

# OSAV'08

Saint Petersburg, Russia, 12-15 May 2008

The 2<sup>nd</sup> International Topical Meeting on  
Optical Sensing and Artificial Vision

TECHNICAL PROGRAM



Saint Petersburg  
2008

# OSAV'2008 Technical Program



## Monday, May 12

### **Bus transportation from Hotel Saint-Petersburg at 9:00**

**Location:** Research Institute of Optoinformatics

**Address:** 4, Birzhevaya line

09:30 Registration  
(open Monday 9:30-18:00, Tuesday 9:30-18:00, Wednesday 9:30-17:00, Thursday 9:30-11:30)

10:30 Coffee

### **Opening Session**

11:00 Welcome. Honorary Chairs

11:10 **Invited lecture.** BENEATH THE GIOCONDA VEIL  
John F. Asmus (University of California, USA)

### **I. Optical Sensing in Cultural Heritage Diagnostics and Conservation**

Chairs: Luca Pezzati, Istituto Nazionale di Ottica Applicata, INOA – CNR, Italy  
Haida Liang, Nottingham Trent University, UK

12:00 RGB-ITR: A NEW NATIVE RGB AM 3D LASER SCANNER FOR ARTWORK INSPECTION AND CONSERVATION [ID #52]  
L. Bartolini, L. De Dominicis, M. Ferri De Collibus, G. Fornetti, M. Francucci, M. Guarneri, E. Paglia, R. Ricci

12:20 A TRANSPORTABLE COMPUTED TOMOGRAPHY SYSTEM FOR IN SITU INVESTIGATION OF ART OBJECTS [ID #26]  
M.P. Morigi, F. Casali, M. Bettuzzi, R. Brancaccio, A. Berdondini, V. D'Errico, A. Aldrovandi, R. Bellucci, M. Ciatti, C. Frosinini

12:40 PIGMENT IDENTIFICATION WITH OPTICAL COHERENCE TOMOGRAPHY AND MULTISPECTRAL IMAGING [ID #65]  
H. Liang

13:00 Lunch break

14:30 A SCANNING DEVICE FOR MULTISPECTRAL IMAGING OF PAINTINGS [ID #33]  
D. Bencini, C. Bonifazzi, P. Carcagni, A. della Patria, R. Fontana, M. Greco, M. Mastroianni, M. Materazzi, E. Pampaloni, L. Pezzati

14:50 NEAR-INFRARED CONFOCAL LASER SCANNING MICROSCOPE FOR THE ANALYSIS OF PAINTINGS [ID #25]  
L. Pezzati, C. Daffara, D. Bencini, P. Carcagni

15:10 LASER INDUCED FLUORESCENCE ANALYSIS OF ACRYLIC RESINS USED IN CONSERVATION OF CULTURAL HERITAGE [ID #50]  
L. Caneve, F. Colao, R. Fantoni, A. Palucci, I. Nemeč, M. Strlic

15:30 ESTIMATING THE SPECTRAL REFLECTANCE OF FINE ART PAINTINGS [ID #53]  
V. Bochko, N. Tsumura, Y. Miyake, J. Parkkinen, M. Hauta-Kasari, T. Jaaskelainen

15:50 Coffee break

## II. Multispectral and Color Imaging

- Chair: Fabrice Meriaudeau, Université de Bourgogne, France
- 16:20 ACCURATE AND FAST RECOGNITION OF COLORS USING LIGHT SOURCE CONTROLLED BY COMPUTER [ID #24]  
L. Fauch, E. Nippolainen, A. Kamshilin
- 16:40 MULTISPECTRAL IMAGING FOR SUBCUTANEOUS STRUCTURES CLASSIFICATION AND ANALYSIS [ID #16]  
V. Paquit, F. Mériaudeau, J.R. Price, K.W. Tobin
- 17:00 AN APPROACH TO THE CHARACTERIZATION OF VISUAL APPEARANCE OF POLISHED GRANITE TILES: A PROSPECT OF INDUSTRIAL APPLICATION [ID#11]  
E. Kurmyshev, J.T. Guillen-Bonilla
- 17:20 SPECTRAL IMAGES COMPRESSION USING CLUSTERING AND SPECTRAL REDUCTION [ID #51]  
A. Andriyashin, T. Jaaskelainen, J. Parkkinen, K. Miyata
- 17:40 Coffee

## Tuesday, May 13

### Bus transportation from Hotel Saint-Petersburg at 8:50

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## III. Optical Sensing by Coherent Light I

- Chairs: Igor Gurov, Saint Petersburg State University ITMO, Russia  
Sergio De Nicola, Institute of Applied Optics of CNR and European Laboratory for Nonlinear Spectroscopy, Italy
- 9:30 **Invited lecture.** COMPUTATIONAL OPTICAL SENSING WITH APPLICATIONS TO NDT  
Ryszard J. Pryputniewicz (Worcester Polytechnic Institute, USA)
- 10:20 OPTOMECHANICAL CHARACTERISATION OF ALN-DRIVEN MICROCANTILEVERS OPERATING AS MEMS ACTUATORS [ID #08]  
C. Gorecki, A. Andrei, K. Krupa, M. Jozwik
- 10:40 INSPECTION OF PRINT QUALITY USING A VISIBILITY MAP OBTAINED BY A DIFFRACTIVE OPTICAL ELEMENT BASED GLOSSMETER [ID #19]  
A. Oksman, M. Juuti, K.-E. Peiponen
- 11:00 Coffee break
- 11:30 FAR-FIELD OPTICAL COHERENCE TOMOGRAPHY [ID #36]  
Y. Mazurenko
- 11:50 ULTRA-HIGH RESOLUTION OPTICAL COHERENCE TOMOGRAPHY IN PAPER CHARACTERIZATION [ID #63]  
T. Prykäri, E. Alarousu, R. Myllylä
- 12:10 INFORMATION THEORETICAL OPTIMIZATION OF OPTICAL COHERENCE TOMOGRAPHY SYSTEMS [ID #37]  
I. Gurov, V. Vasiliev
- 12:30 ACCURACY OF OPTICAL SENSORS BASED ON SPATIALLY FILTERED DYNAMIC SPECKLES [ID #20]  
D.V. Semenov, E. Nippolainen, S.V. Miridonov, A.A. Kamshilin

12:50 INVESTIGATION OF MgF<sub>2</sub> CRYSTAL SURFACE EXPOSED TO VUV RADIATION BY HIGH-RESOLVING LOW-COHERENCE PROFILOMETER [ID #39]  
N. Margaryants, E. Zhukova

13:10 Lunch break

#### **IV. Image Analysis, Transformation and 3D Representation**

Chairs: Graeme Awcock, University of Brighton, UK  
Hiroshi Sako, Hitachi Central Research Laboratory, Japan

14:30 **Invited lecture.** MACHINE VISION APPLICATIONS: RECENT DEVELOPMENTS  
Fabrice Meriaudeau (Université de Bourgogne, France)

15:20 DECISION POSTPONEMENT STRATEGY IN MACHINE VISION APPLICATIONS [ID #14]  
H. Sako, T. Kagehiro

15:40 IMAGE FILTERING IN CATADIOPTRIC PLANE [ID #28]  
S. Ainouz, O. Morel, D. Fofi

16:00 Coffee break

16:30 SALIENT POINT SUSAN 3D OPERATOR FOR TRIANGLES MESHES [ID #31]  
N. Walter, O. Laligant, O. Aubreton

16:50 FACIAL CARICATURING SYSTEM PICASSO-2 EXHIBITED AT EXPO2005 AND ITS IMPROVEMENT BY TOP-DOWN AND BOTTOM-UP PROCEDURES [ID #34]  
N. Tokuda, T. Fujiwara, H. Koshimizu

17:10 VISION SYSTEM BASED ON AN OPTOELECTRONIC HARDWARE NEURAL PROCESSOR AND A PCNN PREPROCESSOR STAGE [ID #55]  
H. Lamela, M. Ruiz-Llata, J. Gimeno, M. Gonzalez, M. Jiménez

17:30 Coffee

18:00 Bus transportation, a tour of Saint Petersburg

### **Wednesday, May 14**

**Bus transportation from Hotel Saint-Petersburg at 8:50**

**Location:** Research Institute of Optoinformatics

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#### **V. Optical Sensing by Coherent Light II**

Chairs: Toyohiko Yatagai, Utsunomiya University, Japan  
Christophe Gorecki, Université de Franche-Comté, France

9:30 **Invited lecture.** COUPLING DYNAMICS IN LASERS AND APPLICATIONS TO SELF-MIXING INTERFEROMETRY, Silvano Donati (University of Pavia, Italy)

10:20 WIDE FIELD HIGH RESOLUTION CT USING COHERENT FIBER OPTICS [ID #44]  
M. Bettuzzi, M.P. Morigi, F. Casali, R. Brancaccio, A. Berdondini, V. D'Errico, A. Ciarmatori

10:40 ULTRASOUND INTERFEROMETRIC OPTICAL FIBER SENSORS FOR PARTIAL DISCHARGES MEASUREMENTS IN POWER TRANSFORMERS AND OPTOACOUSTIC BIOMEDICAL IMAGING [ID #56]  
H. Lamela, D.C. Gallego, C. Macia, J.A. García-Souto

- 11:00 Coffee break
- 11:30 OPTICAL NDT OF MEMS [ID #41]  
R.J. Pryputniewicz
- 11:50 SURFACE SHAPE EVALUATION IN PHASE SHIFTING INTERFEROMETRY BASED ON THE KALMAN FILTERING METHOD WITH 3D-PREDICTION [ID #38]  
I. Gurov, A. Karpets
- 12:10 MULTIPLEXING OF MULTIMODE OPTICAL FIBER SENSOR BY USING VECTORIAL WAVE MIXING IN CDTE:V PHOTOREFRACTIVE CRYSTAL [ID #57]  
S. Di Girolamo, A.A. Kamshilin, R.V. Romanshko, Y.N. Kulchin, J.C. Launay
- 12:30 DISCONTINUOUS SURFACE-SHAPE PROFILING BY ABSOLUTE DISTANCE MEASUREMENT WITH WAVELENGTH SCANNING INTERFEROMETER [ID #07]  
K. Hibino, Y. Tani, Y. Bitou, S. Osawa
- 12:50 ON THE OPTICAL CONCENTRATION ACHIEVABLE BY A NON-IMAGING MICROPRISM ARRAY COMBINED TO AN IMAGE PHOTODETECTOR [ID #68]  
G. Martini, S. Donati, M. Norgia
- 13:10 Lunch break

## **VI. Optical Sensing in Biomedicine**

- Chair: Valery Tuchin, Saratov State University, Russia
- 14:30 **Invited lecture.** 3D WIDEFIELD MICROSCOPY AND FLUORESCENCE SCREENING OF CELL MEMBRANES, Herbert Schneckenburger (Hochschule Aalen, Germany)
- 15:20 THREE-DIMENSIONAL COMPUTER-GENERATED HOLOGRAPHIC IMAGING OF BIOLOGICAL TISSUE [ID #60]  
T. Yatagai, D. Miura, Y. Sando, M. Itoh
- 15:40 OPTICAL SENSING OF ATTACHED ODN AND HPF MOLECULES ON BIOMATERIAL SURFACE [ID #04]  
H. Tuononen, M. Silvennoinen, K. Myller, R. Silvennoinen
- 16:00 A MINIATURIZED DETECTOR FOR MOLECULAR ANALYSIS BASED ON REFLECTOMETRIC INTERFERENCE SPECTROSCOPY [ID #61]  
O. Zvyagolskaya, E. Papastathopoulos, K. Körner, W. Osten
- 16:20 Coffee, **Poster Session**
- 18:30 Conference dinner

## **Thursday, May 15**

### **Bus transportation from Hotel Saint-Petersburg at 8:50**

**Location:** Research Institute of Optoinformatics

**Address:** 4, Birzhevaya line

- 9:30 **IEEE-LEOS Distinguished Lecture.** COUPLING DYNAMICS IN SEMICONDUCTOR LASERS AND APPLICATIONS TO CHAOTIC CRYPTOGRAPHY  
Silvano Donati (University of Pavia, Italy)

## VII. Image Formation, Correction and Recognition

- Chair: Kenichi Hibino, Photonics Research Institute, AIST, Japan
- 10:20 MULTI-IMAGING FORMATION BY TUNABLE ELECTRO-OPTICAL PHASE ARRAY IN LiNbO<sub>3</sub> (ID #12)  
M. Paturzo, P.Ferraro, S. Grilli, S. De Nicola, M. Gioffr , G. Coppola, M. Iodice
- 10:40 SPATIAL CORRECTION OF IMAGE TO BE PRINTED ON A PLASTIC SHEET FOR FURTHER VACUUM FORMING (ID #58)  
A. Andreev, A. Mezhenin
- 11:00 CORRELATION FILTERS FOR RECOGNITION OF MOVING OBJECTS IN MOTION-DEGRADED SCENES (ID #15)  
E.M. Ramos-Michel, V. Kober
- 11:20 Coffee break

## 7th SPIE Student Chapters Meeting

- Chairs: Sergey Kozlov, Saint Petersburg State University ITMO, Russia  
Vladimir Makarov, M.V. Lomonosov Moscow State University, Russia
- 12:00 Welcome
- 12:10 **Invited lecture.** CONTROL OF TISSUES OPTICAL PROPERTIES USING IMMERSION AGENTS AND NANOPARTICLES: APPLICATIONS IN BIOMEDICAL DIAGNOSTICS AND LASER THERAPY, Valery Tuchin (Saratov State University, Russia)
- 13:00 Lunch break
- 14:30 **Invited lecture.** OPTICAL SENSING BY USING DYNAMIC SPECKLES  
Alexei Kamshilin (University of Kuopio, Finland)
- 15:20 Presentations and reports on the activities of the SPIE Student Chapters
- 16:00 Farewell, coffee
- 16:30 Bus transportation, a tour of Saint Petersburg

## VIII. Posters

Poster session on Wednesday, May 14, at 16:20-18:20

- Chairs: Alexei Kamshilin, University of Kuopio, Finland  
Yury Mazurenko, Saint Petersburg State University ITMO, Russia

PERFORMANCE ANALYSIS OF IMAGING SYSTEMS FOR NIR REFLECTOGRAPHY [ID #35]  
C. Daffara, M.C. Gambino, L. Pezzati

MICRO-FADING SPECTROMETRY: INVESTIGATING THE WAVELENGTH SPECIFICITY OF FADING [ID #74]  
A. Lerwill, J.H. Townsend, H. Liang, J. Thomas, S. Hackney

A MEASURE OF SIMILARITY OF TEXTURE IMAGES [ID #06]  
E. Kurmyshev, J.T. Guillen-Bonilla

COMPLEX NETWORK AND TEXTURE CLASSIFICATION [ID #17]  
T.Chalumeau, O. Lalgant, L. da Fontoura Costa, F. Meriaudeau

PROJECTOR VIEW SYNTHESIS AND VIRTUAL TEXTURING [ID #30]

T. Molinier, D.Fofi, J. Salvi, P. Gorria, F. Meriaudeau

HIGH-SPEED BOB-DEINTERLACING FILTER [ID #69]

P. Skakov

ACTIVE CAMERA CONTROL FOR AGENT REGION TRACKING WITH MULTI-LAYERS INVERS PERSPECTIVE PROJECTION [ID #40]

M. Mozerov, A. Amato, X. Roca, J. González

SYNTHETIC PATTERN RECOGNITION METHODS BASED ON THE REPRESENTATIONAL MINIMUM DESCRIPTION LENGTH PRINCIPLE [ID #10]

A.S. Potapov

THE PROBLEMS OF 3-D SPACE CODING IN HUMAN MEMORY [ID #22]

G. Krumina, V.A. Lyakhovetskii

THREE DIMENSIONAL LOCALIZATION OF IMPLANTS USING COMBINED X-RAY COMPUTED TOMOGRAPHY AND THREE DIMENSIONAL SURFACE RECONSTRUCTION [ID #09]

V.M.J.I. Cuijpers, X.F. Walboomers, J.A. Jansen

POLARIZATION IMAGING FOR 3D INSPECTION OF TRANSPARENT OBJECTS [ID #18]

M. Ferraton, C. Stolz, F. Meriaudeau

DESIGNING AN OPTICAL COMPUTER MOUSE USING WHITE LIGHT SPECKLE TECHNIQUE [ID #01]

H. El Ghandoor, E.A. Abd El Ghafar

DISTRIBUTED FIBER OPTICAL MEASUREMENT SYSTEM FOR LOCALIZATION OF LOSS-INDUCED PERTURBANION BASED ON TRANSMISSION-REFLECTION ANALYSIS [ID #03]

V. Spirin, S. Miridonov, E. Mitrani, M. Shlyagin, M. Castro

SPECTRAL INTERFEROMETRY OF SELF-FREQUENCY SHIFTED SOLITONS IN AN OPTICAL FIBER [ID #05]

V. Nazarov, A. Korolev

COMPLEX OPTICAL FIELD RECONSTRUCTION OF PROBING BEAM IN SCANNING DIFFERENTIAL HETERODYNE MICROSCOPE [ID #32]

I.M. Akhmedzhanov, D.V. Baranov, E.M. Zolotov

EVALUATION OF TEST POLYMER SAMPLES BY FULL-FIELD LOW-COHERENCE INTERFEROMETRIC PROFILOMETER [ID #23]

I. Gurov, M. Volynsky

NONDESTRUCTIVE INVESTIGATION METHOD OF COLOR CENTERS IN A NEAR-SUFACE LAYER OF CRYSTALS [ID #46]

E. Zhukova

PRACTICAL METHOD FOR SHADOW AND REFLECTION REMOVAL AND COLOR CORRECTION IN NON-UNIFORM ILLUMINATION CASES FOR PURE ALBEDO GENERATION OF RELIEF OBJECTS WITH PRINTED PATTERNS FOR TANGENTIAL DEFORMATION EVALUATION [ID #59]

A. Andreev, A. Mezhenin

INFLUENCE OF ATMOSPHERIC ABSORPTION ON ACCURACY OF SPECTRAL SELECTION OF RADIATION [ID #42]

A.A. Vasiljev, A.I. Lopatin

INVESTIGATING COATING LAYER OF PAPER BY OPTICAL COHERENCE TOMOGRAPHY [ID #62]

T. Prykäri, M. Tuominen, E. Alarousu, R. Myllylä

INSPECTION OF MICRO INJECTION MOULDED LENSES BY MEANS OF COMMON-PATH INTERFEROMETER USING DATA-DEPENDENT FRINGE PROCESSING [ID #67]

I. Gurov, M. Kuittinen, P. Vahimaa, I. Vartiainen, M. Volkov

INCREASING LINEAR DYNAMIC RANGE OF DIGITAL PHOTOCAMERA USED IN IMAGING SYSTEMS WITH OPTICAL CODING [ID #71]

M.V. Konnik, E.A. Manykin, S.N. Starikov

INTELLIGENT OPTICAL OTOLITH CLASSIFICATION FOR SPECIES RECOGNITION OF OSTEICHTHYES [ID #29]

D. Lefkaditis, G.J. Awcock, R.J. Howlett, E. Koutrakis, A. Kallianiotis

APPLICATION OF IMMERSION CLEARING TECHNIQUE TO THE STUDY OF LIQUID DIFFUSION INTO BIOLOGICAL TISSUE [ID #27]

G.V. Simonenko, E.S. Kirillova, V.V. Tuchin

OPTOACOUSTIC SIGNAL GENERATION BY USING NANOPARTICLES AND NANORODS FOR BIOMEDICAL IMAGING [ID #54]

V. Cunningham, H. Lamela, P. Pedreira, D.C. Gallego, P. Acedo, W. Fritzsche, A. Csaki, G. Festag, A. Steinbrück

LASER BEAM SCATTERING BY SHEAR ORIENTED AND DEFORMED RED BLOOD CELLS AND THEIR LINEAR AGGREGATES

A.V. Priezzhev, A.E. Lugovtsov, S.Yu. Nikitin [ID #75]

MODELING OF DENTINAL PERMEATION [ID #72]

N.A. Trunina, V.L. Derbov, V.V. Tuchin, G.B. Altshuler

BIOSENSOR ON HOLLOW CORE MICROSTRUCTURED PHOTONIC CRYSTAL FIBER [ID #73]

N.A. Mikhailova, P.M. Zhestkov, I.Y. Silohin, J.S. Skibina, V.V. Tuchin, V.I. Beloglazov, M.V. Chainikov