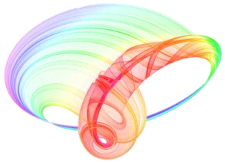
Book of abstracts



PHOTONICA2019

The Seventh International School and Conference on Photonics, 26 August – 30 August 2019, Belgrade, Serbia

& Machine Learning with Photonics Symposium (ML-Photonica 2019)

& ESUO Regional Workshop

& COST action CA16221

Editors: Milica Matijević, Marko Krstić and Petra Beličev

Belgrade, 2019

ABSTRACTS OF TUTORIAL, KEYNOTE, INVITED LECTURES, PROGRESS REPORTS AND CONTRIBUTED PAPERS

of

The Seventh International School and Conference on Photonics
PHOTONICA2019, 26 August – 30 August 2019, Belgrade, Serbia

and
Machine Learning with Photonics Symposium

and
ESUO Regional Workshop

Editors
Milica Matijević, Marko Krstić and Petra Beličev

Technical Assistance
Danka Stojanović and Goran Gligorić

Publisher
Vinča Institute of Nuclear Sciences
Mike Petrovića Alasa 12-14, P.O. Box 522
11000 Belgrade, Serbia

Printed by
Serbian Academy of Sciences and Arts

Number of copies
300

ISBN 978-86-7306-153-5

PHOTONICA2019 (The Seventh International School and Conference on Photonica-www.photonica.ac.rs) is organized by Vinča Institute of Nuclear Sciences, University of Belgrade (www.vinca.ac.rs), Serbian Academy of Sciences and Arts (www.sanu.ac.rs), and Optical Society of Serbia (www.ods.org.rs).

Institute of Nuclear Sciences Vinča

Serbian Academy of Sciences and Arts

Optical Society of Serbia

Other institutions that helped the organization of this event are: Institute of Physics Belgrade, University of Belgrade (www.ipb.ac.rs), School of Electrical Engineering, University of Belgrade (www.etf.bg.ac.rs), Institute of Chemistry, Technology and Metallurgy, University of Belgrade (www.ihtm.bg.ac.rs), Faculty of Technical Sciences, University of Novi Sad (www.ftn.uns.ac.rs), Faculty of Physics, University of Belgrade (www.ff.bg.ac.rs), and Faculty of Biology, University of Belgrade (www.bio.bg.ac.rs). Joint event "Machine learning with Photonics Symposium" has been co-organized with programme partners H2020-RISE-CARDIALLY, H2020 – MULTIPLY and H2020-EID-FONTE.

PHOTONICA2019 is organized under auspices and with support of the Ministry of Education, Science and Technological Development, Republic of Serbia (www.mpn.gov.rs). PHOTONICA2019 is supported and recognized by OSA - The Optical Society (www.osa.org), Integrated Initiative of European Laser Research Infrastructures Laser Lab-Europe (www.laserlab-europe.eu) and European Physical Society (www.eps.org).

Ministry of Education, Science and Technological Development of the Republic of Serbia

OSA The Optical Society | 100 Since 1916

Laserlab Europe

EPS

The support of the sponsors of PHOTONICA2019 is gratefully acknowledged:

Microsoft Development Center Serbia

AMERICAN ELEMENTS THE ADVANCED MATERIALS MANUFACTURER®

THORLABS

NKT Photonics

OptoSigma

Telekom Srbija

mks Spectra-Physics | Ophir® | mks Newport®

Ocean Insight | laservision

Represented by LRM Ljubljana / Slovenija

Optical Society of Serbia

CENTER FOR THE PROMOTION OF SCIENCE

Optical fiber grating sensors for the measurement of superficial temporal artery pulsations

J. Krsic[1], M. Miletic[1], V. Atanasoski[2], Lj. Hadzievski[1] and M. Ivanovic[1]
[1]*Vinca Institute of Nuclear Sciences, Belgrade, Serbia*
[2]*University of Belgrade, Serbia*
e-mail: jkrsic@vin.bg.ac.rs

The measurement of arterial blood pressure waveform can provide important data about arterial health, from which general cardiovascular health can be estimated. The arterial blood pressure wave is created by heart contraction which then propagates along the arterial tree. Along its path, the pressure wave causes the distention of arterial walls which consequently can be palpated and measured as micro-movements on the surface of the body.

The most frequently used places on the body for recording of the blood pressure waveform are in the fingers and above the radial artery on the wrist. However, since waveforms recorded on the periphery of the body alter from central ones, there is the necessity for non-invasive measurements closer to the ascending aorta [1]. The purpose of this study was to evaluate the possibility of utilizing the superficial temporal artery (STA) as a potential candidate for obtaining arterial waveform recorded non-invasively by fiber grating sensors. The STA is a terminal branch of the external carotid artery and it represents the major artery of the head. The sites over the main branch (near the ear) and the frontal branch of the STA (near ocular area) are easily accessible ones with negligible amounts of fat and muscle tissues.

Assessment tests were carried out by using fiber grating sensors (fiber Bragg grating (FBG) and long-period grating (LPG)) as sensors of the arterial distention movement. Here we were focused on the possibility to record the STA pulsations in healthy volunteers when the sensors were just placed on the skin over the STA and fixed with the tape or elastic bandage. Our results show that with this type of application, LPG technology outperformed FBG in a sense of sensitivity and signal to noise ratio. The reason possibly lies in the fact that cladding modes generated by an LPG are much more affected by arterial distention than back-propagating core modes of an FBG [2]. By using LPG sensor we were able to record STA pulsations in all volunteers.

REFERENCES

[1] K. Y. Chin, R. B. Panerai, Physiol. Meas. 34, 407 (2013).
[2] T. Erdogan, J. Opt. Soc. Am. A 14, 1760 (1997).