Chairmen's invitation

"Biophotonics is a multidisciplinary research area that utilizes light-based technologies, in medicine and life science. The vision behind biophotonics is to gain a full understanding of the origin and molecular mechanisms of diseases to either prevent them or, at least, diagnose them early and precisely, followed by a treatment which is specifically adapted to individual needs."
(by "Lighting the way ahead", Photonics21 Strategic Research Agenda, 2010)

Dear Participants to the IEEE BioPhotonics conference,

After the success of the first international IEEE BioPhotonics Workshop (Parma, Italy 2011) and the second one (Taipei, Taiwan, 2013), the Institute of Applied Physics of the National Research Council of Italy and the IEEE Italy Section are pleased to welcome you to the third appointment of the series.

From the beginning of the International Workshop BioPhotonics2011 organization, it has been clear that talking about biophotonics would have meant to gather scientists with many different experiences, competences and background to cover all different aspects of this new and emerging field.

The IEEE BioPhotonics meetings has been established as a high-level meeting in the area of light-based techniques for medicine, life science, agriculture, environmental science and many other areas of application. Being at BioPhotonics2015 is thus a unique opportunity to interact with a multidisciplinary and fertile forum of experts, where researchers and professionals exchange their specific knowledge and experiences.

The conference will have three Plenary Sessions with keynote speakers from all over the word and fourteen further oral sessions plus two poster ones and an exhibitor showcase. The main topics comprise: diagnostics and therapeutics applications; imaging; integrated optical devices; microscopy; modeling; nano biophotonics; optofluidic platforms; sensing and plasmonic platforms; spectroscopy. More than thirty invited speakers will enrich the conference presenting the activity of important European and international research groups. Also, a joint session with ICOB 2015 will take place in the afternoon of May 20th within the so-called "Florence Biophotonics Week".

We are confident that between abstracts, technical sessions, food and city tours, all participants will contribute to lead a very rewarding conference.

Have a great time in Florence at IEEE BioPhotonics2015!

Roberto Pini
Stefano Selleri

BioPhotonics 2015

Florence, Italy
May 20-22, 2015

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Roberto Pini, *Institute of Applied Physics-CNR Florence* (Italy)
Stefano Selleri, *University of Parma* (Italy)

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Conference Venue

Area di Ricerca di Firenze - CNR
Via Madonna del Piano
50019 Sesto Fiorentino
Building F - Meeting center

For Information

http://biophotonics2015.ifac.cnr.it
InfoBioPhotonics2015@ifac.cnr.it

Technical Program

Wednesday 20th May 2015

08:00-08:45 Registration

08:45-08:55 Welcome

Plenary I- Aula Magna

08:55-09:20 We1.1 (Invited)

4D Nanoscopy 2.0. A Great Immediate Challenge,

Diaspro, A.[1]

[1]*NanoBioPhotonics, Istituto Italiano di Tecnologia, Department of Physics, Università di Genova, Nikon Imaging Center, NIC@IIT, Genova (Italy)*

09:20-09:45 We1.2 (Invited)

Accelerating Progress in Light Sheet Microscopy,

Dholakia, K.[1]

[1]*SUPA, University of St. Andrews, North Heugh, Fife (UK)*

Shaped light fields namely propagation invariant ('non-diffracting') light fields and complex beam shaping. This talk will describe such fields and look at their application to single plane illumination (light sheet) microscopy (SPIM). This modality uses orthogonal detection for rapid imaging of large, three-dimensional, samples of living tissue. Illumination with a thin sheet of light ensures high contrast by minimizing the fluorescent background.

09:45-10:10 We1.3 (Invited)

Quantitative Spectrally Resolved Optoacoustic Imaging,

Gerrit Held[1], Tigran Petrosyan[1], H. Günhan Akarçay[1], Linda Ahnen[2], Martin Wolf[2], Michael Jaeger[1], and Martin Frenz[1]

[1]*Institute of Applied Physics, University of Bern, Bern (Switzerland),*

[2]*University Hospital Zuerich, University of Zuerich, Zuerich (Switzerland)*

Spectral quantitative optoacoustic imaging is based on the knowledge of the local fluence distribution, which can experimentally be determined either by near-infrared imaging or by single point illumination optoacoustic imaging. Phantom experiments show that both techniques allow to quantitatively retrieve the spectral information of embedded absorbers.

10:10-10:30 Coffee Break

Parallel Sessions
We2: Spectroscopy and Imaging I - Aula Magna

10:30-10:55 We2.1 (Invited)

Shedding New Light on Cells with Coherent Multiphoton Microscopy,

Borri, P.[1]

[1]*School of Biosciences, Cardiff University, Cardiff (UK)*

We have developed in our laboratory several home-built CARS microscopes featuring innovative excitation/detection schemes. Furthermore we have invented and demonstrated a novel imaging modality, based on the resonant Four-Wave Mixing (FWM) of colloidal nanoparticles. I will present our latest progress with both techniques and their applications to cell imaging

10:55-11:20 We2.2 (Invited)

Fluorescent Imaging of Tumor Metabolic State,

Zagaynova, E.[1]

[1]*Nizhny Novgorod State medical academy, Nizhny Novgorod (Russia)*

11:20-11:35 We 2.3

Three-Dimensional Imaging of Entire Murine Intestine with Light Sheet Microscopy,

Daniela De Stefano[1], Ilenia Sana[1], Luigi Maiuri[1], Giulio Simonutti[2], Alessia Candeo[2], Gianluca Valentini[1], Andrea Bassi[2]

[1]*IERFC, Fondazione ONLUS, Ospedale San Raffaele, Milan (Italy),*
[2]*Dipartimento di Fisica, Politecnico di Milano, Milan (Italy)*

Murine organs such as intestine tissue can be imaged with Light Sheet Microscopy in depth at high resolution, but accumulating a large dataset, difficult to process and interpret. We developed a processing routine to virtually unfold the sample, observe it layer-by-layer, identify distinct villi and statistically compare multiple samples.

11:35-11:50 We2.4

Multispot Multiphoton Ca2+ Imaging in Acute Myocardial Slices,

Giulia Borile[1,4], Claudio de Mauro[2], Andrea Urbani[1,4], Domenico Alfieri[2], Francesco S. Pavone[3], Marco Mongillo[1,4]

[1]*University of Padova, Department of Biomedical Science, Padova (Italy),* [2]*Light4Tech Firenze s.r.l., Scandicci, Florence (Italy),* [3]*University of Florence, Department of Physics, Sesto F.no (Italy),* [4]*Venetian Institute of Molecular Medicine, Padova (Italy)*

Multispot multiphoton microscopy (MMM) has been applied for the first time to image Ca2+ dynamics in myocardial tissue. We demonstrated that MMM parallel scanning with 16 laser beamlets enables the investigation of fast occurring Ca2+ dependent signals in the living cells within intact heart slices.

11:50-12:05 We2.5

Femtosecond Stimulated Raman Spectroscopy and Preliminary Steps for Nonlinear Microscopy,

A. D'Arco[1,2], M. Indolfi[1], M. A. Ferrara[1], L. Zeni[2], I. Rendina[1], L.Sirleto[1]

[1]*National Research Council(CNR) -Institute for Microelectronics and*

Microsystems, Naples (Italy), [2]Second university of Naples (SUN), Department of Information Engineering, Naples (Italy)

SRS is a shot_noise limited highly sensitive tool of vibrational spectroscopy. SRS is free from the non-resonant background, exhibits an identical spectrum as the spontaneous Raman, it is linearly proportional to the concentration of the analyte. In this paper we describe the realization of a SRS nonlinear microscope and we discuss the main experimental issue for its implementation

12:05-12:20 We2.6

Wavelet Filter for Femtosecond Stimulated Raman Spectroscopy: a New Approach Brings New Horizons,

Miroslav Kloz[1,2], Jörn Weissenborn[1], Yusaku Hontani[1], John T.M. Kennis[1]
[1]Department of Physics, VU University, Amsterdam (The Netherlands)
[2]Institute of Physics ASCR, v.v.i. (FZU), ELI-Beamlines Project Prague (Czech Republic)

We developed an innovative way of performing femtosecond stimulated Raman experiment. Instead of using narrowband pulses we use shaped broadband pulses. In this way the signal to noise ratio and fidelity of experiments rises by at least a one order of magnitude.

We3: Diagnostics and Therapeutics Applications I- Room 2

10:30-10:55 We3.1 (Invited)

Optical Assessment of Blood Microrheology in Norm, Disease and at Interaction with Nanoparticles,

A.V. Priezzhev[1,2], A.E. Lugovtsov[1], S.Yu. Nikitin[1,2], K. Lee[1], V.D. Ustinov[3], O.E. Fadyukov[1,4], M.D. Lin[4],V.B. Koshelev[4], Yu.I. Gurfinkel[5], M. Kinnunen[6], C.-L. Cheng[7], E.V. Perevedentseva[7], A.V. Karmenyan[7,8]
[1]Physics Faculty, Lomonosov Moscow State University, Moscow (Russia), [2]International Laser Centre, Lomonosov Moscow State University, Moscow (Russia), [3]Faculty of Computational Mathematics and Cybernetics, Lomonosov Moscow State University, Moscow (Russia), [4]Faculty of Medicine, Lomonosov Moscow State University, Moscow (Russia), [5]Research Clinical Center of JSC «Russian Railways», Moscow (Russia), [6]University of Oulu, Oulu (Finland) [7]National Dong Hwa,University, Hualien (Taiwan), [8]National Yang-Ming University, Taipei (Taiwan)

Possibilities to optically assess the major parameters of blood microrheology and microcirculation in norm, disease and at interaction with nanoparticles are demonstrated. Possibilities of using them as optical biomarkers of diseases (e.g., diabetes and hypertension), or of the consequences of interaction of blood components with nanoparticles are discussed.

10:55-11:20 We3.2 (Invited)

Optical Techniques for Distant Assessment of Human Skin,

Spigulis, J.[1]
[1]Biophotonics Laboratory, Institute of Atomic Physics and Spectroscopy, University of Latvia, Riga (Latvia)

Three optical techniques for distant mapping of skin diagnostic indices, chromopores, fluorophores and microcirculation parameters are discussed. The technologies have been implemented in experimental prototype devices and are validated in laboratory and clinics.

11:20-11:35 We3.3

Complex Optical Method of Cancer Detection and Visualization,

Ivan A. Bratchenko[1], Dmitry N. Artemyev[1], Oleg O. Myakinin[1], Julia A. Khristophorova[1], Dmitry V. Kornilin[1], Alexander A. Moryatov[2], Valery P. Zakharov[1], Sergey V. Kozlov[2]

[1]Samara State Aerospace University, Samara (Russia), [2]Samara State Medical University, Samara (Russia)

Complex investigation of malignant tumours diagnosis was performed involving combined optical coherence tomography, Raman spectroscopy and fluorescence analysis. Combined setup was used for common skin and lung malignant tumours in vivo and ex vivo analysis and for precise tissue morphology visualization. The complex method could identify cancers with >90% accuracy.

11:35-11:50 We3.4

Laboratory Full-Field Transmission X-Ray Microscopy and Applications in Life Science,

C.Seim[1,2], A. Dehlinger[1,2], B. Kanngießer[1,3], K.Reineke[4], H. Stiel[1,2]

[1]Berlin Laboratory for innovative X-ray technologies (BLiX), Berlin (Germany), [2]Max-Born-Institut, Berlin (Germany), [3]Technische Universität Berlin, Institut für Optik und Atomare Physik, Berlin (Germany), [4]Leibniz-Institut für Agrartechnik Potsdam- Potsdam (Germany)

Zone plate based soft X-ray microscopy in the water window offers resolution in the nanometer regime combined with natural contrast and a high penetration depth for hydrated samples. This enables nanoscale investigations of biological objects in three dimensions

11:50-12:05 We3.5

Towards Next Generation Time-Domain Devices for Increasing Depth Sensitivity in Diffuse Optics,

Andrea Farina[1], Alberto Dalla Mora[2], Davide Contini[2], Simon R. Arridge[3], Fabrizio Martelli[4], Alberto Tosi[5], Gianluca Boso[5], Turgut Durduran[6], Edoardo Martinenghi[2], Alessandro Torricelli[2], Antonio Pifferi[1,2]

[1]Istituto di Fotonica e Nanotecnologie, Consiglio Nazionale delle Ricerche, Milan (Italy), [2]Dipartimento di Fisica, Politecnico di Milano, Milan (Italy), [3]Department of Computer Science, University College London, London (UK), [4]Dipartimento di Fisica e Astronomia, Università degli Studi di Firenze, Florence (Italy), [5]Dipartimento di Elettronica, Informazione e Bioingegneria, Politecnico di Milano, Milan (Italy), [6]ICFO-Institut de Cències Fotòniques, Castelldefels, Barcelona (Spain).

We present and validate a miniaturised Time-Domain (TD) probe, embedding a pulsed Vertical-Cavity Surface-Emitting Laser (VCSEL), and a Single-Photon Avalanche Diode (SPAD) or a Silicon Photomultiplier (SiPM). These technologies show the way towards compact and wearable TD probes with orders of magnitude reduction in size and cost.

12:05-12:20 We3.6

Field-portable and Cost-effective Devices for Biological and Chemical Assays,

Annamaria Cucinotta[1], Stefano Selleri[1], Alessandro Tonelli[2], Alessandro Candiani[2], Michele Sozzi[2]
[1]Information Enginnering Department, University of Parma, Parma (Italy),
[2]DNAPhone S.R.L., Parma (Italy)

Consumer electronics is dramatically boosting the employment of smart, low cost devices for specific tasks like chemical assays. The results presented herein are focused on the successful application of the credit-card sized computer Raspberry Pi and customized optics to food chemistry assays. The developed device exhibited comparable results with laboratory-based approaches.

12:20-13:20 Lunch

13:30-13:45 Transfer Villa La Quiete

Joint Session with ICOB2015

14:00-16:30 **Success Stories**
Chairs: Dennis Matthews, Quingmin Luo
Speakers:
14:00–14:30 Lorenzo Targetti
14:30–15:00 David Sampson
15:00–15:30 Juergen Popp
15:30–16:00 Antonio Pifferi
16:00–16:30 Sailing He

16:30:17:30 Coffee Break

17:30-18:45 **Success Stories**
Chairs: Roberto Pini, Sailing He
Speakers:
17:00-17:30 Dennis Matthews, UC Davis Health System
17:30-18:00 Turgut Durduran, Institute of Photonic Science
18:00-18:30 Qingmin Luo, Britton Chance Center for Biomedical Photonics
18:30-18:45 Laura Marcu, UC Davis Biomedical Enginieerring

18:45-19:00 ICOB2015 Closing remarks

19:15-19:30 Transfer downtown Florence
19:30-20:30 Welcome Cocktail at Caffetteria delle Oblate
21:00-22:00 Special event celebrating the **International Year of Light 2015** at Biblioteca delle Oblate

Thursday 20th May 2015

08:00-08:30 Registration

Plenary II- Aula Magna

08:30-08:55 Th1.1 (Invited)

Biosensing with Silicon Photonics,

Paolo Bettotti[1], Tatevik Chalyan[1], Davide Gandolfi[1], Mher Ghulinyan[2], Romain Guider[1], Laura Pasquardini[3], Cecilia Pederzolli[3], Georg Pucker[2], Fernando Ramiro Manzano[1], AlinaSamusenko[2], Marina Scarpa[1], Lorenzo Pavesi[1]

[1]Nanoscience Laboratory, Department of Physics, University of Trento,Trento, (Italy), [2]Center for Material and Microsystems, Bruno Kessler Foundation, Trento (Italy), [3]LaBSSAH, Fondazione Bruno Kessler, Povo (Italy)

Silicon photonics based biosensors are reviewed with examples for sensing proteins, allergens and aflatoxin in milk

08:55-09:20 Th1.2(Invited)

Compact, Semiconductor-based Light Sources for Biophotonics,

Peter Andersen[1],

[1]Technical University of Denmark (Denmark)

09:20-09:45 Th1.3 (Invited)

Optimization of Metal Nano-Materials for the Development of LSPR-Based Optical Fibre Sensors

T Sun[1], M H Tu[1], J Cao[1] and K T V Grattan[1]

[1]School of Mathematics, Computer Science and Engineering, City University London (UK)

This paper is focused on the development of localised surface plasmon resonance (LSPR)-based optical fibre sensors, through the optimization of the coated metal nano-materials. The highest sensitivity of an LSPR sensor coated with gold hollow nanocages has been demonstrated to be ~1933 nm/RIU.

09:45-10:05 Coffee Break

Parallel Sessions

Th2: Diagnostics and Therapeutics Applications II - Aula Magna

10:05-10:30 Th2.1 (Invited)

Corneal Transparency, Light Scattering and Coherence Loss,

Karsten Plamann[1], Fatima Alahyane[1], Emmanuel Beaurepaire[2], Zacaria Essaïdi[1]

[1] Laboratoire d'optique appliquée, ENSTA ParisTech –École polytechnique – CNRS Palaiseau cedex (France), [2]Laboratoire d'optique et biosciences, École polytechnique –CNRS –Inserm, 91128 Palaiseau (France)

In earlier studies we have worked on light scattering in cornea in order to improve laser surgical methods. We here present new optical measurements on porcine cornea based on digital holography and third harmonic generation in view of identifying specific light scattering mechanisms and quantifying their impact on corneal transparency

10:30-10:55 Th2.2 (Invited)

Automatic Temperature Guided Retinal Photocoagulation,

R. Brinkmann[1,2], A. Baade[1,2], S. Koinzer[3], W. Schwarzer[1,2], K.Schlott[1,2], Y. Miura[2], J. Roider[3]

[1]Medical Laser Center Lübeck, Lübeck (Germany), [2]Institute of Biomedical Optics, University of Lübeck, Lübeck (Germany), [3]Department of Ophthalmology, University of Kiel, Kiel (Germany)

The strengths of retinal photocoagulation lesions are automatically controlled by means of an optoacoustic based feedback technique, which acquires the temperature rise in realtime. The technique was investigated on rabbits by using different initial laser parameter. Lesions were evaluated by a fundus camera with respect to uniform lesion sizes.

10:55-11:10 Th2.3

Gas in Scattering Media Absorption Spectroscopy for Sinusitis and Otitis Diagnostics,

Hao Zhang[1], Jing Huang[1], Tianqi Li[1], HuiyingLin[1], Katarina Svanberg[1,2] and Sune Svanberg[1,2]

[1]Center of Optical and Electromagnetic Research, South China Normal University, Guangzhou (China), [2]Lund Laser Centre, Lund University, Lund (Sweden)

We use tuneable diode laser spectroscopy to non-invasively study free gas in human sinus cavities and the middle ear. Good signal stability was found in healthy sinus volunteers, and the possibility to assess free gas through the ear drum in back-scattering geometry was established in phantom experiments.

11:10-11:25 Th2.4

Fluorescence Spectroscopy of Blood Plasma of Patients with Diabetes Mellitus,

Evgeny Shirshin[1], Tatiana Tikhonova[2], Victor Fadeev[1] and Alexander Priezzhev[1,2]

[1]M.V. Lomonosov Moscow State University, Physical Department, Moscow

(Russia), [2]M.V. Lomonosov Moscow State University, International Laser Center, Moscow (Russia)

We present the results of the investigation of blood plasma of patients with diabetes mellitus using steady-state and time-resolved fluorescence spectroscopy aimed at the development of fluorescence indicators of metabolic syndrome

11:25-11:40 Th2.5

Estimation of Tissue Optical Properties between Different Grades and Stages of Urothelial Carcinoma Using Reflectance Spectroscopy,

Suresh Anand[1], Riccardo Cicchi[1,2], Fabrizio Martelli[3], Alfonso Crisci[4], Gabriella Nesi[4], Marco Carini[4], Francesco S. Pavone[1,2,3]

[1]European Laboratory for Non-Linear Spectroscopy (LENS), University of Florence, Sesto Fiorentino (Italy), [2]National Institute of Optics, National Research Council (INO-CNR), Florence (Italy), [3]Department of Physics, University of Florence, Sesto Fiorentino (Italy), [4]Division of Urology, Department of Surgical and Medical Critical Area, University of Florence, Florence (Italy)

11:40-11:55 Th2.6

Characterization of Tumour Laser Ablation Probes with Temperature Measuring Capabilities,

Yu Liu[1], Hao Yu[1], Riccardo Gassino[1], Andrea Braglia[1], Massimo Olivero[1], Daniele Tosi[2], Alberto Vallan[1], Guido Perrone[1]

[1]Dept. of Electronics and Telecommunications, Politecnico di Torino, Torino (Italy), [2]School of Engineering, Nazarbayev University, Astana (Kazakhstan)

The paper reports on the development and characterization of an innovative all-optical laser delivery fibre probe for cancer cell ablation with simultaneous temperature sensing capabilities. The probe integrates grating-based temperature sensors and a micro-structured tip surface for adapting the beam diffusion to the tumour geometry.

11:55-12:10 Th2.7

CO_2 and Nd: YAP Lasers Irradiation on CAD/CAM Ceramics: SEM, EDS and Thermal Studies,

Ahmed El Gamal[1], Carlo Fornaini[1,2,3], Jean Paul Rocca[1,2], Omid Muhamad[1], Etienne Medioni[1,2], Annamaria Cucinotta [3], Nathalie Brulat-Bouchard[2]

[1]Micoralis laboratoy EA 7354, University of Nice Sophia Antipolis, Nice (France), [2]Restorative Dentistry and Endodontics Department, Faculty of Dentistry, University of Nice-Sophia Antipolis, Nice (France), [3]Information Engineering Department, University of Parma, Parma (Italy)

To investigate the interaction of infrared light on CAD/CAM ceramics surfaces, sixty CAD/CAM ceramic discs were prepared and divided into two different groups: lithium disilicate ceramics and Zirconium ceramics and irradiated with CO_2 laser and Nd:YAP laser at 10W. Both the two wavelengths modify CAD/CAM surface without chemical composition modification

Th3: Sensing and Optofluidic Platforms - Room 2

10:05-10:30 Th3.1 (Invited)

Photonics-Enhanced Polymer Optofluidic Chips: from High-Tech Prototyping Platform to Applications,

Heidi Ottevaere[1], Diane De Coster[1], Jürgen Van Erps[1], Michael Vervaeke[1], Hugo Thienpont[1]

[1]Vrije Universiteit Brussel, Department of Applied Physics and Photonics, Brussels Photonics Team (B-PHOT), Pleinlaan 2, B-1050 Brussels (Belgium)

We will highlight versatile photonics-enhanced polymer optofluidic chips fabricated with our high-tech prototyping platform and developed for absorbance, fluorescence and Raman spectroscopy measurements. These chips pave the way towards multifunctional, low-cost, portable, robust, and, ultimately, disposable lab-on-a-chip systems that can be used in the field and for point-of-care diagnostic applications.

10:30-10:55 Th3.2 (Invited)

Ultrasensitive DNA Detection by PNA-modified Photonic Crystal Fibers (PCFs),

Roberto Corradini[1]

[1]Department of Chemistry, Università di Parma, Parma (Italy)

In this lecture we will describe the steps we have undertaken to achieve the goal of using PCF fibers as optofluidic genosensors. PCF containing Bragg grating, internally modified with peptide nucleic acid (PNA) probe, was found suitable for obtaining an optofluidic device for the detection of unamplified genomic DNA.

10:55-11:10 Th3.3

Characterization of SiON Microring Resonators for Biosensing Applications,

T. Chalyan[1], D. Gandolfi[1], R. Guider[1], L. Pasquardini[2], A. Samusenko[3], C. Pederzolli[2], G. Pucker[3], L. Pavesi[1]

[1]Nanoscience Laboratory, Department of Physics, University of Trento, Trento (Italy), [2]LaBSSAH, Fondazione Bruno Kessler, Povo (Italy), [3]Centre for Materials and Microsystems, Fondazione Bruno Kessler, Povo (Italy)

We presented a study on microring-based photonic biosensors, for Aflatoxin M1detection.We measured the bulk Sensitivity (S) and Limit of Detection (LOD) as a function of the waveguide composition and dimensions. In addition, we performed sensing measurements on functionalized devices using Aflatoxin M1 solutions of various concentrations (down to ~10nM).

11:10-11:25 Th3.4

Optical Whispering Gallery Mode Microresonators for Biosensing,

Farnesi D.[1,2], Baldini F.[2], Barucci A.[2], Berneschi S.[2], Cosci A.[1,2], Cosi F.[2], Giannetti A.[2], NunziConti G.[2], Pelli S.[1,2], Righini G.C.[1,2], Soria S.[2], Tombelli S.[2], Trono C.[2]

[1]Enrico Fermi Center, 00184 Roma (Italy), [2]Institute of Applied Physics "Nello Carrara", CNR, Sesto Fiorentino (Italy)

Morphological dependence of optical Whispering Gallery Mode (WGM) microresonators can be well exploited in biosensing. Any variation in the resonator size or in the refractive index of the surrounding medium causes a shift of the resonance position. By measuring this shift, highly sensitive label-free biosensors can be developed.

11:25-11:40 Th3.5

Hybrid Silicon-PDMS Optofluidic Ring Resonator,

G. Testa[1], I.A. Grimaldi[1], G. Persichetti[1], R. Bernini[1]

[1]Istituto di Rilevamento Elettromagnetico dell'ambiente, CNR, Naples (Italy)

Optofluidic approaches for ring resonators take advantages from the high sensitivity of the resonant photonic structure and simpler fluid handling characteristic due to fluidic integration. An integrated optofluidic ring resonator based on hybrid ARROW is presented.

11:40-11:55 Th3.6

Development of a Fluorescence-Based Optical Sensor for Nucleic Acid Detection,

Katia Tragni[1], Annamaria Cucinotta[1], Stefano Selleri[1], Alessandro Tonelli[2], Alessandro Candiani[1], Michele Sozzi[1]

[1]Dept. of Information Engineering, University of Parma, Parma (Italy), [2]Dept. of Chemistry, University of Parma, Parma (Italy)

Afluorescence-based optical sensor for nucleic acid detection is demonstrated. It offers many advantages such as portability, low energy consumption, and rapid monitoring and it can detect viruses in small concentrations.

12:10-13:10 **Poster Session I**

13:10-14:00 Lunch

Parallel Sessions
Th4: Integrated Optical Devices- Aula Magna

14:00-14:25 Th4.1 (Invited)

Red Blood Cell as Optfluidic Tuneable Lens,

Francesco Merola[1], Lisa Miccio[1], Pasquale Memmolo[1,2], Paolo Netti[2], Pietro Ferraro[1]
[1]CNR -Istituto "E. Caianiello", Pozzuoli-Naples (Italy), [2]Center for Advanced Biomaterials for Health Care@CRIB, Istituto Italiano di Tecnologia, Naples (Italy)

For the first time a red blood cell is used as tunable microlens, driven by the solution osmolarity variation. Applications in diagnostics and microscopy are foreseen.

14:25-14:50 Th4.2 (Invited)

Fiber Based and Fiber Lasers Sources for Medical Applications,

Taccheo, S.[1]
[1]Swansea University, Swansea (UK)

This talk will present results and future research directions in the field of laser sources than will impact biomedical research in the coming years.
In particular the talk will focus on Fibre-Lasers based sources since their reliability and flexibility, exploring applications ranging from imaging, to cancer detection and customized implants. Particular emphasize will be give to the availability in the near future of new wavelength, particularly in the medium-infrared, for biomedical diagnostics and what could be expected to be available to biomedical researchers and clinicians aiming to use laser based tools for their activity.

14:50-15:05 Th4.3

Integrated III-V Semiconductor Platform with Capillary Fill Micro-Fluidics for Chip-Based Flow Cytometry,

R.Thomas[1], M.D.Holton[2], S.Gilgrass[1], A.Sobiesierski[1], P.M.Smowton[1], H.D.Summers[2], D. Barrow[3]
[1]School of Physics and Astronomy, Cardiff University, The Parade, Cardiff (UK), [2]Centre for Nanohealth, Swansea University, Singleton Park, Swansea (UK), [3]Cardiff School of Engineering, Cardiff University, The Parade, Cardiff (UK)

We present a prototype of a III-V semiconductor platform with integrated laser/detectors and capillary fill micro-fluidics for flow cytometry in point-of-care and resource poor settings. Results of a micro-bead detection experiment demonstrate the arrayed lasers and detectors provide sub-μs time resolution with multiple interrogation events per cell.

15:05-15:20 Th4.4

A Parallel Microfluidic Device for Hydrodynamic Focusing of Acute Lymphoid Leukemia Cells,

S.Torino[1], M. Iodice[1], I. Rendina[1], G. Coppola[1], E. Schonbrun[2], D. Passaro[1]
[1]Institute for Microelectronics and Microsystems, National Research Council, Naples (Italy), [2]Rowland Institute at Harvard, Harvard University, Cambridge MA (USA)

15:20-15:35 Th4.5

Amorphous Silicon Photodiodes as a New Platform for Chemiluminescent Lateral Flow Immuneassay Quantitative Detection,

Mara Mirasoli[1], Giampiero De Cesare[2], Laura Anfossi[3], Domenico Caputo[2], Augusto Nascetti[4], M. Zangheri[1], Fabio Di Nardo[3], Claudio Baggiani[3], Aldo Roda[1]

[1]Department of Chemistry, Alma Mater Studiorum, University of Bologna, Bologna (Italy), [2]Department of Information, Electronic and Telecommunication Engineering, Sapienza University of Rome, Rome (Italy), [3]Department of Chemistry, University of Turin, Turin (Italy), [4]Department of Astronautics, Electrical and Energy Engineering, Sapienza University of Rome, Rome (Italy)

A simple, accurate, rapid and ultrasensitive biosensor based on Chemiluminescence Lateral Flow Immunoassay technology was developed for quantitative detection of human serum albumin in urine samples. To provide maximum detectability in a compact integrated device, an hydrogenated amorphous silicon photodiode array was employed for CL signal detection.

Th5: Modeling - Room 1

14:00-14:25 Th5.1 (Invited)

Cloud Monte Carlo Based Platform for the Needs of Biophotonics and Biomedical Optics,

Igor Meglinski[1,2], Steven Jacques[3], Alexander Doronin[1]

[1]Jack Dodd Centre for Quantum Technology, Department of Physics, University of Otago, Dunedin, (New Zealand), [2]Laboratory of Opto-Electronics and Measurement Techniques, University of Oulu, Oulu (Finland), [3]Departments of Biomedical Engineering and Dermatology, Oregon Health & Science University, Portland, OR (USA)

Engineering design and optimization of optical diagnostic and imaging systems require a clear understanding of light-tissue interaction. We present the cloude Monte Carlo based platform for the needs of Biophotonics, including modeling of fluence rate distribution, skin reflectance spectra, Optical Coherence Tomography, tissue polarimetry, coherent back scattering, fluorescence and other.

14:25-14:50 Th5.2 (Invited)

New Methods for Acquiring the 3-D Structure and Contents of Live Cells without Labeling,

Natan T. Shaked[1] and Mor Habaza[1]
[1]*Department of Biomedical Engineering, Faculty of Engineering, Tel-Aviv University, Tel-Aviv (Israel)*

We propose new methods for noninvasive acquisition of the 3-D refractive-index structure of live cells in suspension without using any labelling. The methods are based on the acquisition of off-axis interferograms of the cell from different angles using external interferometric module, while fully rotating the cell using micro-manipulations.

14:50-15:05 Th5.3

An Eigenmode Expansion Method for Rigorous Simulations of Light Scattering From Living Cells,

Jirí Petráček[1,2], Yasa Eksioglu[1], Radim Chmelík[1,2]
[1]*Institute of Physical Engineering, Faculty of Mechanical Engineering, Brno University of Technology, Technická 2, 616 69 Brno (Czech Republic),*
[2]*CEITEC - Central European Institute of Technology, Brno University of Technology, Technická 10, 616 00 Brno (Czech Republic)*

We present a novel application of the eigenmode expansion technique for rigorous simulation of light scattering from living cells. The formulation uses numerically stable scattering matrices and a perturbation approach based on the rigorous coupled-mode theory. We demonstrate convergence properties and discuss practical applicability of the technique.

15:05-15:20 Th5.4

Photodynamic Therapy: Good News from Computational Approaches,

Nino Russo[1], Marta E. Alberto[1], Gloria Mazzone[1], Bruna C. De Simone[1], Tiziana Marino[1], Emilia Sicilia[1]
[1]*Dipartimento di Chimica e Tecnologie Chimiche, Università della Calabria, I-87036 Rende (Italy)*

The possibility to design new photosensitizers active in photodynamic therapy (PDT) starting from computed electronic and geometrical properties (absorption wavelengths shifted in the Near Infrared Region, singlet-triplet energy gaps and spin-orbit matrix elements large enough to allow an efficient intersystem spin crossing) can be reliably predicted by Density Functional Theory.

15:20-15:35 Th5.5

Analysis of Light Transport Phenomena in Photosynthetic Microbial Cultures,

Hashem Asgharnejad[1], Mohammad-Hossein Sarrafzadeh[1], Reza Zarghami[1]
[1]*UNESCO Chair on Water Reuse, School of Chemical Engineering, College of Engineering, University of Tehran, Tehran (Iran)*

In this paper a relation is made between light intensity and cell concentration in a photosynthetic microbial culture like photobioreactors. Present study is based on the diffusion of photons in a media and mathematical equations are derived through

Boltzmann equation and the diffusion analogy for light.

14:00-17:20 **Exhibitor Showcase - Room 2**

15:35-15:55 Coffee Break

Parallel Sessions
Th6: Nano Biophotonics I- Aula Magna

16:00-16:25 Th6.1 (Invited)

Ultrapure Laser-Synthesized Nanomaterials for Biomedical Applications,

Andrei V. Kabashin[1]

[1]*Aix-Marseille University (AMU), LP3 UMR 7341 CNRS, Campus de Luminy, Case 917, 13288 Marseille (France)*

This presentation overviews our results on laser-ablative synthesis of ultrapure nanomaterials for biomedical applications. Running experiments in vitro and in vivo, we conclude on “zero” toxicity of such nanomaterials. We then describe a novel method for cancer therapy, in which Si nanoparticles are used as sensitizers of RF-induced hyperthermia.

16:25-16:50 Th6.2 (Invited)

Plasmon and Plasmon-Like Nanophotonics for Biosensing,

Ivo Rendina[1]

[1]*Institute of Microelectronics and Microsystems, Naples (Italy)*

16:50-17:05 Th6.3

Nanophotonic Lab-On-A-Chip Raman Sensors: a Sensitivity Comparison with Confocal Raman Microscope,

Ashim Dhakal[1,2], Pieter Wuytens[1,2,3], Frederic Peyskens[1,2], Ananth Subramanian[1,2], Andre Skirtach[2,3], Nicolas Le Thomas[1,2], Roel Baets[1,2]

[1]*Photonics Research Group, Department of Information Technology, Ghent University-IMEC, Ghent (Belgium),* [2]*Center for Nano-and Biophotonics (NB-photonics), Ghent University, Ghent (Belgium),* [3]*Department of Molecular biotechnology, Ghent University,B-9000 Ghent (Belgium)*

We compare the performance of several nano-photonic waveguide based evanescent Raman sensors and the confocal microscope. While theoretically we expect more than 500 times higher signal for 1 cm long waveguides compared to the confocal systems, the results of our preliminary measurements indicate at least 25times higher measured.

17:05-17:20 Th6.4

Characterization of ZnSe/ZnS QD Conjugated with Antibody Labeling

Kisspeptins,

Anna Drobintseva[1], Victoria Polyakova[1], Lev Matyushkin[2], Yulia Krylova[1], Dmitry Masing[2], Olga Aleksandrova[2], Vyacheslav Moshnikov[2], Sergey Musikhin[3], Igor Kvetnoy[1]

[1]Ott Institute of Obstetrics Gynecology and Reproductology, Saint Petersburg (Russia), [2]Electrotechnical University, Saint-Petersburg [3]Polytechnical University, Saint-Petersburg (Russia)

To our knowledge, this immunofluorescence assay applied ZnSe/ZnS combined with specific monoclonal antibody detecting kisspeptinsis presented for the first time. The application in real samples with favorable results and the highly sensitivity and selectivity further indicate that this QD's-mAb complex is feasible for kisspeptins detection.

Th7: Sensing and Plasmonic Platforms I- Room 1

16:00-16:25 Th7.1 (Invited)

Advanced Surface Plasmon Resonance Imaging Methods for Genomic DNA Detection,

Roberta D'Agata[1], Marzia Calcagno[2], Giulia Breveglieri[3], Monica Borgatti[3], Roberto Gambari[3], Giuseppe Spoto[1,2]

[1]Department of Chemical Sciences, University of Catania, Catania (Italy), [2]I.N.B.B. Consortium, Roma (Italy), [3]Department of Life Sciences and Biotechnology, University of Ferrara, Ferrara (Italy)

Nanoparticle-enhanced surface plasmon resonance imaging methods for PCR-free detection of genomic DNA will be presented. The role played by the proper functionalization of gold nanoparticles will be also discussed.

16:25-16:50 Th7.2 (Invited)

Molecular Switches for Sensing in Cells: Let's Light Up the "Dark Matter" of the Genome,

Ambra Giannetti[1], Barbara Adinolfi[1], Sara Tombelli[1], Cosimo Trono[1], Francesco Baldini[1]

[1]CNR-IFAC, Sesto Fiorentino (FI) (Italy)

The delivery into cells of molecular switches, can conveniently allow the preparation of small tools to spy on cellular mechanisms with high specificity and sensitivity. The understanding, following, and monitoring of non-coding RNAs, a sort of "dark side" of the genome, could play a fundamental role for diagnosis and, even further, for therapy development.

16:50-17:05 Th7.3

Correlative TERS Imaging of B. Subtilis Spores,

Giulia Rusciano[1], Gianluigi Zito[1], Rachele Isticato[2], Teja Sirec[2], Ezio Ricca[2],

Antonio Sasso[1]
[1]*Department of Physics University of Naples Federico II, Naples (Italy),*
[2]*Department of Biology, University of Naples Federico II, Naples (Italy)*

We apply Tip-Enhanced Raman Scattering (TERS) for surface analysis of the Bacillus subtilis spore, a very attractive bio-system for a wide range of applications regulated by the spore surface properties. Our experimental outcomes reveal the arrangement of proteins and carbohydrates on specific spore surface regions, simultaneously revealed by AFM phase-imaging.

17:05-17:20 Th7.4

Versatile in Vivo Optogenetic Stimulation with Microstructured and Tapered Optical Fibers,

Ferruccio Pisanello[1], Leonardo Sileo[1], Ian A Oldenburg[2], Marco Pisanello[1,3], John A Assad[4,5], Bernardo L Sabatini[2] and Massimo De Vittorio[1,3]
[1]*Istituto Italiano di Tecnologia-Center for Biomolecular Nanotechnologies, Arnesano, Lecce (Italy),* [2]*Department of Neurobiology, Howard Hughes Medical Institute, Harvard Medical School, Boston, MA (USA),* [3]*Dip.Ingegneria dell'Innovazione, Università del Salento, Lecce (Italy),* [4]*Center for Neuroscience and Cognitive Systems@UniTn, Istituto Italiano di Tecnologia, Rovereto (Italy),* [5]*Department of Neurobiology, Harvard Medical School, Boston, MA (USA)*

We describe the fabrication and the in vivo implementation of a new and minimally invasive optogenetic device [F. Pisanello et al., Neuron 82, 1245 (2014)] that allows dynamic and selective stimulation of multiple brain regions through a single, thin and sharp micro machined fiber optic.

17:30-17:50 Transfer downtown Florence

18:15-19:15 City Tour (1h)

20:00-23:00 Social Dinner at restaurant "Lo Spaccio" Fattoria di Maiano

Friday 22nd May 2015

08:00-08:30 Registration

Plenary III- Aula Magna

08:30-08:55 Fr1.1 (Invited)

Applications of Laser Spectroscopy to Meet Challenges in Medicine,

Katarina Svanberg[1,2]

[1]Department of Oncology, Lund University Hospital, Lund University, Lund (Sweden), [2]South China Normal University, Guangzhou (China)

08:55-09:20 Fr1.2 (Invited)

Tissue Optical Clearing: New Prospects in Optical Imaging and Therapy,

Valery Tuchin[1,2,3]

[1]Research-Educational Institute of Optics and Biophotonics, National SaratovState University, Saratov (Russia), [2]Institute of Precise Mechanics and Control of Russian Academy of Sciences, Saratov (Russia), [3]Optoelectronics and Measurement Techniques Laboratory, Department of Electrical Engineering, University of Oulu, Oulu (Finland)

Achievements of tissue optical clearing techniques are demonstrated. The specific features of optical clearing of tissues and blood are investigated using linear and nonlinear optical techniques in the visible, NIR and terahertz. In vitro, ex vivo, and in vivo studies of a variety of human and animal tissues are presented.

09:20-09:45 Fr1.3 (Invited)

Coherent Hemodynamics Spectroscopy for Quantitative Measurements of Cerebral Blood Flow and Autoregulation,

Sergio Fantini[1], Angelo Sassaroli[1], Jana M. Kainerstorfer[1], and Kristen T. Tgavalekos[1]

[1]Department of Biomedical Engineering, Tufts University, Medford, MA (USA)

We present a novel technique, coherent hemodynamics spectroscopy (CHS), which is based on frequency-resolved measurements of coherent cerebral hemodynamic oscillations that are induced by controlled perturbations to the arterial blood pressure. The analysis of CHS spectra with a new hemodynamic model yields quantitative measurements of local cerebral blood flow and autoregulation.

09:45-10:05 Coffee Break

Parallel Sessions

Fr2: Spectroscopy and Imaging II - Aula Magna

10:05-10:30 Fr2.1 (Invited)

Human Microcirculation Imaging,

Martin J. Leahy[1], Roshan Dsouza[1], Seán O'Gorman[1], Aedán Breathnach[1], Haroon Zafar[1] and Hrebesh Subhash[1]

[1]*Tissue Optics & Microcirculation Imaging Facility, School of Physics, National University of Ireland, Galway (Ireland) and National Biophotonics & Imaging Platform (Ireland)*

10:30-10:55 Fr2.2 (Invited)

Biophotonics and Molecular Imaging: Looking at Biological Function and Disease From Cells to Whole Organisms,

Stylianos Psycharakis[1], Evangelos Liapis[1], Athanasios Zacharopoulos[1] and Giannis Zacharakis[1]

[1]*Institute of Electronic Structure and Laser, Foundation for Research and Technology-Hellas, Heraklion Crete (Greece)*

Modern tools in biophotonics have revolutionized biological, preclinical and clinical research, providing new insights into the function of living organisms and disease. Technologies such as light-sheet microscopy, optical micro-tomography, optoacoustics and others can be used in label-free and targeted imaging from the single cell to the whole organism level.

10:55-11:10 Fr2.3

Mobile Platform for Online Processing of Multimodal Skinoptical Images,

Dmitrijs Bliznuks[1], Dainis Jakovels[1], Inga Saknite[1] and Janis Spigulis[1]

[1]*Biophotonics Laboratory, Institute of Atomic Physics and Spectroscopy, University of Latvia, Riga (Latvia)*

Mobile platform for multimodal skin assessment has been developed combining diffuse reflectance, fluorescence spectral imaging and laser speckle imaging. It consist of handheld, battery powered image acquisition module that can be wirelessly connected to mobile phone or laptop and transfer data to online storage place for further processing.

11:10-11:25 Fr2.4

Importance of Image Processing in Digital Optical Capillaroscopy for Early Diagnostics of Arterial Hypertension,

Gurfinkel Yu.I. [1], Priezzhev A.V. [2], Kuznetzov M.I. [1]

[1]*Research Clinical Center of JSC "Russian Railways", Moscow (Russia),*
[2]*Physics Department and International Laser Center of Lomonosov Moscow State University, Moscow (Russia)*

Nailfold capillaries were visualized in hypertensive and prehypertensive patients using digital optical capillaroscopy with a high speed CCD-camera. Image processing included stabilization, capillary contouring and determining the capillary blood velocity. It allowed

for recognizing the remodeling and rarefaction of capillaries that are important for early diagnostics of arterial hypertension.

11:25-11:40 Fr2.5

Benign –Atypical Nevi Discrimination Using Diffuse Reflectance and Fluorescence Multispectral Imaging System,

Dainis Jakovels[1], Inga Saknite[1], Dmitrijs Bliznuks[1], Janis Spigulis[1]

[1]*BiophotonicsLaboratory, Institute of Atomic Physics and Spectroscopy, University of Latvia, Riga (Latvia)*

The multispectral imaging system Nuance operating in spectral range 450-950 nm was adapted for diffuse reflectance and fluorescence clinical in vivo measurements of pigmented skin lesions. Pilot study was performed on 75 volunteers to test discrimination possibility between benign and atypical nevi

11:40-11:55 Fr2.6

Development of a Time-Resolved Diffuse Optical Tomography System Based on a Single Pixel Camera,

Andrea Farina[1], Marta Betcke[2], Laura Di Sieno[3], Alberto Dalla Mora[3], Nicolas Ducros[4], Gianluca Valentini[1,3], Antonio Pifferi[1,3], Simon Arridge[2], Cosimo D'Andrea[3,5]

[1]*Consiglio Nazionale delle Ricerche, IFN, Milan (Italy),* [2]*Centre for Medical Image Computing, University College London London (UK),* [3]*Politecnico di Milano, Dipartimento di Fisica Milan (Italy),* [4]*CREATIS, CNRS UMR5220, INSERM U1044, Universitéde Lyon, INSA Lyon, Villeurbanne (France),* [5]*Center for Nano Science and Technology@PoliMi, Istituto Italiano di Tecnologia, Milan (Italy)*

Diffuse Optical Tomography (DOT) and Fluorescence Molecular Tomography (FMT)are 3D imaging techniques to quantitatively measure tissue optical parameters. In this work a time-resolved DOT/FMT system based on compressive sensing approach which allows to significantly reduce the data set while preserving the spatial and temporal capability, is presented.

Fr3: Microscopy - Room 2

10:05-10:30 Fr3.1 (Invited)

***In Situ* Quantitation of Collagen Fibrils Size *Via* Absolute Measurements of SHG Signals,**

S. Bancelin[1], C. Aimé[2], I. Gusachenko[1], L. Kowalczuk[3], G. Latour[1], T. Coradin[2] and M.-C. Schanne-Klein[1]

[1]*École Polytechnique, CNRS, INSERM U696, Laboratoire d'Optique et Biosciences, Palaiseau (France),* [2]*Sorbonne Universités, UPMC Univ Paris 06,*

CNRS, Laboratoire de Chimie de la Matière Condensée de Paris, Collège de France, Paris (France), [3]Sorbonne Universités, UPMC Univ Paris 06, INSERM UMRS 872, Centre de Recherche des Cordeliers, Paris (France).

We correlated SHG and Electron Microscopies to calibrate SHG signals as a function of collagen fibril diameter, down to 30 nm. We observed a fourth power variation, in agreement with analytical and numerical calculations. We applied this calibration to abnormal fibrils in the Descemet's membrane of fresh rat corneas.

10:30-10:55 Fr3.2 (Invited)

Optical Brain Imaging,

Allegra Mascaro, L.[1]

[1]*Lens-University of Florence, Florence (Italy)*

10:55-11:10 Fr3.3

Lens-Less Microscopy Combined with Capillary Force Assembly for Systematic Particle Detection,

Olivier Lecarme[1,2], Anthony Léonard[1,2], Julien Cordeiro[1,2], Emmanuel Picard[3], David Peyrade[1,2]

[1]*Univ. Grenoble Alpes, F-38000 Grenoble (France), [2]CEA, LETI, LTM-CNRS, MINATEC Campus, F-38000 Grenoble (France), [3]CEA, INAC-SP2M, SiNaPS, MINATEC Campus, F-38000 Grenoble (France)*

We show a method coupling capillary force assembly of colloidal objects and consumer camera based lens-less microscopy for simple and fast detection of micro-particles. As proof-of-concept for micro-biodetection, we demonstrate the assembly of ~70000 microbeads in a single particle array and their simultaneous imaging using an ultra-wide field-of-view lens-less microscope.

11:10-11:25 Fr3.4

Spectral Detection of Accumulation of a Ph-Activatable Fluorescent Probe in Dendritic Cells,

Zoran Arsov[1,2], Urban Švajger[3], Janez Mravljak[4], Stane Pajk[4], Iztok Urbančič[1], Janez Štrancar[1,2], Marko Anderluh[4]

[1]*Laboratory of Biophysics, Department of Solid State Physics, Jozef Stefan Institute, Ljubljana (Slovenia), [2]Center of Excellence NAMASTE, Ljubljana (Slovenia), [3]Blood Transfusion Centre of Slovenia, Ljubljana (Slovenia), [4]Department of Medicinal Chemistry, Faculty of Pharmacy, University of Ljubljana, Ljubljana (Slovenia)*

Internalization by antigen-presenting dendritic cells (DCs) was studied with a pH-sensitive probe. The probe exhibits activation at low pH and an aggregation-induced spectral shift. The latter is small, so only a highly spectrally sensitive fluorescence microspectroscopy (FMS) enabled detection of the probe accumulation in low-pH compartments of DCs

11:25-11:40 Fr3.5

Fluorescence Microspectroscopy Insight into Membrane Disintegration Driven by Titanium Dioxide Nanoparticles,

Maja Garvas[1,2], Iztok Urbančič[1], Anže Testen[1], Polona Umek[1,3], Miha Škarabot[1], Zoran Arsov[1,3], Tilen Koklič[1,3], Igor Muševič[1,4], Janez Štrancar[1,2]

[1]J. Stefan Institute, Jamova cesta 39, Ljubljana (Slovenia), [2]Jozef Stefan International postgraduate school, Jamova cesta 39, Ljubljana (Slovenia), [3]Center of excellence NAMASTE, Jamova cesta 39, Ljubljana (Slovenia), [4]Faculty of Mathematics and Physics, University of Ljubljana, Jadranska 19, Ljubljana (Slovenia)

By using fluorescence microspectroscopy and Foerster resonance energy transfer we identify the accumulation of TiO_2 nanoparticles on the membranes. Aggregates of the TiO_2 nanoparticles become wrapped by the membrane lipids and diffuse away, resulting in a lipid outflow that critically destabilizes the lipid bilayer.

12:00-13:00 **Poster Session II**

13:00-14:00 Lunch

Parallel Sessions

Fr4: Sensing and Plasmonic Platforms II - Aula Magna

14:00-14:25 Fr4.1 (Invited)

Surface Plasmon Resonance Biosensors to Detect Autoantibodies in Human Plasma – Potentials for Diagnostic Applications,

Peter B. Luppa[1],

[1]Institut für Klinische Chemie und Pathobiochemie, Klinikum rechts der Isar der TU München (Germany)

14:25-14:50 Fr4.2 (Invited)

Opportunities with Light-Responsive Plasmonic Nanomaterials and Graphene in Therapy and Sensing,

Paolo Matteini[1], Fulvio Ratto[1], Francesca Rossi[1], Marella de Angelis[1], Martina Banchelli[1], Lucia Cavigli[1], Sonia Centi[1], Francesca Tatini[1] and Roberto Pini[1]

[1]Institute of Applied Physics "Nello Carrara", National Research Council, via Madonna del Piano 10, 50019 Sesto Fiorentino (Italy)

Plasmonic nanoparticles and graphene can be used for generating photothermal effects and for enhancing the local electric field, which in turn are being exploited for a variety of biomedical applications. We present some light-activated materials we have recently engineered as viable solutions to critical issues in therapy and sensing.

14:50-15:05 Fr4.3

Towards Personalized Snps Screening by SPR Biosensing: Recent Strategies and Achievements,

S. Scarano[1], S. Mariani[1], M.L. Ermini[1], R. Barale[2], M. Bonini[1,3], and M. Minunni[1,3]

[1]Department of Chemistry 'Ugo Schiff', University of Florence, Sesto Fiorentino (Italy), [2]Department of Biology, University of Pisa, Pisa (Italy), [3]CSGI Consortium, Sesto Fiorentino (Italy)

15:05-15:20 Fr4.4

"Lab-on-Fiber Technology" for the Real Time Cancer Marker Detection: Developing an Innovative Local SPR Based Optical Fiber Biosensor,

Renato Severino[1], Armando Ricciardi[1], Giuseppe Quero[1], Benito Carotenuto[1], Marco Consales[1], Alessio Crescitelli[2], Emanuela Esposito[2], Menotti Ruvo[3], Annamaria Sandomenico[3], Anna Borriello[4], Lucia Sansone[4], Antonello Cutolo[1], Andrea Cusano[1]

[1]Optoelectronic Division, Dept. of Engineering, University of Sannio, Benevento (Italy), [2]Istituto per la Microelettronica e Microsistemi, National Research Council, Naples (Italy), [3]Istituto di Biostrutture e Bioimmagini, National Research Council, Naples (Italy), [4]Istituto per i Polimeri Compositi e Biomateriali, National Research Council, Naples (Italy)

The work deals with an innovative Lab-on-Fiber biosensor developed for the real time detection of thyroid carcinomas biomarkers. Thanks to the presence of a metallic nanostructure supporting LSPR on the fiber tip, the device is able to detect nanomolar.

15:20-15:35 Fr4.5

Voltage Sensitivity of Surface Plasmon Resonance for Biological Applications,

Sidahmed Abayzeed[1], Richard Smith[1], Kevin Webb[1], Michael Somekh[2] and Chung See[1]

[1]Applied Optics Group, University of Nottingham, Nottingham (UK), [2]Department of Electronic and Information Engineering, The Hong Kong Polytechnic University, Hung Hom, Kowloon (Hong Kong)

Fr5: Diagnostics and Therapeutics Applications III - Room 2

14:00-14:25 Fr5.1 (Invited)

Functional Optical Coherence Tomography on Human Skin with Cellular

Resolution,

Tuan-ShuHo[1], Jeng-Wei Tjiu[2], Meng-Ting Chien[1], Dong-Yi Wu[1], Chia-Kai Chang[1], Pinghui S. Yeh[3], Yu-I Li[4], Chia-Tung Shun[4], Sheng-Lung Huang[1]
[1]*Graduate Institute of Photonics and Optoelectronics, National Taiwan University, Taipei (Taiwan),* [2]*Department of Dermatology, National Taiwan University Hospital, Taipei (Taiwan),* [3]*Department of Electronic Engineering, National Taiwan University of Science and Technology, Taipei (Taiwan),* [4]*Department and Graduate Institute of Forensic Medicine, National Taiwan University, Taipei (Taiwan)*

Imaging of cells and tissues with sub-micron resolution using optical coherence tomography could help unveil functions of living organisms and facilitate clinical disease/cancer diagnosis in the early stage. The vector flowing of blood cells in micro vessels were traced. Both morphological recognition and parametric analysis will be discussed.

14:25-14:50 Fr5.2 (Invited)

Dynamic Imaging of Human Eye Accommodation with Optical Coherence Tomography,

Marco Ruggeri[1], Victor Hernandez[1,2], Siobhan Williams[1,2], Carolina de Freitas[1], Florence Cabot[1], Nilufer Yesilirmak[1], Fabrice Manns[1,2] and Jean-Marie Parel[1,2],
[1]*Ophthalmic Biophysics Center, Bascom Palmer Eye Institute, University of Miami School of Medicine, Miami, FL (USA),* [2]*Department of Biomedical Engineering, College of Engineering, University of Miami, Coral Gables, FL (USA)*

We developed optical coherence tomography technologies enabling real time in vivo imaging and biometry of the human accommodation optics and mechanics. The instrumentation is used to study the changes leading to presbyopia and to accelerate the development of innovative procedures aimed at restoring accommodation in presbyopes and cataract surgery patients.

14:50-15:05 Fr5.3

Antimicrobial Effect on *Candida Albicans* by Different Coupling of Wavelengths and Colors in Photodynamic Therapy Protocols,

Elisabetta Merigo[1], Stefania Conti[2], Tecla Ciociola[2], Carlo Fornaini[1], Luciano Polonelli[2], Giuseppe Lagori[1], Maddalena Manfredi[1], Paolo Vescovi[1]
[1]*Department of Biomedical, Biotechnological and Translational Sciences (S.Bi.Bi.T), University of Parma, Parma (Italy)*

15:05-15:20 Fr5.4

Light-Emitting Capsule for Intra-Gastric Photodynamic Therapy,

Giovanni Romano[1], Federico Cubeddu[2], Barbara Orsini[1], Giuseppe Tortora[2], Monica Monici[3], Elisabetta Surrenti[4], Calogero Surrenti[1], Arianna Menciassi[1], Franco Fusi[1]

[1]*Dept. of Experimental and Clinical Biomedical Sciences "Mario Serio", University of Florence, Florence (Italy),* [2]*The BioRobotics Institute, Scuola Superiore Sant'Anna, Pisa (Italy),* [3]*ASA Campus Joint Laboratory, ASA Research Division, Dept. of Experimental and Clinical Biomedical Sciences "Mario Serio", University of Florence, Florence (Italy),* [4]*ASL 10, Florence (Italy)*

Helicobacter Pylori is a bacterium colonizing the stomach antrum, causing several gastric pathologies and being treated with pharmacological therapies. We propose the characterization of an innovative therapeutic device –an ingestible luminous capsule –to eradicate Helicobacter Pylori infection by means of photodynamic therapyin a minimally invasive way.

15:20-15:35 Fr5.5

Micro-Raman Spectroscopy during Orthodontic Tooth Movement: Follow-Up of Gingival Status,

C. Camerlingo[1], F. d'Apuzzo[2], V. Grassia[2], G. Parente[2], L. Perillo[2], M. Lepore[3]

[1]*SPIN-CNR, Istituto Superconduttori, Materiali innovativi e Dispositivi, Pozzuoli (Italy),* [2]*Dip. Multidisciplinare di Specialità Medico-Chirurgiche e Odontoiatriche, Seconda Università di Naples, Naples (Italy),* [3]*Dip. di Medicina Sperimentale, Seconda Università di Naples, Naples (Italy)*

The potentiality of Micro-Raman spectroscopy to evaluate GCF composition changes generated in the periodontium by orthodontic forces was assessed. A suitable numerical treatment based on wavelet algorithms has been used for spectral data. The preliminary results showed an increase of carotene in GCF during the orthodontic tooth movement.

15:35-15:55 Coffee Break

Parallel Sessions
Fr6: Food - Aula Magna

16:00-16:25 Fr6.1 (Invited)

Smart Sensors for Food Safety: Opportunities and Challenges,

Chiara Dall'Asta[1]

[1]*Department of Food Science, University of Parma, Parma (Italy)*

Food safety is mainly aimed at the prevention of food-related outbreaks. Although, instrumental protocols are still gold standards, there is a need for complementary techniques in the field of rapid screening. This communication focuses on the major advantages and challenges associated with the use of optical sensors in food safety.

16:25-16:40 Fr6.2

Si-based Monolithic Poylchromatic Young Interferometeras an Enabling

Tool for Point-of-Need Food Safety Determinations,

Konstantinos Misiakos[1], Panagiota Petrou[2], Sotirios Kakabakos[2], Alexandros Salapatas[1], Athanasios Botsialas[3], Ioannis Raptis[3], Iliani Kylintirea[4], Triantafyllos Sarafidis[4], Antonis Lambidonis[5], Anastasios Varouxis[6], Eleni Makarona[1]

[1]Institute of Nanoscience and Nanotechnology, NCSR "Demokritos", Athens (Greece), [2]Institute of Nuclear and Radiological Sciences &Energy, Safety and Environment, NCSR "Demokritos", Athens (Greece), [3]ThetaMetrisis S.A., Egaleo; [4]H+S Technology Solutions S.A., Elliniko (Greece), [5]Food Allergens Laboratory, Rethymno (Greece), [6]Provirom Ltd, Elefsina (Greece)

We present an optoelectronic platform designed for the multi-analyte, label-free, real-time detection of pesticides in drinking water and agricultural products. The platform, exploiting broad-band Young interferometry, specially-designed immunosensing/functionalization strategies and a compact and user-friendly reader is currently used for the determination of pesticide residues in drinking water samples.

16:40.16:55 Fr6.3

Nondestructive Assessment of Apple Optical Properties during Growth by Time-Resolved Reflectance Spectroscopy in The Orchard,

Alessandro Torricelli[1], Dominique Fleury[2], Jeanne Giesser[2], Reynald Pasche[2], Jana Kaethner[3], Manuela Zude[3], Lorenzo Spinelli[4]

[1]Dipartimento di Fisica, Politecnico di Milano, Milan (Italy), [2]Hes so, Changins, Nyon (Switzerland), [3]Leibniz Institute for Agricultural Engineering Potsdam-Bornim, Potsdam (Germany), [4]Istituto di Fotonica e Nanotecnologie, Consiglio Nazionale per le Ricerche, Milan (Italy)

We report on the first application of time-resolved reflectance spectroscopy in the orchards for the nondestructive assessment of apple optical properties during growth. A portable dual-wavelength (650 nm, 780 nm) system was developed and used to assess the absorption coefficient and the reduced scattering coefficient of apples during growth.

16:55-17:10 Fr6.4

Multilayer Integrated Structure for Selective Detection of Ochratoxin A,

D. Caputo[1], E. Parisi[1], M. Carpentiero[1], F. Pavanello[2], M. Tucci[3], A. Nascetti[4], G. de Cesare[1]

[1]DIET University of Rome "La Sapienza" Rome (Italy), [2]AUTOMATION s.r.l. Abbiategrasso, Milan (Italy), [3]ENEA, Research Center Casaccia, Rome (Italy), [4]DIAEE University of Rome "La Sapienza" Rome (Italy)

This work presents, for the first time, the integration on the same glass substrate of amorphous silicon photosensors and of a long pass thin film filter, in order to achieve a more compact and efficient system to detect Ochratoxin A, a highly toxic mycotoxin present in widespread food commodities.

17:10-17:25 Fr6.5

Non-Destructive Fluorescence Sensing for Applications in Precision Viticulture,

Lorenza Tuccio[1], Graziana Grassini[2], Giovanni Agati[1]

[1]*Istituto di Fisica Applicata "Nello Carrara" – Consiglio Nazionale delle Ricerche, Sesto Fiorentino (Italy),* [2]*Centro Analisi C.A.I.M.,Via del Turismo 196, 58022 Follonica (Italy)*

A portable fluorescence sensor was used to assess in a sustainable, rapid and non-destructive way target molecules in winegrape (Vitis vinifera L.) which markedly change during fruit maturity and plant stress conditions. These information provided in situ are useful in precision viticulture to support producer decisions and improve the wine quality.

Fr7: Nano Biophotonics II - Room 2

16:00-16:25 Fr7.1 (Invited)

Magnetite Nanoparticles for Optical Diagnostics and Laser Regeneration of Cartilage,

Emil Sobol[1], AlexanderOmelchenko[1], YuliaSoshnikova[1],

[1]*Institute on Laser & Information Technologies, Russian Academy of Sciences, Troitsk (Russia)*

16:25-16:40 Fr7.2

Plasmon-Resonant Nanostars with Variable Sizes as Contrast Agents for Optical Coherence Tomography and Confocal Microscopy,

Olga Bibikova[1,2], Andrew Fales[3], Hsiangkuo Yuan[3], Alexey Popov[1,2], Alexander Bykov[1,2], Matti Kinnunen[1], Vladimir Bogatyrev[4,5], Krisztian Kordas[6], Tuan Vo-Dinh[3], Valery Tuchin[1,2,7]

[1]*Optoelectronics and Measurement Techniques Laboratory, Department of Electrical Engineering, Faculty of Information Technology and Electrical Engineering, University of Oulu, Oulu (Finland),* [2]*Research-Educational Institute of Optics and Biophotonics, Saratov State University, Saratov (Russia),* [3]*Fitzpatrick Institute for Photonics, Departments of Biomedical Engineering and Chemistry, Duke University, Durham, NC (USA),* [4]*Institute of Biochemistry and Physiology of Plants and Microorganisms, Russian Academy of Sciences, Saratov (Russia),* [5]*Department of Biophysics, Faculty of Nonlinear Processes, Saratov State University, Saratov (Russia),* [6]*Microelectronics and Materials Physics Laboratories, Department of Electrical Engineering, Faculty of Information Technology and Electrical Engineering, University of Oulu,*

Oulu (Finland), [7]Institute of Precise Mechanics and Control, Russian Academy of Sciences, Saratov (Russia)

Gold nanostars with variable sizes were synthesized and optically characterized by a spectrophotometer system with integrating spheres. The high scattering contribution enables usage of nanostars as contrast agents in optical coherence tomography for bioimaging and in laser confocal microscopy for real-time observation of NSts localisation inside living cells.

16:40.16:55 Fr7.3

Diatomite Nanoparticles as Potential Drug Delivery Systems,

M. Terracciano[1,4], A. Lamberti[2], H.A.Santos[3], N.M.Martucci[2], M.A.Shahbazi[3], A.Correira[3] I.Ruggiero[2], I. Rendina[1], L. De Stefano[1], I.Rea[1]

[1]Institute for Microelectronics and Microsystems, National Research Council, Naples (Italy), [2]Department of Molecular Medicine and Medical Biotechnology, University of Naples Federico II, Naples (Italy), [3]Division of Pharmaceutical Chemistry and Technology, Faculty of Pharmacy, University of Helsinki (Finland), [4]Department of Pharmacy, University of Naples Federico II, Naples (Italy)

The physical and chemical properties of diatomite, the relatively low cost and abundance in nature have attracted a large variety of industrial applications such as food production, water extracting agent, production of cosmetic and pharmaceutics; in particular, the chemical inertness, thermal stability, high surface area, non-toxicity and biocompatibility make diatomite ideal material for the preparation of drug delivery nanocarriers.

16:55-17:10 Fr7.4

Raman Imaging for the Intracellular Label-Free detection and study of Drug Nanocarriers and Graphene nanoparticles,

Renzo Vanna[1], Federica Valentini[2], Carlo Morasso[1], Aldrei Boaretto[2,3], Laura Pandolfi[4], Paolo Verderio[4], Silvia Picciolini[1], Alice Gualerzi[1], Marzia Bedoni[1], Davide Prosperi[4], Furio Gramatica[1]

[1]Laboratory of Nanomedicine and Clinical Biophotonics (LABION), Fondazione Don Carlo Gnocchi ONLUS, Milan (Italy), [2]Dipartimento di Scienze e Tecnologie Chimiche, Rome (Italy), [3]CAPES Foundation, Ministry of Education of Brazil Brasilia (Brazil), [4]Dipartimento di Biotecnologie e Bioscienze, Università di Milano-Bicocca, Milan (Italy)

Nanoparticles are emerging as a new platform for cancer therapy, but their intracellular characterization is mostly based on fluorescent labelling. Here we show how the use of Raman spectroscopy permits the label-free localization and the chemical characterization of drug-loaded nanoparticles and graphene nanoparticles at intracellular level.

17:10-17:25 Fr7.5

Strategies for Gold Nanorods Targeting of Tumors for Optical

Hyperthermia,

Sonia Centi[1], Fulvio Ratto[1], Francesca Tatini[1], Ida Landini[2], Stefania Nobili[2], Ewa Witort[3], Giovanni Romano[3], Franco Fusi[3], Sergio Capaccioli[3], Enrico Mini[3], Roberto Pini[1]

[1]Institute of Applied Physics, National Research Council of Italy, Sesto F.no (Italy), [2]Department of Health Science, University of Florence, Florence (Italy), [3]Department of Experimental Biomedical and Clinical Science, University of Florence, Florence (Italy)

Gold nanorods (GNRs) are optimal contrast agents for photoacustic imaging and photothermal ablation of cancer. Selective targeting of cancer cells with these contrast agents may rely on complementary biochemical and biological strategies, including the use of specific probes or the exploitation of cellular vehicles. Different approaches for active delivery are reported.

Poster Session I

Thursday 21st May 2015, 12:10-13:10

P1.1. Skin Neoplasm Diagnostics Using Combined Spectral Method in Visible and Near Infrared Regions

Valery Zakharov[1], Ivan Bratchenko[1], Dmitry Artemyev[1], Oleg Myakinin[1], Yulia Khristoforova[1], Maria Vrakova[1]
[1]*Samara State Aerospace University, Samara (Russia)*

P1.2. Delivering a Photosensitizer to The Right Place - What Matters

Ludmil Benov[1,]
[1]*Department of Biochemistry, Faculty of Medicine, Kuwait University, (Kuwait)*

P1.3. Photophysical Properties of Free and Metallated Meso-Substituted Tetrabenzotriazaporphyrin and Isoindole-Boron Dipyrromethene Derivatives from Density Functional Theoretical Investigation

Bruna C. De Simone[1], Marta E. Alberto[1], Gloria Mazzone[1], Tiziana Marino[1], Nino Russo[1]
[1]*Dipartimento di Chimica e Tecnologie Chimiche, Università della Calabria, Rende (Italy)*

P1.4. Optical Spectroscopy in Photodynamic Therapy for Superficial Skin Malignancies and Actinic Keratosis

E. Drakaki[1], I. Stefanaki[2], C. Dessinioti[2], I.A. Sianoudis[3], M. Makropoulou[1], A.A. Serafetinides[1], E. Christofidou[2], A.J. Stratigos[2], A.D. Katsambas[2], Ch. Antoniou[2]
[1]*National Technical University of Athens, Dept of Physics, Athens (Greece),* [2]*University of Athens, Dept of Dermatology, Hospital A. Syggros, Athens (Greece),* [3]*Technological Educational Institute (TEI) of Athens, Dept of Optics & Optometry, Athens (Greece)*

P1.5. Er:YAG Laser in Orthodontic Brackets Bonding: “ex vivo” Study

Carlo Fornaini[1,2], Michele Sozzi[1], Jean-Paul Rocca[2], Stefano Selleri[1] and Anna Cucinotta[1]
[1]*Information Engineering Department, University of Parma, Parma (Italy),* [2]*Restorative Dentistry and Endodontics Department, Faculty of Dentistry, University of Nice-Sophia Antipolis, Nice (France)*

P1.6. Laser and light on Dental Composite Polymerization Comparison: “In Vitro” Study

Carlo Fornaini[1,2], Giuseppe Lagori[1], Michele Sozzi[2], Elisabetta Merigo[1], Stefano Selleri[2] And Annamaria Cucinotta[2]
[1]*Oral Medicine and Laser-assisted Surgery Unit, University of Parma, Parma (Italy),* [2]*Information Engineering Department, University of Parma, Parma (Italy)*

P1.7. Performing of the Polarimetric Imaging Diagnosis of Ex-vivo Uterine Cervical Cancer

Huda Haddad[1]

[1]Laboratoire de Physique des Interfaces et des Couches Minces, CNRS Ecole polytechnique 91128 Palaiseau (France)

P1.8. Necrosis as a Consequence of PKCα Silencing after Hypericin Photoactivation in U87-MG Cells

Zuzana Nadova[1], Jaroslava Joniova[1], Matus Misuth[1], Michaela Ferencakova[1], Franck Sureau[3] and Pavol Miskovsky[1,2]

[1]Dept. of Biophysics, P.J. Safarik University, Kosice (Slovakia), [2]Center for Interdisciplinary Biosciences P.J. Safarik University, Kosice, (Slovakia), [3]CNRS / UPMC Univ Paris 06, Laboratoire Jean Perrin LJP, Paris (France)

P1.9. Cell Viability in the Endothelium of Porcine Cornea exposed to Ultrashort Laser Pulses

Syed Asad Hussain[1], Fatima Alahyane[1], Caroline Crotti[1], Zacaria Essaïdi[1], Laura Kowalczuk[1], Marie-Claire Schanne-Klein[2], Karsten Plamann[1]

[1]Laboratoire d'optique appliquée, ENSTA ParisTech - École polytechnique - CNRS Palaiseau (France), [2]Laboratoire d'optique et biosciences, École polytechnique – CNRS Palaiseau (France)

P1.10. Investigation of Deep Stroma by Confocal Microscopy

F. Rossi[1], F. Tatini[1], A. Canovetti[2], A. Malandrini[2], I. Lenzetti[2], L. Menabuoni[2], P. Valente[3], L. Buzzonetti[3], R. Pini[1]

[1]Institute of Applied Physics IFAC-CNR, Florence (Italy), [2]Nuovo Ospedale Santo Stefano, Prato (Italy), [3]Bambino Gesù IRCCS Children's Hospital, Fiumicino (Italy)

P1.11. Effects of Probe Placement on Tissue Oxygenation Levels During Reflectance Measurements for Different Types of Tissues in a Clinical Setting

Suresh Anand[1] and Sujatha Narayanan Unni[1]

[1]Biomedical Engineering Group, Department of Applied Mechanics, Indian Institute of Technology Madras, Chennai (India)

P1.12. Random Access Microscopy to Unravel the Spatio-Temporal Relationship Between T-Tubular Electrical Activity and Ca2+ Release in Heart Failure

C. Crocini[1], R. Coppini[2], C. Ferrantini[2], P. Yan[3], L. Loew[3], C. Tesi[2], C. Poggesi[2], E. Cerbai[2], F.S. Pavone[1,4,5], L. Sacconi[1,5]

[1]European Laboratory for Non-Linear Spectroscopy (LENS), Florence (Italy), [2]University of Florence, Interuniversity Center of Molecular Medicine and Applied Biophysics CIMMBA, Florence (Italy), [3]R. D. Berlin Center for Cell Analysis and Modeling, University of Connecticut Health Center, Connecticut (USA), [4]Department of Physics and Astronomy, University of Florence, Sesto Fiorentino (Italy), [5]National Institute of Optics INO-CNR, Florence (Italy)

P1.13. TDE: a New Versatile Clearing Agent for Multi Modal Brain Imaging

Irene Costantini[1], Antonino Paolo Di Giovanna[1], Anna Letizia Allegra Mascaro[1], Ludovico Silvestri[1], Marie Caroline Müllenbroich[1], Leonardo Sacconi[1,2], Francesco Saverio Pavone[1,2,3]

[1]European Laboratory for Non-linear Spectroscopy, University of Florence, Sesto Fiorentino (Italy), [2]National Institute of Optics INO-CNR, Florence (Italy), [3]Department of Physics and Astronomy, University of Florence, Sesto Fiorentino (Italy)

P1.14. Combined Multiphoton and Optical Coherence Microscopy

Dominik Marti[1], Mathias Christensen[1], Peter E. Andersen[1]

[1]Technical University of Denmark, Roskilde (Denmark)

P1.15. Optical Methods for Research of Teeth Dentin with Chronic Fibrous Pulpitis

Elena Timchenko[1], Pavel Timchenko[1], Larisa Zherdeva (Taskina)[1], Larisa Volova[1]

[1]Samara State Aerospace University (SSAU), Samara (Russia)

P1.16. Optical Methods of Collagen and Hydroxyapatite Change Monitoring in the Process of Bone Tissue Demineralization

Elena Timchenko[1], Pavel Timchenko[1], Larisa Zherdeva (Taskina)[1], Larisa Volova[1], Julia Ponomareva[1]

[1]Samara State Aerospace University (SSAU), Samara (Russia)

P1.17. Optical Methods of Hydrogen Degassing Monitoring in the City Areas

E.V. Timchenko[1], P.E. Timchenko[1], L.A. Taskina[1], N.V. Tregub[1], E.A. Seleznyeva[1], V.N. Yakovlev[1]

[1]Samara State Aerospace University (SSAU), Samara (Russia)

P1.18. Optical Methods of Aquatic Plants Under the Influence of Pollutants Monitoring

E.V. Timchenko[1], P.E. Timchenko[1], L.A. Taskina[1], N.V. Tregub[1], A.A. Asadova[1]

[1]Samara State Aerospace University (SSAU), Samara (Russia)

P1.19. FLIM-FRET Analysis Using Ca2+ Sensors in HeLa Cells

Ilaria Fortunati[1], Camilla Ferrante[1], Renato Bozio[1], Elisa Greotti[2,3], Tullio Pozzan[2,3,4]

[1]Chemical Science Dept., University of Padova and INSTM, Padova (Italy), [2]Biomedical Sciences Dept., University of Padova, Padova (Italy), [3]Italian National Research Council (CNR), Padova (Italy), [4]Venetian Institute of Molecular Medicine, Padova (Italy)

P1.20. BSA Adsorption on Gold Nanoparticles Investigated under Static and Flow Conditions

Camilla Ferrante[1], Ilaria Fortunati[1], Verena Weber[1]

[1]Dept. di Scienze Chimiche, Università di Padova, Padova (Italy)

P1.21. Physiology-First Development for Resonant Reflection Spectroscopy of Skeletal Muscle Sarcomeres

Kevin W. Young[1,2], Stojan Radic[1], Evgeny Myslivets[1], Shawn M. O'Connor[1], Richard L. Lieber[1,2,3]

[1]University of California San Diego, La Jolla, CA (USA), [2]VA San Diego Healthcare System, San Diego, CA (USA), [3]Rehabilitation Institute of Chicago, Chicago, IL (USA)

P1.22. Sensing Platform for The Detection of Tumor Markers

Praskoviya Boltovets[1], Ganna Geraschenko[2], Ludmila Strokovska[2], Maya Bobrovska[2], Sergiy Kravchenko[1], Boris Snopok[1], Vladimir Kashuba[2]
[1]Institute of Semiconductor Physics NAS of Ukraine (Kyiv), [2]Institute of Molecular Biology and Genetics NAS of Ukraine (Kyiv)

P1.23. New Generation Superconducting Optical Converter with Single Photon Resolution in Near and Mid IR Range

M.A. Tarkhov[1], B.A. Gurovich[1], K.E. Prikhodko[1], E.A. Kuleshova[1], V.L. Stolyarov[1], E.D. Olshansky[1], B.V. Goncharov[1], D.A. Goncharova[1], A.G. Domantovsky[1], L.V.Kutuzov[1], P.P.An[1]
[1]National Research Centre "Kurchatov Institute", Moscow (Russia)

P1.24. Detection of Viral DNA by Isothermal NASBA Amplification and Chemiluminescence Gene Probe Hybridization Assay in a Microfluidic Cartridge with Integrated Array of Amorphous Silicon Photosensors

Mara Mirasoli[1], Francesca Bonvicini[2], Augusto Nascetti[3], Giampiero De Cesare[4], Martina Zangheri[1], Domenico Caputo[4], Giorgio Gallinella[2], Aldo Roda[1]
[1]Department of Chemistry, Alma Mater Studiorum, University of Bologna, Bologna (Italy), [2]Department of Pharmacy and Biotechnology, Alma Mater Studiorum, University of Bologna, Bologna (Italy), [3]Department of Astronautics, Electrical and Energy Engineering, Sapienza University of Rome, Rome (Italy), [4]Department of Information, Electronic and Telecommunication Engineering, Sapienza University of Rome, Rome (Italy)

P1.25. Transmission and Reflection SPR Disposable Fibre Probes for Bio-chemical Sensing

Papiya Dhara[1,2], Massimo Olivero[1], Alberto Vallan[1], Guido Perrone[1]
[1]Politecnico di Torino - Dept. of Electronics and Telecommunications, Torino (Italy), [2]Dept. of Applied Physics,Indian School of Mines, Dhanbad (India)

P1.26. Mobile Laser Radar Platform for Environmental Monitoring

Guangyu Zhao[1], Ming Lian[1], Zheng Duan[1], Yiyun Li[1], Zhiming Zhu[1], Liang Mei[1], and Sune Svanberg[1,2]
[1]COER, South China Normal University, Guangzhou (China), [2]Lund Laser Centre, Lund University (Sweden)

P1.27. Optical Birefringence Sensor for Fluidic Concentration Measurements

Ruey-Ching Twu[1], Guan-Min Chen[1]
[1]Department of Electro-Optical Engineering, Southern Taiwan University of Science and Technology, Tainan (Taiwan)

P1.28. Inducing Cells Rotation in a Microfluidic Device by Hydrodynamic Forces

S. Torino[1], M. Iodice[1], I. Rendina[1], G. Coppola[1], E. Schonbrun[2]
[1]Institute for Microelectronics and Microsystems, National Research Council, Naples (Italy), [2]Rowland Institute at Harvard, Harvard University, Cambridge MA (USA)

P1.29. Micro Rings – a New Way of Optical Sensing,

M. Kleinert, C. Zawadzki, N. Keil, W. Schlaak[1]
[1]Fraunhofer Heinrich-Hertz-Institute HHI, Berlin (Germany)

P1.30. Nanodome Coins for Intracellular Surface-Enhanced Raman Spectroscopy

Pieter Wuytens[1,2,3], Winnok De Vosb[4], Andre Skirtach[2,3], Roel Baetsa[3],
[1]Photonics Research Group, Ghent University-imec, Ghent (Belgium), [2]Department of Molecular Biotechnology, Ghent University (Belgium), [3]Center for Nano- and Biophotonics, Ghent University (Belgium), [4]Dept. Veterinary Sciences, University of Antwerp, Antwerp (Belgium)

Poster Session II

Friday 22nd May 2015, 12:00-13:00

P2.1. In Situ Assessment of Quality-Related Compounds in Fruits by Using Fluorescence Sensors

Elisa Fierini[1], Lisa Banelli[1], Damiano Remorini[2], Patrizia Pinelli[1], Annalisa Romani[1], Giovanni Agati[3]
[1]Dipartimento di Statistica, Informatica, Applicazioni-DiSIA, Università di Firenze, Florence (Italy), [2]Dipartimento di Scienze Agrarie, Alimentari e Agro-ambientali (DiSAAA-a) -Università di Pisa, Pisa (Italy), [3]Istituto di Fisica Applicata "Nello Carrara" –CNR, Florence (Italy)

P2.2. Fruit Ripening Studied by Optical Spectroscopic Techniques

Jing Huang[1], Hao Zhang[1], Tianqi Li[1], Huiying Lin[1], Guangyu Zhao[1], Liang Mei[2], Sune Svanberg[1,2], Katarina Svanberg[1,2]
[1]COER, South China Normal University, Guangzhou (China), [2]Lund Laser Centre, Lund University (Sweden)

P2.3. Optical Remote Sensing of Flying Insects

Mikkel Brydegaard[1], Tianqi Li[2], Shiming Zhu[2], Guangyu Zhao[2], Sune Svanberg[1,2]
[1]Lund Laser Centre, Lund University (Sweden), [2]COER, South China Normal University, Guangzhou (China)

P2.4. Array of Differential Photodiodes for Lab-On-Chip Applications

M. Carpentiero[1], E. Parisi[1], G. Petrucci[1], D. Caputo[1], A. Nascetti[1], G. de Cesare[1]
[1]DIET University of Rome "La Sapienza", Rome (Italy), [2]DIAEE University of Rome "La Sapienza" Rome (Italy)

P2.5. Dispersion Compensation of 40 Gb/s Data by Phase Conjugation in Slow Light Engineered Chalcogenide and Silicon Photonic Crystal Waveguides

Farshid Koohi-Kamali[1], Majid Ebnali-Heidari[1], Mohammad Kazem Moravvej-Farshi[2]
[1]Shahrekord University Shahrekord (Iran), [2]Advanced Devices Simulation Laboratory, Faculty of Electrical and Computer Engineering, Tarbiat Modares University Tehran (Iran)

P2.6. Optical Microfibre Sensor Incorporating Alloy Nanoparticles

Lin Bo[1], Yuliya Semenova[1], Pengfei Wang[1], João Conde[2], Furong Tian[3], Benjamin Schazmann[4], and Gerald Farrell[1]
[1]Photonics Research Centre, Dublin Institute of Technology, Dublin (Ireland), [2]Institute for Medical Engineering and Science, Harvard-MIT Division for Health Sciences and Technology, Cambridge (USA), [3]Focas Research Institute, Dublin Institute of

Technology, Dublin (Ireland), [4]School of Chemical and Pharmaceutical Sciences, Dublin Institute of Technology, Dublin (Ireland)

P2.7. Reflection Type Long Period Fiber Grating Biosensor for Real Time Thyroglobulin Detection as Differentiated Thyroid Cancer Biomarker: The "Smart Health" Project

Renato Severino[1], Giuseppe Quero[1], Patrizio Vaiano[1], Alessandra Boniello[1], Marco Consales[1], Menotti Ruvo[2], Annamaria Sandomenico[2], Anna Borriello[3], Simona Zuppolini[3], Laura Diodato[3], Antonello Cutolo[1], Andrea Cusano[1]

[1]Optoelectronic Division, Dept. of Engineering, University of Sannio, Benevento (Italy), [2]Istituto di Biostrutture e Bioimmagini, National Research Council, Naples (Italy), [3]Istituto per i Polimeri Compositi e Biomateriali, National Research Council, Portici (Italy)

P2.8. All Optical Ferrule-Top Sensor for Indentation Measurements of Very Soft Biological Tissues

N. Antonovaite[1] , S.V. Beekmans[1], H. van Hoorn[1], L. Beex-Osborn[2], E.M. Hol[2], W.J. Wadman[2], D. Iannuzzi[1]

[1]Department of Physics and Astronomy and LaserLaB, VU Amsterdam (The Netherlands), [2]Center for Neuroscience, Swammerdam Institute for Life Sciences, University of Amsterdam (The Netherlands)

P2.9. Development of a Fiber-top Controlled Adaptable Stiffness Needle

Beekmans SV[1], van den Dobbelsteen J[2], Iannuzzi D[1]

[1]Biophotonics and Medical Imaging, VU Laserlab, VU University Amsterdam (The Netherlands), [2]Department of BioMechanical Engineering, University of Technology. Delft (The Netherlands)

P2.10. Graphene Oxide/ Silver Nanocube Composites for SERS Detection of Biomolecules

Martina Banchelli[1], Paolo Matteini[1], Gabriella Caminati[2], Bruno Tiribilli[3], Roberto Pini[1]

[1]Institute of Applied Physics IFAC-CNR, Florence (Italy), [2]Department of Chemistry and CSGI, University of Florence, Sesto Fiorentino (Italy), [3]Institute for Complex Systems CNR, Florence (Italy)

P2.11. Multiplexed SOI Ring Resonators for Real-Time Protein Detection

Manuel Mendez-Astudillo[1,2], Danny Volkman[1], Matthias Jäger[1]

[1]Technische Universität Berlin (Gemany), [2] Waseda University, Shinjuku, Tokyo (Japan)

P2.12. Microstructured Waveguides for Express Analysis of Water, Coffee, Tea and Wine and Spirit

Anastasiya A. Zanishevskaya[1,2], Andrey A. Shuvalov[1,2], Yulia S. Skibina[1,2], Valery V. Tuchin[2,3,4]

[1]SPE Nanostructured Glass Technology, Saratov (Russia), [2]Research-Educational Institute of Optics and Biophotonics, Saratov State University, Saratov (Russia),

[3]*Institute of Precise Mechanics and Control RAS, Saratov (Russia),* [4]*Laboratory of Biophotonics, Tomsk State University, Tomsk (Russia)*

P2.13. Gold&Nanodiamond: New Multifunctional Tools for SERS Application

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P2.14. Magneto-Optical Localised-SPR a Novel Sensing Platform to Characterize New Nanostructured Materials for Sensing

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P2.15. POCT Immunosuppressants Monitoring by a Novel Optical Biochip

B. Adinolfi[1], C. Berrettoni[1,2], S. Berneschi[1], R. Bernini[3], K. Cremer[4], C. Gartner[4], A. Giannetti[1], I.A. Grimaldi[3], G. Persichetti[3], G. Testa[3], S. Tombelli[1], C. Trono[1], F. Baldini[1]

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P2.16. Towards Feasible Label-Free Biosensing by Means of Long Period Fibre Gratings: Performance Assessment Using IgG/Anti-IgG Model Assay

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P2.17. Phosphate Glasses and Optical Fibres for Bio-Photonic Application

Edoardo Ceci Ginistrelli[1], Diego Pugliese[1], Simone Berneschi[2], Nadia Boetti[1], Giorgia Novajra[1], Chiara Vitale-Brovarone[1], Joris Lousteau[3], Francesco Baldini[2], Daniel Milanese[1]

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P2.18. Preparation and Characterization of 3D Hyaluronic Scaffolds with Controlled Optical Properties for Biomedical Applications

M. Lepore[1], M. Portaccio[1], I. Delfino[2], A. La Gatta[1], A. D'Agostino[1], E. Izzo[1], C. Schiraldi[1]

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P2.19. Investigation of Fluorescence Properties of Cationic (Phenothiazinyl)Vinyl-pyridinium Dye Attached Electrostatically to Multilayered Polyelectrolyte-Coated Gold Nanorods

Ana-Maria Gabudean[1], Luiza Gaina[2], Luminita Silaghi-Dumitrescu[2], Simion Astilean[1]

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P2.20. Gelatin-Assisted Synthesis of Gold Nanoparticles and Investigation of their Biocompatibility and Osteogenic Effect on Osteoblast Cells

Sorina Suarasan[1], Monica Focsan[1], Olga Soritau[2], Dana Maniu[1], Simion Astilean[1]
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P2.21. Sensitivity Improved Plasmonic Platform for Specific Biomarkers Detection

Monica Focsan[1], Andreea Campu[1], Cosmin Leordean[1], Monica Potara[1], Ana Gabudean[1], Dana Maniu[1], Simion Astilean[1]
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P2.22. 5-Fluorouracil Loaded Silver Nanotriangles as Highly Effective Agents for Image-Guided Therapy of Pancreatic Cancer Cells

Monica Potara[1], Timea Simon[1], Emilia Licarete[2], Simion Astilean[1]
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P2.23. Fabrication of Pluronic Encapsulated Porphyrin - Gold Nanoparticles and Investigation of their Potential in Photodynamic Therapy

Timea Simon[1], Ana-Maria Gabudean[1], Emilia Licarete[2], Luiza Gaina[3], Luminita Silaghi-Dumitrescu[3], Simion Astilean[1]
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P2.24. Spatio-Temporal Thermal Processes Induced by Pulsed Laser Irradiation of Medium Doped by Nanoparticles

Alexander N. Yakunin[1,2], Yuri A. Avetisyan[1,2], Alexey A. Bykov[2] and Valery V. Tuchin[2]
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P2.25. Optical Measurements of Glycerol Diffusion in Skin Tissue

Ali Jaafar Sadeq[1] , Alexey N. Bashkatov[1], Daria K. Tuchina[1], Elina A. Genina[1], Valery V. Tuchin[1]

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P2.26. Blood Plasma of Patients with Myelodysplastic Syndromes analysed by Surface Plasmon Resonance Imaging and Mass Spectrometry

Jan E. Dyr[1], Leona Chrastinova[1], Marketa Bockova[2], Hana Vaisocherova[2], Ondrej Pastva[1], Jiri Suttnar[1], Roman Kotlin[1], Jiri Homola[2]

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P2.27. Influence of Gold Nanorods Parameters on Photoacoustic Conversion Stability

Lucia Cavigli[1], Sarah Lai[1], Marella de Angelis[1], Fulvio Ratto[1], Paolo Matteini[1], Francesca Rossi[1], Sonia Centi[1], Roberto Pini[1]

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P2.28. Feasibility of Plasmonic Cellular Vehicles for Photothermal and Photoacoustic Applications

C. Borri[1,2], L. Cavigli[1], A. Cini[1,3], S. Centi[1], S. Lai[1], F. Tatini[1], F. Ratto[1], M. de Angelis[1], P. Matteini[1], S. Colagrande[2], R. Pini[1]

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P2.29. Biological Profiles of Plasmonic Particles Modified with a Cell Penetrating Peptide

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P2.30. Planar Optical Antenna to Direct Light Emission

Simona Checcucci[1], Sahrish Rizvi[1], Pietro Lombardi[1,2], Fabrizio Sgrignuoli[1,3], Costanza Toninelli[1,2], Mario Agio[1,2,4]

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Instructions for Presenters

Oral Presentations

Invited talk: 20 minutes presentation + 5 minutes discussion.
Contributed talk: 12 minutes presentation + 3 minutes discussion.

Poster Presentations

Posters may be set up in the morning before the coffee break.
Authors are requested to be present at their posters during the poster session.

Poster size

width: max 100 cm.
height: min 85 cm, max 116 cm.

Information For Partecipants

CONFERENCE VENUE

The conference is hosted at the “Nello Carrara” Institute of Applied Physics (IFAC) within the Florence Research Area of the National Research Council (CNR).

A shuttle bus service from Santa Maria Novella train station to the conference venue will be organized every day, in the morning and in the afternoon at the end of scientific sessions. Alternatively, you can reach the Conference Area, which is located at the “Polo Scientifico di Sesto Fiorentino” by bus no. 66 from Sesto Fiorentino train station or no. 59 from Firenze Rifredi station. Bus tickets are sold in tobacco shops or at the ATAF ticket office within Santa Maria Novella. Tickets can be purchased also onboard, but at a higher price. Please note that the public transportations can take up to one hour to reach the Conference venue, because of the combination between train and bus timetables, which vary during the day. Therefore, we encourage the use of the shuttle for your convenience.

SOCIAL DINNER

BioPhotonics 2015 social dinner will take place on May 21th at the restaurant “Lo Spaccio”, inside the “Fattoria di Maiano”.

The Fattoria, whose origins date back to 1400, is located on a unique position on Fiesole hills. It is a completely organic agricultural estate, which covers an area of nearly 300 hectares mainly used for growing olives.

Just inside the estate, the restaurant Lo Spaccio is a corner of flavour where you can taste typical Tuscan delicatessen. Outfitted with a panoramic terrace and cosy inside rooms, the restaurant will be the perfect location to enjoy a cultural and scientific exchange during the social dinner.