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Translational Biophotonics

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For the third consecutive year, the *Journal of Biomedical Optics* complemented the SPIE BIOS Translational Research Symposium at Photonics West to highlight ongoing research efforts aiming to transform discoveries in biomedical optics and biophotonics into new diagnostics and treatments for patients in need.

This collection of papers comprises 6 original research articles and 1 perspective review report, which were published in a special section on Translational Biophotonics in the *Journal of Biomedical Optics*, Volume 24, Issue 2:

- Vavadi et al., “[Compact ultrasound-guided diffuse optical tomography system for breast cancer imaging](#),”
- Migliozi et al., “[Combining fluorescence-based image segmentation and automated microfluidics for ultrafast cell-by-cell assessment of biomarkers for HER2-type breast carcinoma](#),”
- Deal et al., “[Identifying molecular contributors to auto-fluorescence of neoplastic and normal colon sections using excitation-scanning hyperspectral imaging](#),”
- Fincke et al., “[Characterization of laser ultrasound source signals in biological tissues for imaging applications](#),”
- Cornaglia, Migliozi, et al., “[Multimodal imaging and high-throughput image-processing for drug screening on living organisms on-chip](#),”
- Cochran et al., “[Tissue oxygen saturation predicts response to breast cancer neoadjuvant chemotherapy with in 10 days of treatment](#),”

- Li, Marks, et al., “[Sensing, monitoring, and release of therapeutics: the translational journey of next generation bandages](#),”

The original research articles report exciting results in areas such as the use of near-infrared diffuse optical tomography based imaging for breast cancer diagnosis and treatment response monitoring ([Vavadi et al.](#)); combining microfluidic immunostaining, fluorescence imaging and image-based cell segmentation to enable ultrafast biomarker assessment of HER2-type breast carcinoma ([Migliozi et al.](#)); differentiating between normal and neoplastic colon by identifying the corresponding molecular signature through excitation-scanning hyperspectral imaging ([Deal et al.](#)); mitigating interoperator variability associated with current medical ultrasound imaging technique by using a noncontact laser ultrasound signals based system ([Fincke et al.](#)); validating new drugs by screening in whole organisms through multi modal imaging and high throughput image processing ([Cornaglia, Migliozi, et al.](#)); and optimizing chemotherapy strategies in breast cancer based on tissue oxygen saturation predictions ([Cochran et al.](#)). The perspective review report ([Li, Marks, et al.](#)) introduces a new concept of translational sciences paper. It describes the translational journey of SMART bandage technology through a chronological review of the key scientific, engineering and clinical milestones achieved, discussing the challenges and the solutions to overcome them.

The overarching goal of both the symposium and this special section is to inspire a new generation of scientists in biomedical optics and biophotonics to pursue careers in translational sciences, bring novel technologies to clinical practice through solid collaborations between academia

and industry, and ultimately solve important problems in healthcare.

The guest editors would like to thank all authors for their excellent contributions as well as the reviewers for their high-quality work and commitment to making this special series a success. The guest editors would also like to express their gratitude to Brian Pogue, editor-in-chief of JBO, for giving our community this unique opportunity, and to the JBO editorial staff at SPIE for the continuous support and attention that helped complete this series.

Gabriela Apiou-Sbirlea, PhD, is an assistant professor of dermatology at Harvard Medical School, director of Translational Research Core at Wellman Center for Photomedicine and of Translation Research Training and Development at Mass General Research Institute. She received her PhD degree in biomedical engineering and earned her *habilitation à diriger des recherches* (HDR) in France. She has over 25 years of experience performing and directing biomedical research in both industry and academia internationally.

Regine Choe, PhD, is an associate professor of biomedical engineering at the University of Rochester. She received her PhD degree in physics and astronomy at the University of Pennsylvania. Her research focus is on the development, validation, and clinical translation of diffuse optical techniques.

Markus Kleemann, MD, is a professor of vascular surgery and head of division of vascular and endovascular surgery at the University Medical Center in Lübeck, Germany. His research focus is in translational biomedical engineering in surgery with special regard to navigation, 3D-printing, augmented reality and robotics. His current research is focused on the development of fiber-Bragg navigation for the implantation of stent grafts without radiation.

Bruce J. Tromberg, PhD, is a professor of biomedical engineering and surgery at the University of California, Irvine (UCI), former director of UCI's Beckman Laser Institute and Medical Clinic, and director of the National Institute of Biomedical Imaging and Bioengineering (NBIB). He has pioneered the development and clinical translation of nonlinear optical microscopy and diffuse optical spectroscopy technologies for noninvasive label-free imaging of tissue composition and metabolism.