PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 6439

, "Front Matter: Volume 6439," Proc. SPIE 6439, Optics in Tissue Engineering and Regenerative Medicine, 643901 (12 March 2007); doi: 10.1117/12.727333

Event: SPIE BiOS, 2007, San Jose, California, United States

Optics in Tissue Engineering and Regenerative Medicine

**Sean J. Kirkpatrick
Ruikang K. Wang**
Editors

**21 and 23 January 2007
San Jose, California, USA**

Sponsored and Published by
SPIE—The International Society for Optical Engineering

Volume 6439

The International Society
for Optical Engineering

Proceedings of SPIE—The International Society for Optical Engineering, 9780819465528, v. 6439

SPIE is an international technical society dedicated to advancing engineering and scientific applications of optical, photonic, imaging, electronic, and optoelectronic technologies.

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 *Optics in Tissue Engineering and Regenerative Medicine*, edited by Sean J. Kirkpatrick, Ruikang K. Wang, Proceedings of SPIE Vol. 6439 (SPIE, Bellingham, WA, 2007) Article CID Number.

ISSN 1605-7422
ISBN 9780819465528

Published by
SPIE—The International Society for Optical Engineering
P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone 1 360/676-3290 (Pacific Time) · Fax 1 360/647-1445
<http://www.spie.org>

Copyright © 2007, The 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 <http://www.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 1605-7422/07/\$18.00.

Printed in the United States of America.

Contents

vii *Conference Committee*

SESSION 1 IMAGING

- 643903 **Continuous monitoring of tissue growth inside a perfusion bioreactor by optical coherence tomography** [6439-02]
P. O. Bagnaninchi, A. El Haj, Y. Yang, Keele Univ. (United Kingdom)
- 643904 **Structural analysis of blended materials using multiphoton autofluorescence and second harmonic generation microscopy** [6439-03]
H.-Y. Tan, Institute of Medical Engineering (Taiwan), Chang Gung Memorial Hospital (Taiwan), and Chang Gung Univ. (Taiwan); M.-G. Lin, National Taiwan Univ. (Taiwan); S.-J. Lin, National Taiwan Univ. (Taiwan) and National Taiwan Univ. Hospital (Taiwan); W.-C. Hsiao, Institute of Medical Engineering (Taiwan); L.-K. Wen, W.-L. Chen, National Taiwan Univ. (Taiwan); T.-H. Young, Institute of Medical Engineering (Taiwan); C.-Y. Dong, National Taiwan Univ. (Taiwan)
- 643905 **A tissue-engineered 3D model of light scattering in atherosclerotic plaques** [6439-04]
D. Levitz, M. T. Hinds, R. K. Wang, Z. Ma, K. Ishii, N. Tran, O. J. T. McCarty, S. R. Hanson, S. L. Jacques, Oregon Health and Science Univ. (USA)

SESSION 2 MECHANICAL PROPERTIES

- 643907 **A novel OCT-based micro-indentation technique for mechanical characterization of soft tissues** [6439-06]
Y. Yang, P. O. Bagnaninchi, M. Ahearne, Keele Univ. (United Kingdom); R. K. Wang, Oregon Health and Science Univ. (USA); K.-K. Liu, Keele Univ. (United Kingdom)
-

Pagination: 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 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.

643909

Usefulness and limitation of measurement methods for evaluation of tissue-engineered cartilage function and characterization using nanosecond pulsed laser [6439-08]

M. Ishihara, National Defense Medical College (Japan) and Tokai Univ. School of Medicine (Japan); M. Sato, N. Kaneshiro, G. Mitani, T. Nagai, T. Kutsuna, Tokai Univ. School of Medicine (Japan); M. Ishihara, National Defense Medical College Research Institute (Japan); J. Mochida, Tokai Univ. School of Medicine (Japan); M. Kikuchi, National Defense Medical College Research Institute (Japan) and National Defense Medical College (Japan)

SESSION 3 HEALING AND REGENERATION

64390D

Control of guided hard tissue regeneration using phosphorylated gelatin and OCT imaging of calcification [6439-13]

K. Ishii, Osaka Univ. (Japan); Z. Ma, Oregon Health and Science Univ. (USA); Y. Ninomiya, Osaka Univ. (Japan); M. Takegoshi, Kyoto Univ. (Japan); T. Kushibiki, Osaka Univ. (Japan) and Japan Science and Technology Agency (Japan); M. Yamamoto, Kyoto Univ. (Japan); M. Hinds, Oregon Health and Science Univ. (USA); Y. Tabata, Kyoto Univ. (Japan); R. K. Wang, Oregon Health and Science Univ. (USA); K. Awazu, Osaka Univ. (Japan)

POSTER SESSION

64390F

Controlling optical properties of bio-tissue by the use of biocompatible hyperosmotic agents [6439-15]

J. Jiang, Tianjin Univ. (China); R. K. Wang, Oregon Health and Science Univ. (USA); K. Xu, Tianjin Univ. (China)

64390G

Characterization of scaffold architecture by optical coherence tomography [6439-16]

Y. Yang, P. O. Bagnaninchi, C. Cunha-Reis, Keele Univ. (United Kingdom); H. M. Aydin, E. Piskin, Hacettepe Univ. (Turkey) and TUBITAK (Turkey); A. El Haj, Keele Univ. (United Kingdom)

64390H

Characterization of local fluid flow in 3D porous construct characterized by Fourier domain Doppler optical coherence tomography [6439-17]

P. O. Bagnaninchi, Y. Yang, A. El Haj, Keele Univ. (United Kingdom); M. T. Hinds, R. K. Wang, Oregon Health and Science Univ. (USA)

64390I

Fourier transform infrared spectroscopic analysis of cell differentiation [6439-18]

K. Ishii, A. Kimura, Osaka Univ. (Japan); T. Kushibiki, Osaka Univ. (Japan) and Japan Science and Technology Agency (Japan); K. Awazu, Osaka Univ. (Japan)

64390J

Birefringence imaging of biological tissue by spectral domain polarization sensitive optical coherence tomography [6439-19]

Z. Jing, C. Fan, J. Jiang, Q. Gong, Z. Ma, F. Zhang, J. Yao, Tianjin Univ. (China); R. K. Wang, Tianjin Univ. (China) and Oregon Health and Science Univ. (USA)

64390K

Spectral domain polarization sensitive optical coherence tomography based on two phase method [6439-20]

C. Fan, Z. Jing, J. Jiang, Q. Gong, Z. Ma, F. Zhang, J. Yao, Tianjin Univ. (China); R. K. Wang, Tianjin Univ. (China) and Oregon Health and Science Univ. (USA)

- 64390L **Signal processing using wavelet transform in photo-acoustic tomography** [6439-21]
T. Lu, J. Jiang, Y. Su, Z. Song, J. Yao, Tianjin Univ. (China); R. K. Wang, Tianjin Univ. (China) and Oregon Health and Science Univ. (USA)
- 64390M **Regularized processing of signal deconvolution in photoacoustic signal recovery**
[6439-22]
Z. Song, Y. Su, T. Lu, F. Zhang, Tianjin Univ. (China); R. K. Wang, Tianjin Univ. (China) and Oregon Health and Science Univ. (USA)
- 64390N **MRI 3D tissue temperature distribution measurement** [6439-23]
Y. Chen, Univ. of Central Oklahoma (USA); S. C. Gnyawali, Oklahoma State Univ. (USA); H. Liu, Univ. of Oklahoma (USA); Y. A. Tesiram, A. Abbott, R. A. Towner, Oklahoma Medical Research Foundation (USA); W. R. Chen, Univ. of Central Oklahoma (USA)
- 64390Q **Suppression of white light generation (supercontinuum) in biological media: a pilot study using human salivary proteins** [6439-26]
C. Santhosh, Manipal Academy of Higher Education (India); A. K. Dharmadhikari, K. Alti, J. A. Dharmadhikari, Tata Institute of Fundamental Research (India); D. Mathur, Manipal Academy of Higher Education (India) and Tata Institute of Fundamental Research (India)

Author Index

Conference Committee

Symposium Chairs

James G. Fujimoto, Massachusetts Institute of Technology (USA)
Richard R. Anderson, Wellman Center for Photomedicine (USA),
Massachusetts General Hospital (USA), and Harvard School of Medicine
(USA)

Program Track Chairs

Steven L. Jacques, Oregon Health and Science University (USA)
William P. Roach, Air Force Research Laboratory (USA)

Conference Chairs

Sean J. Kirkpatrick, Oregon Health and Science University (USA)
Ruikang K. Wang, Oregon Health and Science University (USA)

Program Committee

Stephen A. Boppart, University of Illinois at Urbana-Champaign (USA)
Sergio Fantini, Tufts University (USA)
Jeremy C. Hebden, University College London (United Kingdom)
Miya Ishihara, National Defense Medical College (Japan) and Tokai
University School of Medicine (Japan)
Ying Yang, Keele University (United Kingdom)

Session Chairs

- 1 Imaging
 Sean J. Kirkpatrick, Oregon Health and Science University (USA)
- 2 Mechanical Properties
 Stephen A. Boppart, University of Illinois at Urbana-Champaign (USA)
- 3 Healing and Regeneration
 Ruikang K. Wang, Oregon Health and Science University (USA)