Laser Florence 2017: Advances in Laser Medicine

Leonardo Longo
Editor

9–11 November 2017
Florence, Italy

Organized by
IALMS—The International Academy for Laser Medicine and Surgery (Italy)
ISLSM—The International Society of Laser Surgery and Medicine
WFLSMS—World Federation of Societies for Laser Surgery and Medicine
IPTA—International Photo Therapy Association
ILM—Institute Laser Medicine Florence (Italy)

Sponsored by
UEMS—European Union of Medical Specialists
Italian Health Office
Florence Medical Association
Common of Firenze (Italy)

Published by
SPIE

Volume 10582
The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIEDigitalLibrary.org.

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from these proceedings:


ISSN: 1605-7422
ISSN: 2410-9045 (electronic)

ISBN: 9781510620056

Published by
SPIE
P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445
SPIE.org
Copyright © 2018, Society of Photo-Optical Instrumentation Engineers.

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is $18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 1605-7422/18/$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

SPIE. DIGITAL LIBRARY
SPIEDigitalLibrary.org

Paper Numbering: Proceedings of SPIE follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

- The first five digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc. The CID Number appears on each page of the manuscript.
## Contents

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>v</td>
<td>Authors</td>
</tr>
<tr>
<td>vii</td>
<td>Conference Committee</td>
</tr>
<tr>
<td>ix</td>
<td>Introduction</td>
</tr>
<tr>
<td>xiii</td>
<td>Conference Sponsorship and Support</td>
</tr>
</tbody>
</table>

### PHOTO BIO MODULATION

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10582 02</td>
<td>Low level laser therapy (photobiomodulation) for the management of breast cancer-related lymphedema: an update [10582-14]</td>
</tr>
<tr>
<td>10582 03</td>
<td>Laser biostimulation therapy planning supported by imaging [10582-3]</td>
</tr>
<tr>
<td>10582 04</td>
<td>Treatment of complicated gangrene using infrared photodynamic therapy [10582-5]</td>
</tr>
<tr>
<td>10582 05</td>
<td>Approach and potentiality of low level laser therapy in veterinary medicine [10582-9]</td>
</tr>
<tr>
<td>10582 06</td>
<td>Photobiomodulation laser improves the early repair process of hypothyroid rats [10582-18]</td>
</tr>
<tr>
<td>10582 07</td>
<td>The effect of phototherapies on bone repair of euthyroid and hypothyroid rats: Raman spectroscopic study [10582-19]</td>
</tr>
<tr>
<td>10582 08</td>
<td>Laser therapy in women genital Chlamydia trachomatis infection complicated with PID and infertility [10582-6]</td>
</tr>
<tr>
<td>10582 09</td>
<td>Clinical and histological evaluation of laser therapy in the treatment of oral mucositis in an animal model [10582-13]</td>
</tr>
<tr>
<td>10582 0A</td>
<td>Evaluation of phototherapy in the differentiation of mesenchymal stem cells in the tissue repair of rats submitted to a hyperlipidemic diet [10582-21]</td>
</tr>
<tr>
<td>10582 0B</td>
<td>Muscle shortening maneuver and not topical anti-inflammatory therapy is effective in reducing the width of subacromial-subdeltoid bursa in shoulder impingement syndrome [10582-23]</td>
</tr>
</tbody>
</table>

### LASER PHYSICS

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10582 0C</td>
<td>Laser synthesis of hybrid nanoparticles for biomedicine [10582-8]</td>
</tr>
<tr>
<td>10582 0D</td>
<td>Low-level laser therapy equipment needs calibration before clinical use [10582-15]</td>
</tr>
</tbody>
</table>
Automatic classification of fluorescence and optical diffusion spectroscopy data in neuro-oncology [10582-17]

Non-contact procedure to measure heart and lung activities in preterm pediatric patients with skin disorders [10582-20]

**LASER SURGERY**

Face and labial rejuvenation with the new Nd-Yag 1064 picoseconds laser [10582-10]

Varicose veins endoluminal laser ablation from the beginning EVLT till now CELIV [10582-12]

Differential expression of myofibroblasts on CO2 laser wounds and scalpel wounds: an experimental model [10582-16]

Ultrastructural analysis of dental ceramic surface processed by a 1070 nm fiber laser [10582-22]
Authors

Numbers in the index correspond to the last two digits of the seven-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first five digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Anders, Juanita J., 02
Antognoli, L., 0F
Avestissian, H. K., 0C
Bagini, Maria Angela, 0B
Barros Nepomuceno, Patricia, 0D
Baxter, G. David, 02
Bravi, Riccardo, 0B
Brinzan, Daniela, 08
Cangussu, M. C. T., 09
Carnielli, V. P., 0F
Chapple, Cathy, 02
Cucinotta, A., 0J
dos Santos, Jean Nunes, 06, 07
Eros, Quarta, 0B
Facundes, Arseni Lázaro, 0D
Fornaini, C., 0J
Freitas, A. C., 0I
Goryajnov, S. A., 0E
Grolli, Stefano, 0S
Lalayan, A. A., 0C
Lazzerini, Patrizia, 0B
Lippi, Paolo, 0B
Liu, Lizhou, 02
Loshchenov, V. B., 0E
Machado de Senna, André, 0D
Machado, R. M., 09, 0I
Machado-de-Sena, Rosa Maria, 0D
Marchi, Alberto, 0B
Marchionni, P., 0F
Maresca, Marco, 0B
Marques, A. M. C., 0A
Mathias, C. C., 09
Melchiorre, Daniela, 0B
Mergio, E., 0J
Mester, Adan R., 03
Nobile, S., 0F
Olegário de Araújo, Ronyere, 0D
Oliveira, C. R. B., 09, 0A, 0I
Paisan, Lucian, 0B
Paterniani, Valentina, 0S
Petitch, Simone, 02
Pineiro, Antonio Luiz B., 07, 0I
Poli, F., 0J
Potapov, A. A., 0E
Ramalho, Luciana M. P., 06, 09, 0A, 0I
Rocca, J.-P., 0J
Rodriguez, Tania T., 06, 07, 09, 0A
Santos, L. S., 0A
Savelieva, T. A., 0E
Sávya Florentino, Wanilha, 0D
Scalise, L., 0F
Selleri, S., 0J
Silveira, Landulfo, Jr., 07
Smeu, Claudia-Ramona, 08
Soares, Amanda P., 07
Soares, Luiz G. P., 07
Szabo, Robert, 04
Teixeira, Carolina, 0G, 0H
Teixeira, Heitor, 0G, 0H
Tumilty, Steve, 02
Uzêda e Silva, V. D., 06, 0A
Vasconcelos, R. M., 06
Vitória, L. A., 09, 0A, 0I
Xavier, F. C. A., 06, 0A, 0I
Conference Committee

Conference Chair

Leonardo Longo, International Academy for Laser Medicine and Surgery (Italy)

Program Committee

J. J. Anders, Uniformed Services University of the Health Sciences (United States)
H. Avetissian, Yerevan University (Armenia)
A. Baruchin, Ben-Gurion University of the Negev (Israel)
G. Bastianelli, ENT (Italy)
G. D. Baxter, Otago University (New Zealand)
Cheng-Jen Chang, University of Taipei (Taiwan China)
T. Dostalova, Charles University in Prague (Czech Republic)
C. Fornaini, Parma University (Italy)
S. Gonchukov, Moscow State University (Russian Federation)
A. Goran, Marconi University (Italy)
A. Ignaciuk, Poland Society of Aesthetic Medicine and Surgery (Poland)
H. Jelinkova, Czech Technical University in Prague (Czech Republic)
Ming Chen Kao, University of Taipei (Taiwan China)
K. Khatri, Skin & Laser Center (United States)
K. Kovacs, Laser Vet Clinic (Hungary)
S. Krishna, International Society for Laser Surgery and Medicine
I. Ilev, Center for Devices and Radiological Health (United States)
J. Jagdeo, University of California, Davis (United States)
R. Lanzafame, SUNY Buffalo School of Dentistry (United States)
A. Lauto, The University of Sydney (Australia)
P. Lippi, Florence University (Italy)
Leonardo Longo, International Academy for Laser Medicine and Surgery (Italy)
R. Lopes-Martins, Universidade de Mogi das Cruzes (Brazil)
T. Lotti, World Health Academy (Italy)
R. Lubart, Bar-Ilan University (Israel)
A. Mester, National Laser Therapy Centre, Peterfy Sandor Teaching Hospital (Hungary)
E. Merigo, University of Nice Sophia Antipolis (Italy)
L. Navratil, Czech Technical University in Prague (Czech Republic)
N. Nimsakul, Plastic Surgery Institute, Bangkok University (Thailand)
T. Ohshiro, Japan Laboratory of Laser Medicine and Surgery (Japan)
A. Panti, Florence Medical Association (Italy)
P. F. Parra, Pisa University (Italy)  
M. L. Pascu, Bucharest University (Romania)  
A. Pinheiro, Bahia University (Brazil)  
R. Pirvulescu, Bucharest University (Romania)  
M. Postiglione, World Health Organization (Italy)  
B. K. Rau, Chennai University (India)  
J. P. Rocca, University of Nice Sophia Antipolis (Italy)  
S. Rockhind, Tel Aviv University (Israel)  
K. Samoilova, Institute of Cytology (Russian Federation)  
F. Sicurello, Bicocca University (Italy)  
P. Smalley, Technology Concepts International (United States)  
M. Stark, Berlin University (Germany)  
G. P. Tassi, Queen Anne Street Medical Centre (United Kingdom)  
H. Teixeira, Medilaser Clinic Surgery (Portugal)  
A. Tenenbaum, ESPAS, Lugano (Italy)  
F. Tomaselli, Marconi University (Italy)  
V. Tsepolenko, Ukraine Society of Aesthetic Medicine (Ukraine)  
A. Vaitkuviene, Vilnius University (Lithuania)  
J. Vaitkus, Lithuanian Physical Society, Vilnius University (Ukraine)
Introduction

The 29th Laser Florence International Medical Congress was held 9-11 November 2017 in Florence. This year’s conference was particularly important, because it was a joint conference with three international congresses: IPTA (International Photo Therapy Association), ISLMS (International Society for Laser in Medicine and Surgery) and WFSLMS (World Federation Societies of Laser Medicine and Surgery).

The 2017 program level was very high, as was the quality of the speakers. About 250 participants from 35 countries and five continents were divided into nine sessions: Laser Dentistry, Basic Science and Laser Physics, Laser ENT and Safety, Laser and Drugs, Laser/Light in Aesthetic Medicine and Surgery, Laser/Light in Surgery, Laser Biomodulation: Scientific Research and Clinical Practice, Laser Rehabilitation in Central Nervous System Injuries, Laser Rehabilitation, and a poster session.

The high scientific level of the program was testified by the achievement of 16 credits by the North American and European CME Program (UEMS—Union European Medicine Specialists) for all the participants to the Congress, as well as by the publication of the Proceedings by SPIE.

The presence of a great number of young lecturers and poster presenters was very positive, thus showing that Laser Florence Congress is considered one of the most important scientific events also by the young researchers and clinics who choose it for presenting their works.

The event was officially opened by Prof. Leonardo Longo, Congress Chairman, followed by three leading lecturers: Dr. R. Lanzafame, “Laser applications in medicine: an evolution”, Prof. P. Manzelli, “Laser therapy: equivalence between biophotonic field and thin energy in the coherence’s reactivation of life energy,” and Dr. D. Sliney’s presentation, “Photobiological dosimetry of tissue exposure.”

Prof. Longo and Prof. Sharon Krishna presented an important and significant remembrance of two IALMS members who recently passed away, Prof. Mario Postiglione and Prof. Venkatasami Jeganathan.

Many lecturers followed on the networks in real time by streaming, with more than 10,000 visualizations. The slides of the congress lectures are available on the website www.ialms.international, in the area members, covered by password.
The jury, formed by the chairpersons of all the scientific sessions, voted for the best oral communications and posters of young scientists. The winners are listed below.

<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>DYNAMIC CHANGES IN GAMMA-IRRADIATED MICE TREATED WITH LASER</td>
<td>Yulia Efremova¹, Zuzana Sinkorova², Jaroslav Racek³, Anna Lierova², Marcela Jelicova², Leos Navratil²</td>
</tr>
<tr>
<td>(Lecture granted with 500 eurodollars offered by the Lions Club Firenze Stibbert)</td>
<td></td>
</tr>
<tr>
<td>FUNDAMENTAL APPLICATIONS OF ER, CR: YSGG LASER IN COMBINATION WITH DIODE 980nm WAVELENGTH</td>
<td>Salam Alakash, MD Amman, Jordan Private clinic, Conservative and Laser Dentistry, Jordan</td>
</tr>
<tr>
<td>LASER AND BIOSCAFFOLDS IN OROMAXILLOFACIAL SURGERY</td>
<td>L. Cella¹, E. Merigo¹, C. Fornaini¹, F. Clini¹, N. Tinelli², M. Fontana¹, G. Lagori¹, A. Oppici¹</td>
</tr>
<tr>
<td>A SUTURELESS CONDUCTIVE PATCH FOR ENHANCING THE CARDIAC ELECTRIC SIGNAL</td>
<td>Damia Mawad, PhD School of Materials Science and Engineering, University of New South Wales, Sydney, NSW 2052, Australia</td>
</tr>
<tr>
<td>INNOVATIVE COMBINATION TECHNIQUE FOR LOWER FACE AND NECK CONTOURING AND REJUVENATION</td>
<td>Pichansak Bunmas, MD Plastic and Reconstructive Surgery, VPast Institute of Aesthetic and Plastic Surgery Center, Bangsaen &amp; Pattaya Beach, Chon Buri, Thailand</td>
</tr>
<tr>
<td>PHOTOBIO MODULATION OF AUTOIMMUN SKIN DISEASES IN SMALL ANIMALS</td>
<td>Kitti Szenasi, K., Kovacs DVM, PhD Small Animal Laser Clinic, laser medicine Budapest, Hungary</td>
</tr>
<tr>
<td>THE MICROVASCULAR RESPONSE TO PHOTOBIO MODULATION WITH NON-COHERENT LIGHT SOURCES IN HEALTHY SUBJECTS: THE ROLE OF WAVELENGHT, GENDER AND AGE</td>
<td>Lilach Gavish¹, L. Duda³, M. Halak¹, B. Gavish¹, Z. Ovadia-Blechman²</td>
</tr>
<tr>
<td>ER: YAG LASER-ACTIVATED IRRIGATION ASSISTED NON-SURGICAL RE-TREATMENT OF MAXILLARY FIRST MOLARS TREATED WITH &quot;RUSSIAN RED CEMENT&quot;: A CASE REPORT</td>
<td>Yuhao Bai, DDS, MSc Dept of Dentistry, Capital Medical University Xuanwu Hospital, Beijing, China</td>
</tr>
<tr>
<td>DIFFERENTIAL EXPRESSION OF MYOFIBROBLASTS ON CO2 LASER WOUNDS AND SCALPEL WOUNDS: AN EXPERIMENTAL MODEL</td>
<td>R. Machado, CRB Oliveira, LA Vitória, FCA Xavier, ALB Pinheiro, AC Freitas, L M P Ramalho. School of Dentistry, Federal University of Bahia, Salvador, Brasil</td>
</tr>
</tbody>
</table>
Inside the congress, the executive committees and the general assemblies of IPTA, ISLMS, WFSLMS, and IALMS were also held where some important decisions were reached:

1. Prof. Toni Pinheiro from Brazil was elected President of IPTA. He replaces Prof. Cheng-Jen Chang from Taiwan
2. Prof. Longo replaced Dr. Sharon Krishna as President of ISLMS
3. Prof. Carlo Fornaini replaced Prof. Mariano Postiglione as Treasurer of IALMS.

The locations and times of the next Congresses were established:

1. The next congress of APALMS will be 19-21 October 2018 in Bangkok, and will be organized by Prof. Apirag Chuangsuwanich and Prof. Bounmas Pichansak.
2. The next congress of WFSLMS, IPTA and ISLMS will be in June 2019 in Taiwan, and organized by Prof. Cheng-Jen Chang and Prof. Ming Chen Kao.
3. The next Congress of ISLMS and WFSLMS will be in Toronto in 2021, organized by Prof. S. Yang.

Traditionally, the gala dinner marks the end of the Laser Florence Congress, and this year the final was wonderful! Inside the exciting atmosphere of Villa Viviani, Prof. Longo and his team prepared a dinner program rich of music, dance, typical Tuscan food and a lot of happiness. Laser Florence is a great family where everybody may appreciate the spirit of authentic friendship!

See you in Laser Florence 2019, November 7–9!

Leonardo Longo
Conference Sponsorship and Support

Organized by
IALMS—The International Academy for Laser Medicine and Surgery (Italy)
ISLSM—The International Society of Laser Surgery and Medicine
WFLSMS—World Federation of Societies for Laser Surgery and Medicine
IPTA—International Photo Therapy Association
ILM—Institute Laser Medicine Florence (Italy)

Sponsored by
UEMS—European Union of Medical Specialists
Italian Health Office
Florence Medical Association
Common of Firenze (Italy)

Cooperating Societies
ASLMS—The American Society of Laser in Medicine and Surgery
IPS—International Peelings Society
NESA—New European Surgical Academy
SACDAM—Swiss Academy of Cosmetic Dermatology & Aesthetic Medicine
SIME—Italian Society of Aesthetic Medicine