with the Department of Information Engineering, University of Padova, Italy, first as Assistant Professor, then as Associate Professor (1998) and presently as Full Professor (2006). He has authored or coauthored approximately 60 journal papers, 50 conference contributions and 5 US patents; he is also coeditor of the book “Polarization Mode Dispersion”, published by



Springer-Verlag (2005). His research activity is devoted to polarization effects in optical transmission systems and, in particular, on polarization mode dispersion (modelling, measurements, impairments, compensation), design of low-PMD spun fibers, fiber optics birefringence properties, reflectometric measurements of fiber birefringence in optical cables. He is senior member of IEEE.

[Invited speaker : July 5, 17:50-18:10]

Research and Development of Full Optical Connected Technology of Optical Wireless and Optical Fiber

Mitsuji Matsumoto Kamugisha Kazaura

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Abstract: Free-space optical (FSO) communication systems are increasingly becoming an attractive option as a means of delivering broadband wireless communication services. This paper describes research work and results of an advanced ultra high-speed FSO communication system utilizing an innovative technique for achieving seamless coupling of a free-space beam to optical fiber. The system can be used to provide broadband heterogeneous wireless access services. The work is being carried out at Waseda University in collaboration with several institutions.

Biography of Mitsuji Matsumoto :

Mitsuji Matsumoto received the B.E. and M.E. degree in Electrical Engineering from the Gunma university in 1968 and 1970 respectively. Since joining NTT Labs in 1970, Dr. Matsumoto has been engaged in Research in the field of protocol architecture and terminal design for Facsimile, Telematics and Multimedia systems. In 1994, he received the Doctor's Degree of Engineering from Waseda university. In 1996, he joined the Research Center for Science and Engineering, Waseda University as a Professor.

Since 19 He started International Standardization activities from 1979 and worked in 1976, he joined ITU activities for the standardization of Facsimile, Telematics terminals, Multimedia Services and Systems. In 2000-2004 study period, he became a Vice Chairman of ITU-T SG16 (Multimedia). In 1993, He also join the Infrared Data Association (IrDA) and become a Vice President in 2006.

His current research is based on the Engineering Design for the Next Generation short range Wireless communication using Infrared, Visible Light and Radio wave. He is a member of IEEE, ACM and IEICE, IPSJ, IIEEJ(now Vice President) in Japan.

[Invited speaker : July 5, 18:10-18:30]

Terabit LAN Challenges in Japan

Osamu Ishida

NTT

Biography of Osamu Ishida :

Osamu Ishida currently leads the Media Networking Systems Research Group of NTT Network Innovation Laboratories, Yokosuka, Japan. He joined NTT in 1988 after receiving a MS in Electronics Engineering from the University of Tokyo where his thesis research concerned coherent optical-fiber communication systems. His early research at NTT Transmission Systems Labs included the characterization of integrated lasers and waveguides such as tunable DBR lasers and silica-based arrayed-waveguide-grating (AWG) routers, and their applications to digital optical-phase-lock loop (OPLL) subsystems and digitally tunable optical filters. He then made contributions to 10 Gigabit Ethernet (10GbE) Standard developed by IEEE 802.3 at 2002, where he pursued the LAN/WAN convergence at the link signaling sublayer that produced the standardization of Link Fault Signaling (LFS) in 10GbE. Currently he is pursuing the technologies that could shift the paradigm towards Terabit-LAN, and from 2006, he has been managing the five-year research project “Lambda Access” for this purpose under the financial support of an agency of Japanese government, the National Institute of Information and Communications Technology (NICT).

Osamu Ishida is a member of IEEE and IEICE. He received the Young Engineers Award from IEICE in 1995. He has authored over 30 papers/letters, holds 10 patents and has authored two book chapters. Also he is a co-editor of the popular textbook on 10 Gb/s Ethernet Technologies (in Japanese).

[Keynote speaker : July 6, 9:20-10:15]

A New Generation Networks and Its Application

T. Aoyama

Keio University

Biography of Tomonori Aoyama :



Tomonori Aoyama received the B.E., M.E. and Dr. Eng. from the University of Tokyo, Japan, in 1967, 1969 and 1991, respectively. Since he joined NTT Public Corporation in 1969, he has been engaged in research and development on communication networks and systems in the NTT Electrical Communication Laboratories. From 1973 to 1974, he stayed in MIT as a visiting scientist to study digital signal processing technologies.

In 1994, he was appointed to Director of the NTT Opto-Electronics Laboratory, and in 1995 he became Director of the NTT Optical Network Systems Laboratory. In 1997, he left NTT, and joined the University of Tokyo where he was Professor in the School of Information Science and Technology. He moved to Keio University in April, 2006 and is currently Professor in the Research Institute for Digital Media and Content, Keio University.

Dr. Aoyama is IEEE Fellow and IEICE (Institute of Electronics, Information and Communication Engineers in Japan) Fellow. He is currently Vice-President of IEICE. He served as a member of the IEEE ComSoc Board of Governors, and an editor of the IEEE JSAC issues three times previously. He is a member of Science Council of Japan. He is currently serving as Chair of the Photonic Internet Forum in Japan, and the Digital Cinema Consortium of Japan, and the Digital Cinema Technology Forum, and Vice-chair of the Ubiquitous Networking Forum. He received a number of awards from IEICE and various organizations in Japan.

[Invited speaker : July 6, 10:15-10:35]

Penetration of Photonic Network in Japan

Kazuo Hagimoto
NTT

[Invited speaker : July 6, 11:00-11:20]

Bio-Inspired Approaches towards New-Generation Network Architecture

Masayuki Murata
Graduate School of Information Science and Technology, Osaka University
murata@ist.osaka-u.ac.jp

Abstract : Recently, discussions on the new-generation network architecture have been actively discussed. In this talk, we present biologically inspired networking approaches, which are expected to resolve problems encountering in the current Internet.

Biography of Masayuki Murata :



Masayuki Murata received the M.E. and D.E. degrees in Information and Computer Sciences from Osaka University, Japan, in 1984 and 1988, respectively. In April 1984, he joined IBM Japan's Tokyo Research Laboratory, as a Researcher. From September 1987 to January 1989, he was an Assistant Professor with the Computation Center, Osaka University. In February 1989, he moved to the Department of Information and Computer Sciences, Faculty of Engineering Science, Osaka University. In April 1999, he became a Professor of Osaka University, and since April 2004, he has been with the Graduate School of Information Science and Technology, Osaka University. He has contributed more than four hundred and fifty papers to international and domestic journals and conferences. His research interests include computer communication networks and performance modeling and evaluation. He is an IEICE Fellow. He is a member of IEEE, ACM, and IEICE.

[Invited speaker : July 6, 11:20-11:40]

Accounting for physical impairments in transparent networks: a Path Computation Element (PCE) solution

Piero Castoldi

Abstract : The implementation of transparent optical mesh networks requires to take into account physical impairment information for ensuring that an adequate signal quality is given to individual lightpaths. In this paper, we assess an approach to encompass physical impairments at the Path Computation Element (PCE) level.

Biography of Piero Castoldi :



Piero Castoldi got his Ph.D degree in Information Technology from the University of Parma (Italy) in 1996. He held post-doc and research staff appointments at the Department of Electrical Engineering of Princeton University (USA) in 1996/97, 1999 and 2000. From December 1997 until February 2001 he has been Assistant Professor at the Faculty of Engineering at the University of Parma (Italy) and since 2001 he has been an Associate Professor at Scuola Superiore Sant'Anna, Pisa, Italy. He has also been Project Manager of many projects of the Inter-university National Consortium for Telecommunications (CNIT) and since March 2003 he has been Director of the CNIT National Laboratory of Photonic Networks. He is also currently Leader of the "Networks and Services" research area at the Center of Excellence for Information and Communication Engineering at Scuola Superiore Sant'Anna.

His research interests has covered wired and wireless telecommunications networks, and more recently has focused on reliability and provisioning aspects for optical networks, on issues related to application-network cooperation mechanisms, in particular for grid applications.

He is author of more than 80 publications in international journals and conference proceedings including an international book titled "Multiuser detection in CDMA mobile terminals" edited by Artech-House.

[Invited speaker : July 6, 11:40-12:00]

Recent Advances and Challenges of Multi-Granular Optical Path

Ken-ichi Sato

Nagoya University

Biography of Ken-ichi Sato :



Ken-ichi Sato is currently a professor at the graduate school of Engineering, Nagoya University, and he is an NTT R&D Fellow. Before joining the university in April 2004, he was an executive manager of the Photonic Transport Network Laboratory at NTT. His R&D activities covers future transport network architectures, network design, OA&M (operation administration and maintenance) systems, photonic network systems including optical cross-connect/ADM and photonic IP routers, and optical transmission technologies. He has authored/co-authored more than 200 research publications in international journals and conferences. He holds 35 granted patents and more than 100 pending patents.

He received his B.S., M.S., and Ph.D. degrees in electronics engineering from the University of Tokyo, Tokyo, Japan, in 1976, 1978, and 1986, respectively. He received the Young Engineer Award in 1984, the Excellent Paper Award in 1991, and the Achievement Award in 2000 from the Institute of Electronics, Information and Communication Engineers (IEICE) of JAPAN. He was also the recipient of the distinguished achievement Award of the Ministry of Education, Science and Culture in 2002. His contributions to ATM (Asynchronous Transfer Mode) and optical network technology development extend to co-editing three IEEE JSAC special issues and the IEEE JLT special issue once, organizing several Workshops and Conference technical sessions, serving on numerous committees of international conferences including OFC and ECOC, authoring a book, *Advances in Transport Network Technologies* (Artech House, 1996), and co-authoring thirteen other books. He is a Fellow of the IEICE of JAPAN and a Fellow of the IEEE.

[Invited speaker : July 6, 12:00-12:20]

Technologies for Optical Transport Networks Evolution

Alfredo Viglienzoni and Bimal Nayar*

Ericsson, Via Negrone, Genova, 16153, Italy

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Abstract : Increasing demand for high bandwidth services is driving optical transport network evolution to provide attributes such as high data rates, re-configurability, fast provisioning, resilience, low cost etc. The technology trends to address these requirements will be presented.

Biography of Alfredo Viglienzoni :



Alfredo is currently head of the Optical Product Line in Ericsson. He is owner and accountable for the whole optical portfolio, including its strategy and related research agenda. Optical products include Ethernet transport nodes, multi service provisioning platforms, photonic systems for edge, metro and core applications as well as mobile backhauling systems.

Previously, he has been head of Photonics for Ericsson, formerly Marconi, at sites in the UK, Italy and Germany. He has been responsible for the MultiHaul photonic platform, which has been deployed by numerous customers for Core and Metro applications and ensured sizeable market share growth. It enabled a 2800km un-regenerated link in Australia, one of the first 40G links in service and a number of novel metro solutions such as ASE recirculating rings.

After a PhD in Physics, his career began with R&D activities in solid-state physics and material science, then electronics, digital imaging and network enabling technologies. This was followed by business development and technical management positions for 3M Corp in Europe and USA. Here he has led the technical development of the DryView laser imaging platform, played a key role in novel digital radiography technologies. Prior to Marconi he was with Pirelli then Cisco, where he was head of project management for optical components and telecom system programs.

He holds some 15 patents and has published papers on innovation and business management, material science and telecommunications. He has been a visiting scientist at CERN in Geneva.

[Invited speaker : July 6, 12:20-12:40]

Control Plane Technologies for the Next Generation Optical/IP Converged Networks

So-ichiro Araki

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Abstract: Various network services including broadband multimedia services can be accommodated by employing IP/MPLS technologies and lambda/GMPLS technologies. We propose multi-domain optical network architecture with path computation elements for future on-demand lambda services.

Biography of Soichiro Araki :

Soichiro Araki received his B.E. and M.E. degrees in electrical engineering from Kyoto University, Japan, in 1987 and 1989, respectively. In 1989 he joined Opto-Electronics Research Laboratories, NEC Corporation, Kawasaki, Japan. In 1995, he spent a year as a visiting researcher at NEC Research Institute, Princeton, NJ, contributing to the analysis of communication performance in PC clusters. Since 1996 he has been developing a high speed switching system based on optical switching techniques. He is now engaged in the research and development of optical networks, WDM node architectures and their control plane technologies. He is a Senior Principal Researcher in System Platforms Research Laboratories, NEC Corporation. He is a member of the IEEE, the IEICE and the IPSJ.

[Invited speaker : July 6, 12:20-12:40]

WDM Optical Packet Interconnection for Peta Flops Ultra-High Performance Computing System Using Multi-Stage SOA gate Switch

H. Onaka
Fujitsu

[Invited speaker : July 6, 14:00-14:20]

Optics and System Technologies in Broadband Optical Access Networks in NGN Era

Kuniaki Motoshima
Mitsubishi Electric Corp.

Biography of Kuniaki Motoshima :

Kuniaki Motoshima was born in Nagasaki, Japan, on March 25, 1958. He received the B.S., M.S., and Dr.Eng degrees in electrical engineering from University of Tokyo, Tokyo, Japan, in 1980, 1982, and 2003, respectively. In 1982, he joined Mitsubishi Electric Corporation, Kamakura, Japan, where he has been engaged in research and development of long-haul WDM optical communication systems and optical subscriber systems including ATM-PON and Gb Ethernet PON systems. He has authored or coauthored more than 35 technical papers to IEEE journals or international conference proceedings. Dr. Motoshima is a member of the IEEE Lasers and Electro-Optics Society, the IEEE Communications Society, and the Institute of Electronics, Information and Communication Engineers of Japan (IEICE).

[Invited speaker : July 6, 14:20-14:40]

New Generation Fiber in Access: Can Optical Technology Rise to The Challenge?

Pierpaolo Ghiggino

Abstract : This paper will discuss optical systems needs to evolve from the high performance, relatively low level of integration and high cost traditional concepts, to offer a better value proposition as required by the high volume access market.

Biography of Pierpaolo Ghiggino :

Current Role : Research Director - Part of the Corporate Ericsson Research team. Special focus on technical, socio-economic and advanced research aspects on converged ultra-broadband networks and related enabling technologies.

Experience: Doctorate degree (Cum Laude) in Elect. Eng. from Pavia University Italy - He joined GEC-Marconi SpA in Genova in late 1985. From early 1996 he worked in strong synergy with the GEC Hirst Research Centre (HRC) in the U.K. on high speed IM-DD and Coherent Optical Communication. In 1990 he co-ordinated the research and development for Marconi SpA on optical amplifiers, which were produced by Marconi as part of the SDH transmission equipment. In 1992 he transferred to the U.K. to co-ordinate two HRC groups seconded to Marconi SpA and working on next generation transport and ATM/Data networks. He also became Visiting Professor at Parma University. In 1996 he returned to Genova where he formed and ran the optical laboratories that produced Marconi's 1st generation DWDM product line. He played the key role in allowing Marconi to enter and consolidate in this market. In 1998-99, following the merger of GPT and Marconi SpA, he returned to the U.K., to form and run the photonics Product Strategy and System Design groups based in Italy and the U.K. He was responsible for defining the DWDM line terminals, R-OADM regional & metro products that led Marconi to gain its sizeable market share and which constitute the vast majority of its DWDM installed base. In early 2003 he joined the Corporate Strategy Group with specific focus on advanced technologies and research. He focussed research on longer term cost and bandwidth efficient ultra-high broadband networks and drove forward the Company research policy based on strong co-operation with centres of excellence, building on the successful model demonstrated in Italy with the Photonics Technologies & Networks Centre of Excellence, which he conceived and developed in Pisa together with the Scuola Superiore Sant'Anna, CNIT and CNR. He extended this model to include alliances with Cambridge University, where he is member of the board of the Centre for Advanced Photonics and Electronics (CAPE) and he chairs its System Technology Focus Group. Following the acquisition of Marconi by Ericsson in 2006 he joined the Central Ericsson Research team where he is now actively engaged in linking with a wider network of research centres and carry on working on radical ultra-high capacity technologies for both transport and access networks. He holds numerous patents, has authored or co-authored several tutorials, technical and techno-historical publications.

[Invited speaker : July 6, 14:40-15:00]

100Gb/s Ethernet design constraints for PMD sublayers and experimental investigation of transmitter jitter and residual chromatic dispersion impact exploiting OOK formats

Scaffardi Mirco⁽¹⁾, Berrettini Gianluca⁽²⁾, Filippo Ponzini⁽²⁾⁽³⁾, Marco Secondini⁽²⁾, Luca Potì⁽¹⁾, Antonella Bogoni⁽¹⁾

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2 : Scuola Superiore Sant'Anna, Pisa, Italy

Abstract: We provide design guidelines to maximize the link length of 100GbE PMD, and we experimentally validate the theoretical analysis investigating the impact of transmitter jitter and residual chromatic dispersion for OOK modulation formats.

Biography of Luca Potì :

Luca Potì was born in Parma, Italy in 1971. He received the M.S. Degree in electronics engineering from University of Parma, Parma, Italy in 1997. From 1997 to 1998 he was grantee of Marconi S.p.a. at



the University of Parma, in the optical communications laboratory. From 1999 to 2000 he was manager of the optical communications laboratory at Parma University. From 2000 he is researcher at CNIT (Consorzio Nazionale Interuniversitario per le Telecomunicazioni). Since 2005 he is CNIT head of research in the ultra-fast optical subsystems at the National Photonic Networks Laboratory in Pisa. His research interests are in the area of fiber.

[Invited speaker : July 6, 15:00-15:20]

All-Optical Label-Processing based Colored OPS Prototype with Novel 10GbE/Optical-Packet Converter

Naoya Wada, Hideaki Furukawa, and Tetsuya Miyazaki

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Abstract : We propose 10 Gbit Ethernet over WDM-based colored optical packet switching (OPS) networks and develop novel network interfaces to connect OPS networks with IP/10-Gbit-Ethernet (10GbE) networks. The interfaces, which is the ingress edge node of the OPS network, generates an optical label according to a look-up table and the destination address of an IP packet, and then encapsulates the almost 10 Gbit/s IP packet into an 80 Gbit/s (8-wavelength x 10 Gbit/s) WDM-based optical packet. Another type interfaces, which is the egress edge node of the OPS network, decapsulates the IP packet from the optical packet and generates a 10GbE frame accommodating the IP packet according to a look-up table. We achieve transmission of 10 Gbit/s Ethernet over OPS network with a packet loss rate under 10^{-6} .

Biography of Naoya Wada :



Naoya Wada received the B.E., M.E., and Dr. Eng. degrees in electronics from Hokkaido University, Sapporo, Japan, in 1991, 1993, and 1996, respectively. In 1996, he joined the Communications Research Laboratory (CRL), Ministry of Posts and Telecommunications, Tokyo, Japan. He is currently a Senior Researcher of the National Institute of Information and Communications Technology (NICT), Tokyo, Japan. Since April 2006, he has been project reader of Photonic Node Project and research manager of the Photonic Network Group.

His current research interests are in the area of photonic networks and optical communication technologies, such as optical packet switching (OPS) network, optical processing, and optical code-division multiple access (OCDMA) system. He has published more than 50 papers in refereed journals and more than 150 papers in refereed international conferences.

Dr. Wada received the 1999 Young Engineer Award from the Institute of Electronics, Information and Communication Engineers of Japan, and the 2005 Young Researcher Award from the Ministry of Education, Culture, Sports, Science and Technology. He is a member of IEEE Comsoc, IEEE LEOS, the

Institute of Electronics, Information and Communication Engineers (IEICE), the Japan Society of Applied Physics (JSAP), and the Optical Society of Japan (OSJ).

[Invited speaker : July 6, 15:20-15:40]

Single-chip encoder for optical routers: packet switching, burst switching and WDM-OCDMA transmission

Gabriella Cincotti⁽¹⁾, Naoya Wada⁽²⁾, Xu Wang⁽²⁾ and Ken-ichi Kitayama⁽³⁾

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Abstract : A single-chip multi-port encoder/decoder that generates/recognizes a large set of optical codes, and can process many codes in parallel, has been successfully used in optical packet and burst switching experiments with a speed of 13 Gpackets/s. The same device has been used in a 3-WDM×10-OCDMA×10.71 Gbps field experiment over the JNGII testbed, reaching the record spectral efficiency of 0.32b/s/Hz.

Biography of Gabriella Cincotti :



Gabriella Cincotti was born in Naples, Italy, in 1966. She received the Laurea (M. Sc.) degree cum laude in Electronic Engineering from "La Sapienza" University of Rome, in April 1992. She was a project engineer at the microwave laboratory of ALENIA, Aeritalia & Selenia S.p.A., in Rome, from 1992 to 1994. She joined the Department of Electronic Engineering of University "Roma Tre", as Assistant Professor, in October 1994. In May 2005 she became Associate Professor at the Department of Applied Electronics. Her research interests are in photonic networks and optical devices. Prof. Gabriella Cincotti has authored over 60 papers in refereed journals, and holds an international patent. She is a member of IEEE Lasers and Electro-Optics Society (LEOS), National Inter-University Consortium for Telecommunications (CNIT), and Inter-University Consortium for Matter Science (CNISM).

[Invited speaker : July 6, 15:40-16:00]

High Capacity Asynchronous OCDMA System with Advanced Modulation Techniques

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Abstract : Differential phase-shift keying (DPSK) and code-shift-keying (CSK) modulation with balanced detection are proposed and demonstrated in high capacity asynchronous optical code division access (OCDMA) system using different encoding/decoding schemes. WDM/DPSK-OCDMA and CSK-OCDMA systems have been successfully demonstrated with capacities of $3\text{-WDM} \times 10\text{-OCDMA} \times 10.71$ Gbps and $8\text{-OCDMA} \times 10.71$ Gbp, respectively.

Biography of Xu Wang :



Xu Wang received the B.S. degree in Physics from Zhejiang University, Hangzhou, China, in 1989; the M.S. degree in electronic engineering from the University of Electronics Science & Technology of China (UESTC), Chengdu, China, in 1992; and the Ph.D. degree in electronic engineering from the Chinese University of Hong Kong (CUHK), HK, in 2001.

From 1992 to 1997, he has been a lecturer in the National Key Laboratory of Fiber Optic Broad-band Transmission and Communication Networks of UESTC. In 2001-2002, he was a Postdoctoral Research Fellow in the Department of Electronic Engineering of CUHK. In 2002-2004, he worked in the Department of Electronic and Information Systems of Osaka University, Osaka, Japan, as TAO research fellow. In 2004 April, he jointed the Ultra-fast Photonic Network Group of the Information and Network Systems Department at the National Institute of Communication and Information Technology (NICT), Tokyo, Japan, as an expert researcher. In 2007 July, he will join School of Engineering and Physical Sciences, Heriot-Watt University as a Senior Lecturer. He is also an adjunct professor of Chongqing University of Post and Telecommunication.

His research interests include fiber optic communication networks, optical code division multiplexing, optical packet switching, semiconductor lasers, applications of fiber gratings, and fiber optic signal processing. He has filed three patents and is the first author of more than 70 technical papers. He was awarded the Telecommunications Advancement Research Fellowship by the TAO of Japan in 2002 and 2003. He is a Senior member of IEEE/LEOS and IEEE/ComSoc.

[Invited speaker : July 6, 16:30-16:50]

Differential-Phase-Shift Quantum Key Distribution

Kyo Inoue

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Abstract : Quantum key distribution (QKD) is being studied, aiming at absolutely secured cryptographic communications. We have been developing a novel QKD scheme, called DPS (differential-phase-shift) QKD, which features simple configuration, efficient use of the time domain leading to a high key creation rate, and robustness against a eavesdropping named photon-number-splitting attack. The record QKD system performance has been demonstrated using the QPS scheme.

Biography of Kyo Inoue :

Kyo Inoue received the B.E. and M. E. degrees in applied physics and Ph.D. degree in electrical engineering from Tokyo University, Tokyo, Japan, in 1982, 1984, and 1997, respectively. In 1984, he started to work at the NTT laboratories, where he studied optical communications (including Mach-Zehnder filters, optical amplifiers, four-wave mixing in fiber, and all-optical functional devices) and quantum communications. From 2001 to 2003, he was a visiting scholar at Stanford University, USA. In 2005, he moved to Osaka University.

[Invited speaker : July 6, 16:50-17:10]

A new slogan for optical transceivers: Plug&Tune

Pierluigi Franco

Pirelli Broadband Solutions

Abstract : In the market of optical transceivers for WDM applications, two features, pluggability and tunability, are key for cost reduction of transport optical equipment. In this contribution will review the main drivers for the need of these features and we will analyze the advantages of combining both features in one optical device. Moreover, different technological approaches for the combination of pluggability and tunability will be discussed.

Biography of Pierluigi Franco :

Pierluigi Franco is senior vice president, Marketing and Product Management - Photonics Products for Pirelli Broadband Solutions, a new company within the Pirelli Group specializing in broadband access and photonics solutions for telecommunications operators worldwide. Franco oversees the introduction of all new photonics products including new product concept, market research, customer adoption, and business and technical validation.

Prior to his current position in the Photonics business unit, Franco held several senior research positions during his 10-plus years of activity in the Pirelli Group. From 2001 to 2004, he was chief scientist for Pirelli Labs Optical Innovation where he coordinated all the R&D projects including budget allocation, project management and technical resource management for Pirelli's current product portfolio.

Franco holds a doctorate in opto-electronics and optical communications and a university degree, Magna Cum Laude, in Electrical Engineering from the University of Padua in Italy.

Italian Participants

Pierpaolo Boffi
Politecnico di Milano

Biography of Pierpaolo Boffi :

Pierpaolo Boffi received the Laurea Degree in Electronic Engineering and the Ph.D. degree in Telecommunication Engineering from Politecnico di Milano - Milan, Italy in 1991 and 1995, respectively. Since 1995 he has been a researcher at Corecom -Consortium for Research in Optical Processing and Switching Milan- where now he has the position of Research Manager for the Optical Communication Systems Area. Currently, he is an Assistant Professor of Telecommunications at Politecnico di Milano - Milan, Italy. His present research interests include WDM system impairments and novel modulation formats for optical communications.