

# ***Photonic Therapeutics and Diagnostics in Dentistry, Head and Neck Surgery, and Otolaryngology***

**Brian J. F. Wong**  
**Peter Rechmann**  
**Daniel Fried**  
**Justus F. Ilgner**  
*Editors*

**6–11 March 2021**  
**Online Only, United States**

*Sponsored and Published by*  
SPIE

**Volume 11627**

Proceedings of SPIE, 1605-7422, V. 11627

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

Photonic Therapeutics and Diagnostics in Dentistry, Head and Neck Surgery, and Otolaryngology, edited by  
Brian J. F. Wong, Peter Rechmann, Justus F. Ilgner, Daniel Fried, Proc. of SPIE Vol. 11627,  
1162701 · © 2021 SPIE · CCC code: 1605-7422/21/\$21 · doi: 10.1117/12.2596805

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 [SPIDigitalLibrary.org](http://SPIDigitalLibrary.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:

Author(s), "Title of Paper," in *Photonic Therapeutics and Diagnostics in Dentistry, Head and Neck Surgery, and Otolaryngology*, edited by Brian J. F. Wong, Peter Rechmann, Daniel Fried, Justus F. Ilgner, Proc. of SPIE 11627, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

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

ISBN: 9781510640894  
ISBN: 9781510640900 (electronic)

Published by

**SPIE**

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time)

[SPIE.org](http://SPIE.org)

Copyright © 2021 Society of Photo-Optical Instrumentation Engineers (SPIE).

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 fees. To obtain permission to use and share articles in this volume, visit Copyright Clearance Center at [copyright.com](http://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.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

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

**SPIE. DIGITAL LIBRARY**

[SPIDigitalLibrary.org](http://SPIDigitalLibrary.org)

---

**Paper Numbering:** A unique citation identifier (CID) number is assigned to each article in the Proceedings of SPIE 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

---

## IMAGING, THERAPEUTICS, AND ADVANCED TECHNOLOGY IN HEAD AND NECK SURGERY AND OTOLARYNGOLOGY

---

- 11627 0B **Laser ablation of bone tissue with Q-switched infrared laser sources for neurosurgical applications** [11627-8]
- 11627 0D **Artificial intelligence assisted determination of Tumor Proportion Score (TPS) in HNSCC patients** [11627-10]

---

## LASERS IN DENTISTRY

---

- 11627 0G **Toward optical monitoring of alveolar bone level, assessing the structure of periodontal tissues with optical coherence tomography: an ex-vivo animal pilot study** [11627-13]
- 11627 0L **Multispectral SWIR images of the pulp-chamber of posterior teeth in vitro** [11627-18]
- 11627 0M **Monitoring silver diamine fluoride application with optical coherence tomography** [11627-19]
- 11627 0N **Compact in vivo handheld dual SWIR transillumination/reflectance imaging system for the detection of proximal and occlusal lesions** [11627-20]

---

## POSTER SESSION

---

- 11627 0O **Infrared imaging confirms the role of the transparent surface zone in arresting dental caries** [11627-21]
- 11627 0P **High contrast reflectance imaging at 1950 nm for the assessment of lesion activity on extracted teeth** [11627-22]
- 11627 0Q **Imaging dental fluorosis at SWIR wavelengths from 1300 to 2000-nm** [11627-23]

