

PROGRESS IN BIOMEDICAL OPTICS AND IMAGING
Vol. 15 No. 44

Fifth International Conference on Lasers in Medicine

Biotechnologies Integrated in Daily Medicine

Carmen Todea
Adrian Gh. Podoleanu
Virgil-Florin Duma
Editors

19–21 September 2013
Timisoara, Romania

Organized by
Romanian Society for Lasers in Dentistry (SRLS)
University of Medicine and Pharmacy Victor Babes Timisoara (Romania)
The World Federation for Laser Dentistry (WFLD)

Sponsored by
Romanian Society for Lasers in Dentistry (SRLS)

Published by
SPIE

Volume 8925

Proceedings of SPIE, 1605-7422, V. 8925

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

Fifth International Conference on Lasers in Medicine: Biotechnologies Integrated in Daily Medicine, edited
by Carmen Todea, Adrian Gh. Podoleanu, Virgil-Florin Duma, Proc. of SPIE Vol. 8925, 892501
© 2014 SPIE · CCC code: 1605-7422/14/\$18 · doi: 10.1117/12.2058095

Proc. of SPIE Vol. 8925 892501-1

The papers included 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. The papers published in these proceedings 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 this book:

Author(s), "Title of Paper," in *Fifth International Conference on Lasers in Medicine: Biotechnologies Integrated in Daily Medicine*, edited by Carmen Todea, Adrian G. Podoleanu, Virgil-Florin Duma, Proceedings of SPIE Vol. 8925 (SPIE, Bellingham, WA, 2014) Article CID Number.

ISSN: 1605-7422

ISBN: 9780819498175

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 © 2014, 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 1605-7422/14/\$18.00.

Printed in the United States of America.

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



SPIEDigitalLibrary.org

Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first 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, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four 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. The complete citation is used on the first page, and an abbreviated version on subsequent pages. Numbers in the index correspond to the last two digits of the six-digit CID Number.

Contents

vii	Conference Committees
ix	<i>Introduction</i>

SESSION 1 LASERS IN DENTISTRY

- 8925 02 **New method of laser doppler flowmetry signal processing in pulp vitality evaluation after teeth cosmetic treatment (Invited Paper)** [8925-13]
C. Todea, A. Sarpe, B. Vitez, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania); G. Dragănescu, Politehnica Univ. of Timisoara (Romania)
- 8925 03 **Laser treatment of oral vascular malformations (Invited Paper)** [8925-15]
U. Romeo, G. Gaimari, M. Mohsen, G. Tenore, G. Palaia, Univ. degli Studi di Roma La Sapienza (Italy)
- 8925 04 **The power of the bubble: comparing ultrasonic and laser activated irrigation (Invited Paper)** [8925-5]
R. J. G. De Moor, M. A. Meire, Univ. Ghent (Belgium); R. M. Verdaasdonk, Vrije Univ. Medical Ctr. (Netherlands)
- 8925 05 **Orofacial hereditary haemorrhagic telangiectasia: high power diode laser in early and advanced lesion treatment** [8925-24]
A. Tempesta, S. Franco, S. Miccoli, P. Suppressa, V. De Falco, V. Crincoli, M. Lacaita, Univ. degli Studi di Bari (Italy); M. Giuliani, Univ. Cattolica del Sacro Cuore (Italy); G. Favia, Univ. degli Studi di Bari (Italy)
- 8925 06 **Orofacial lymphatic malformation: management with a three steps diode laser protocol** [8925-26]
S. Miccoli, A. Tempesta, L. Limongelli, C. Caporosso, D. Di Venere, M. Petrucci, M. Lacaita, E. Maiorano, G. Favia, Univ. degli Studi di Bari (Italy)
- 8925 07 **How to bond to root canal dentin (Invited Paper)** [8925-32]
L. Nica, C. Todea, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania); G. Furtos, Raluca Ripan Institute for Research in Chemistry (Romania); B. Baldea, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania)
- 8925 08 **Micro-CT application for infiltration technology in paedodontics and orthodontics (Invited Paper)** [8925-31]
A. Ogodescu, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania); A. Manescu, Univ. Politecnica delle Marche (Italy); A. E. Ogodescu, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania); A. Giuliani, Univ. Politecnica delle Marche (Italy); C. Todea, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania)
- 8925 09 **PEMFs: new post-surgical management in dentistry** [8925-47]
L. Tonetti, Private Practice e Consulente (Italy)

- 8925 0A **Diode laser photocoagulation in PHACES syndrome hemangiomas: a case series**
[8925-28]
U. Romeo, N. Russo, A. Polimeni, Univ. degli Studi di Roma La Sapienza (Italy); G. Favia, M. G. Lacaita, L. Limongelli, S. Franco, Univ. degli Studi di Bari (Italy)
- 8925 0B **Survival time of endodontically treated teeth: a 7-year retrospective clinical study (Invited Paper)** [8925-43]
B. Baldea, S. Canjau, D. Popescu, Private Practice Dental Office (Romania); A. Tudor, C. Todea, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania)
- 8925 0C **Photodynamic therapy in peri-implantitis (Invited Paper)** [8925-68]
M. Leretter, A. Cândeа, F. Topala, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania)
- 8925 0D **Practical considerations on frenectomy** [8925-46]
L. Moldoveanu, Univ. Ovidius Constanta (Romania); F. C. Badea, Univ. of Medicine and Pharmacy Carol Davila (Romania); A. A. Odor, Aachen Dental Laser Ctr. (Germany) and ToldiMed Dental Ctr. (Romania)
- 8925 0E **Treatment of oral soft tissues benign tumors using laser** [8925-22]
B. Crisan, M. Baciu, L. Crisan, S. Bran, H. Rotar, C. Dinu, I. Moldovan, G. Baciu, Iuliu Hatieganu Univ. of Medicine and Pharmacy (Romania)
- 8925 0F **Alternative techniques in root canal debridement** [8925-35]
R. Luca, C. Todea, C. Bălăbuc, L. Nica, G. Armani, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania); C. Locovei, Politehnica Univ. of Timisoara (Romania)
- 8925 0G **Laser assisted irrigation and hand irrigation for root canal decontamination: a comparison**
[8925-53]
M. Olivi, M. Stefanucci, C. Todea, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania)
- 8925 0H **Passivity of the bars manufactured using current technologies: laser-sintering, casting, and milling** [8925-66]
D. Popescu, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania); S. Popescu, Univ. Politehnica of Bucharest (Romania); D. Pop, A. Jivanescu, C. Todea, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania)
- 8925 0I **On the reliability of the holographic method for measurement of soft tissue modifications during periodontal therapy** [8925-65]
S.-I. Stratul, C. Sinescu, M. Negruțiu, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania); A. de Sabata, Politehnica Univ. of Timisoara (Romania); M. Rominu, A. Ogodescu, D. Rusu, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania)
- 8925 0J **Reliability of CBCT as an assessment tool for mandibular molars furcation defects** [8925-61]
A. G. Marinescu, M. Boariu, D. Rusu, S.-I. Stratul, A. Ogodescu, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania)

SESSION 2 SYSTEMS, DEVICES AND APPLICATIONS OF OPTICAL COHERENCE TOMOGRAPHY FOR BIOMEDICAL IMAGING

- 8925 0K **Trends in optical coherence tomography applied to medical imaging (Keynote Paper)** [8925-48]
A. G. Podoleanu, Univ. of Kent (United Kingdom)
- 8925 0L **Scanning in biomedical imaging: from classical devices to handheld heads and micro-systems (Invited Paper)** [8925-10]
V.-F. Duma, 3OM Optomechatronics Group, Aurel Vlaicu Univ. of Arad (Romania)
- 8925 0M **New signal analysis methods for laser doppler flowmetric recordings (Invited Paper)** [8925-34]
G. E. Drăgănescu, Politehnica Univ. of Timisoara (Romania); C. Todea, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania)
- 8925 0N **Maximum permissible exposure of the retina in the human eye in optical coherence tomography systems using a confocal scanning laser ophthalmoscopy platform** [8925-51]
S. Rees, G. Dobre, Univ. of Kent (United Kingdom)
- 8925 0O **Control architectures of galvanometer-based scanners for an increased precision and a faster response** [8925-20]
C. Mnerie, 3OM Optomechatronics Group, Aurel Vlaicu Univ. of Arad (Romania); S. Preitl, Politehnica Univ. of Timisoara (Romania); V.-F. Duma, 3OM Optomechatronics Group, Aurel Vlaicu Univ. of Arad (Romania)
- 8925 0P **Risley prisms scanners with different configurations: a multi-parametric analysis** [8925-50]
V.-F. Duma, 3OM Optomechatronics Group, Aurel Vlaicu Univ. of Arad (Romania)
- 8925 0Q **Driving solutions and optomechanical design of scanners with Risley prisms** [8925-30]
I. Kaposta, V.-F. Duma, 3OM Optomechatronics Group, Aurel Vlaicu Univ. of Arad (Romania)
- 8925 0R **Confocal imaging through an endoscopic rod** [8925-54]
M. Galloway, Maidstone East Kent Hospitals Univ. NHS Foundation Trust (United Kingdom); K. Gabriel, G. Dobre, Univ. of Kent (United Kingdom)
- 8925 0S **Design programs for optical chopper wheels with different configurations** [8925-21]
O. Cira, V.-F. Duma, 3OM Optomechatronics Group, Aurel Vlaicu Univ. of Arad (Romania)
- 8925 0T **Temperature variation in metal ceramic technology analyzed using time domain optical coherence tomography (Invited Paper)** [8925-63]
C. Sinescu, F. I. Topala, M. L. Negruțiu, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania); V.-F. Duma, 3OM Optomechatronics Group, Aurel Vlaicu Univ. of Arad (Romania); A. G. Podoleanu, Univ. of Kent (United Kingdom)
- 8925 0U **Imagistic evaluation of matrix bone interface (Invited Paper)** [8925-60]
M. L. Negruțiu, C. Sinescu, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania); A. Manescu, Univ. Politecnica delle Marche (Italy); F. I. Topală, B. Hoinoiu, C. Mărcăuțeanu, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania); V. Duma, 3OM Optomechatronics Group, Aurel Vlaicu Univ. of Arad (Romania); A. Bradu, A. G. Podoleanu, Univ. of Kent (United Kingdom)

- 8925 0V **Different matrix evaluation for the bone regeneration of rats' femurs using time domain optical coherence tomography** [8925-64]
L.-C. Rusu, M. L. Negruțiu, C. Sinescu, B. Hoinoiu, C. Zaharia, L. Ardelean, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania); V.-F. Duma, 3OM Optomechatronics Group, Aurel Vlaicu Univ. of Arad (Romania); A. G. Podoleanu, Univ. of Kent (United Kingdom)
- 8925 0W **The advantages of a swept source optical coherence tomography system in the evaluation of occlusal disorders** [8925-36]
C. Marcauteanu, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania); A. Bradu, Univ. of Kent (United Kingdom); C. Sinescu, F. I. Topala, M. L. Negruțiu, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania); V. F. Duma, 3OM Optomechatronics Group, Aurel Vlaicu Univ. of Arad (Romania); A. G. Podoleanu, Univ. of Kent (United Kingdom)
- 8925 0X **Imaging of oral pathological tissue using optical coherence tomography** [8925-1]
S. Canjau, C. Todea, C. Sinescu, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania); V.-F. Duma, 3OM Optomechatronics Group, Aurel Vlaicu Univ. of Arad (Romania); F. I. Topala, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania); A. G. Podoleanu, Univ. of Kent (United Kingdom)
- 8925 0Y **Imaging of noncarious cervical lesions by means of a fast swept source optical coherence tomography system** [8925-42]
E. T. Stoica, C. Marcauteanu, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania); A. Bradu, Univ. of Kent (United Kingdom); C. Sinescu, F. I. Topala, M. L. Negruțiu, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania); V. F. Duma, 3OM Optomechatronics Group, Aurel Vlaicu Univ. of Arad (Romania); A. G. Podoleanu, Univ. of Kent (United Kingdom)

Author Index

Conference Committees

Conference Chairs

Carmen Todea, University of Medicine and Pharmacy Victor Babes
Timisoara (Romania)
Adrian Gh. Podoleanu, University of Kent (United Kingdom)
Virgil-Florin Duma, Aurel Vlaicu University of Arad (Romania)

Conference Committee

Carmen Todea, University of Medicine and Pharmacy Victor Babes
Timisoara (Romania)
Adrian Gh. Podoleanu, University of Kent (United Kingdom)
Raica Marius, University of Medicine and Pharmacy Victor Babes
Timisoara (Romania)
Virgil-Florin Duma, Aurel Vlaicu University of Arad (Romania)

Program Committee

Carmen Todea, University of Medicine and Pharmacy Victor Babes
Timisoara (Romania)
Roeland De Moor, Universiteit Gent (Belgium)
Peter Verheyen, Private Practice (Belgium)
Claus P. Neckel, Privatpraxis (Germany)
Adrian Gh. Podoleanu, University of Kent (United Kingdom)
Josep Arnabat, Universitat de Barcelona (Spain)
Virgil-Florin Duma, Aurel Vlaicu Universitatea of Arad (Romania)
Adrian Mănescu, Università Politecnica delle Marche (Italy)
Stefano Benedicenti, Università degli Studi di Genova (Italy)
Alberico Benedicenti, Università degli Studi di Genova (Italy)
Roly Konbilt, Università degli Studi di Roma La Sapienza (Italy)
Umberto Romeo, Università degli Studi di Roma La Sapienza (Italy)

Session Chairs

Keynote Address
Josep Arnabat, Universitat de Barcelona (Spain)

- 1 Periodontology and Implantology
Carmen Todea, University of Medicine and Pharmacy Victor Babes
Timisoara (Romania)
Adrian Mănescu, Università Politecnica delle Marche (Italy)
- 2 Endodontics
Adrian Gh. Podoleanu, University of Kent (United Kingdom)
Umberto Romeo, Università degli Studi di Roma La Sapienza (Italy)

- 3 Surgery
Josep Arnabat, University de Barcelona (Spain)
Virgil-Florin Duma, Aurel Vlaicu University of Arad (Romania)
- 4 Optics and Optomechatronics
Meda Lavinia Negruțiu, University of Medicine and Pharmacy Victor Babes Timisoara (Romania)
Roly Konbilt, Università degli Studi di Roma La Sapienza (Italy)
- 5 Conservative & Laser Phototherapy – LLLT
Bogdan Crisan, Iuliu Hatieganu University of Medicine and Pharmacy (Romania)
Gianfranco Semez, Studio Privato (Italy)
- 6 Esthetics
Luminita Nica, University of Medicine and Pharmacy Victor Babes Timisoara (Romania)
Claus P. Neckel, Privatpraxis (Germany)
- 7 Biotechnologies
Georgi Tomov, Plovdiv Medical University (Bulgaria)
Alexandru Ogodescu, University of Medicine and Pharmacy Victor Babes Timisoara (Romania)

Introduction

The fifth edition of the **International Conference on Lasers in Medicine: Biotechnologies Integrated in Daily Medicine** in Timisoara, Romania proved to be a highly diversified and interesting conference.

The synergism of practical and technological aspects for addressing and advancing laser clinical applications was clearly evident and has proven to be an excellent choice for this conference, providing a unique and useful forum. Many invited papers were presented as well as two excellent keynote presentations.

The conference integrated many important topics and new developments in this non-conventional field of medicine and dentistry, thus offering participants the opportunity of increasing their knowledge in the field after experiencing the prior editions. Moreover, one of the major goals of this conference was to establish new scientific and professional relationships and to exchange the latest results of scientific research and clinical applications of laser therapy. The fifth edition included a section dedicated to dental technicians and laser application in dental technology. As a novelty, the basic science section was part of the congress topics, dedicated to physicists.

The exhibition presented a wide range of laser devices used in dentistry and oral surgery. The conference also included hands-on workshops, prestigious lectures from all around the world, and scientific papers and posters, which provided great opportunities for updating our knowledge. Timisoara, the Romanian nucleus of laser therapy in dentistry, welcomed all the speakers and participants to this excellent scientific and social event and, last but not least, to discover its unique and local splendor.

We look forward to the next ICLM conference and wish for additional and advanced progress in the field of lasers in dentistry research. We hope that developments will be presented and will continue to expand and improve future conference objectives.

The conference chairs would like to thank the speakers, organizing committee, the scientific and advisory committee, session chairs, and most importantly the SPIE staff for their many contributions to making the ICLM 2013 conference a success.

**Carmen Todea
Adrian Gh. Podoleanu
Virgil-Florin Duma**

