*The **CREA**tion of the Department of Physical Chemistry of Biological Sys**TE**ms [CREATE]*

666295 — CREATE — H2020-WIDESPREAD-2014-2015/H2020-WIDESPREAD-2014-2

Publications on the border of chemistry/physics and biology

[Deliverable D.4.8]

Level of dissemination: Public

Warsaw, Febr. 2021

This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 666295

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1. Introduction

As a part of the CREATE project, the ERA Chair holder – prof. Maciej Wojtkowski – proposed a new research agenda for the Institute of Physical Chemistry, Polish Academy of Sciences (IPC). It employs methods, usually used in the chemistry and physics, to research biological systems. For the last 5 years the ERA Chair holder continued implementing this new research agenda at IPC, i.a. developing imaging techniques for medical diagnostics and use in biological research. He also collaborated and supported the researchers from the selected IPC research teams (synergistic teams) in their research. From this research some publications emerged and they are reported under this Deliverable.

This document was divided into two parts – the first part contains of the publications co-authored by the members of the Department of Physical Chemistry of Biological Systems (the ERA Chair holder's team) while the second lists publications of the members of the synergistic research teams implementing this new research agenda.

All publications are Open Access.

2. List of publications on the border of chemistry/physics and biology

2.1. Publications co-authored by the members of the ERA Chair

No.	Publication title	Journal	Authors	DOI
1.	*Twenty-five years of optical coherence tomography: the paradigm shift in sensitivity and speed provided by Fourier domain OCT*	**BIOMEDICAL OPTICS EXPRESS** 2017 |Vol. 8, No. 7 | 1 Jul | 3248-3280	Johannes F. De boer, Rainer Leitgeb, and Maciej Wojtkowski	https://doi.org/10.1364/BOE.8.003248
2.	*Classification of biological micro-objects using optical coherence tomography: in silico study*	**BIOMEDICAL OPTICS EXPRESS** 2017 Vol. 8, No. 8 | 1 Aug | 3606-3626	Paweł Ossowski, Maciej Wojtkowski, and Peter Rt Munro	https://doi.org/10.1364/BOE.8.003606
3.	*Optical coherence microscopy as a novel, non-invasive method for the 4D live imaging of early mammalian embryos*	**Scientific Reports** 2017, 7: 4165	Karol Karnowski, Anna Ajduk, Bartosz Wieloch, Szymon Tamborski, Krzysztof Krawiec, Maciej Wojtkowski, Maciej Szkulmowski	https://doi.org/10.1038/s41598-017-04220-8
4.	*Visual acuity in two-photon infrared vision*	**Optica** 2017 | 4 (12) | 1488-1491	Pablo Artal, Silvestre Manzanera, Katarzyna Komar, Adrian Gambin-Regadera,, Maciej Wojtkowski	https://doi.org/10.1364/OPTICA.4.001488
5.	*Assessment of the influence of viscoelasticity of cornea in animal ex vivo model using air-puff optical coherence tomography and corneal hysteresis*	**Journal of BIOPHOTONICS** 2018, e201800154	Ewa Maczynska, Karol Karnowski, Krzysztof Szulzycki, Monika Malinowska, Hubert Dolezyczek, Artur Cichanski, Maciej Wojtkowski, Bartlomiej Kaluzny, Ireneusz Grulkowski	https://doi.org/10.1002/jbio.201800154
6.	*Spatio-Temporal Optical Coherence Imaging–a new tool for in vivo microscopy*	**Photonics Letters of Poland** 2019 | 11 (2) | 44	Maciej Wojtkowski, Patrycjusz Stremplewski, Egidijus Auksorius, Dawid Borycki	https://doi.org/10.4302/plp.v11i2.905
7.	*High-speed OCT-based ocular biometer combined with an air-puff system for determination of induced retraction-free eye dynamics*	**BIOMEDICAL OPTICS EXPRESS** 2019 | 10(7) | 3663-3680	Alfonso Jiménez-villar, Ewa Mączyńska, Artur Cichański, Maciej Wojtkowski, Bartłomiej J Kałużny, Ireneusz Grulkowski	https://doi.org/10.1364/BOE.10.003663

8.	*Spatiotemporal optical coherence (STOC) manipulation suppresses coherent cross-talk in full-field swept-source optical coherence tomography*	**BIOMEDICAL OPTICS EXPRESS** 2019 | 10(4) | 2032-2054	Dawid Borycki, Michał Hamkało, Maciej Nowakowski, Maciej Szkulmowski, Maciej Wojtkowski	https://doi.org/10.1364/BOE.10.002032
9.	*In vivo volumetric imaging by crosstalk-free full-field OCT*	**Optica** 2019 | Vol. 6, No. 5 | 608	Patrycjusz Stremplewski, Egidijus Auksorius, Paweł Wnuk, Łukasz Kozoń, Piotr Garstecki, and Maciej Wojtkowski	https://doi.org/10.1364/OPTICA.6.000608
10	*Air-Puff-Induced Dynamics of Ocular Components Measured with Optical Biometry*	**Investigative Ophthalmology & Visual Science** 2019 | Vol.60 | 1979-1986	Ewa Maczynska, Jagoda Rzeszewska-Zamiara, Alfonso Jimenez Villar, Maciej Wojtkowski, Bartlomiej J. Kaluzny, Ireneusz Grulkowski	https://doi.org/10.1167/iovs.19-26681
11.	*System for psychophysical measurements of two-photon vision*	**Photonics Letters of Poland** 2019 | Vol. 11 (1) | 1-3	Agnieszka Zielińska, Karolina Kiluk, Maciej Wojtkowski, Katarzyna Komar	https://doi.org/10.4302/plp.v11i1.837
12.	*Fast method of speckle suppression for reflection phase microscopy*	**Photonic Letters of Poland** 2018 | 10(4) | 118	Patrycjusz Stremplewski, Maciej Nowakowski, Dawid Borycki, Maciej Wojtkowski	https://doi.org/10.4302/plp.v10i4.850
13.	*Enhancing microvasculature maps for Optical Coherence Tomography Angiography (OCT-A)*	**Photonics Letters of Poland** 2018 | 10(3) | 61-63	Mounika Rapolu, Paulina Niedźwiedziuk, Dawid Borycki, Paweł Wnuk, Maciej Wojtkowski	https://doi.org/10.4302/plp.v10i3.841
14.	*Impact diurnal variations of IOP on dynamic corneal hysteresis measured with air-puff swept-source OCT*	**Photonics Letters of Poland** 2018 | 10 (3) | 64-66	Karol Marian Karnowski, Ewa Mączyńska, Maciej Nowakowski, Bartłomiej Kałużny, Ireneusz Grulkowski, Maciej Wojtkowski	https://doi.org/10.4302/plp.v10i3.848
15.	*Two-photon imaging of the mammalian retina with ultrafast pulsing laser*	**JCI insight** 2018 | 3(17)	Grazyna Palczewska, Patrycjusz Stremplewski, Susie Suh, Nathan Alexander, David Salom, Zhiqian Dong, Daniel Ruminski, Elliot H Choi, Avery E Sears, Timothy S Kern, Maciej Wojtkowski, Krzysztof Palczewski	https://doi.org/10.1172/jci.insight.121555
16.	*Crosstalk-free volumetric in vivo imaging of a human retina with Fourier-domain full-field optical*	**Biomedical Optics Express** 2019 | Vol. 10, No. 12 | 6390	Egidijus Auksorius, Dawid Borycki, and Maciej Wojtkowski	https://doi.org/10.1364/BOE.10.006390

	coherence tomography			
17.	*Computational aberration correction in spatiotemporal optical coherence (STOC) imaging*	**Optics Letters** 2020 | Vol. 45, Issue 6 | 1293-1296	Dawid Borycki, Egidijus Auksorius, Piotr Wegrzyn, and Maciej Wojtkowski	https://doi.org/10.1364/OL.384796
18.	*Light-efficient beamsplitter for Fourier-domain full-field optical coherence tomography*	**Optics Letters** 2020 | Vol. 45, Issue 5 | 1240-1243	Egidijus Auksorius	https://doi.org/10.1364/OL.383823
19.	*Two-photon microperimetry: sensitivity of human photoreceptors to infrared light*	**Biomedical Optics Express** 2019 | Vol. 10, Issue 9 | 4551-4567	Daniel Ruminski, Grazyna Palczewska, Maciej Nowakowski, Agnieszka Zielińska, Vladimir J. Kefalov, Katarzyna Komar, Krzysztof Palczewski, and Maciej Wojtkowski	https://doi.org/10.1364/BOE.10.004551
20.	*In vivo imaging of the human cornea with high-speed and high-resolution Fourier-domain full-field optical coherence tomography*	**Biomedical Optics Express** 2020 | Vol. 11, No.5 | 2849-2865	Egidijus Auksorius, Dawid Borycki, Patrycjusz Stremplewski, Kamil Liżewski, Sławomir Tomczewski, Paulina Niedźwiedziuk, Bartosz L. Sikorski and Maciej Wojtkowski	https://doi.org/10.1364/BOE.393801
21.	*Keratoconus Detection Based on a Single Scheimpflug Image*	**Translational Vision Science & Technology** 2020 | June Vol.9 | | 36	Alejandra Consejo, Jędrzej Solarski, Karol Karnowski, Jos J Rozema, Maciej Wojtkowski, D. Robert Iskander	https://doi.org/10.1167/tvst.9.7.36
22.	*Frequency-doubled femtosecond Er-doped fiber laser for two-photon excited fluorescence imaging*	**Biomedical Optics Express** 2020 | Vol. 11, No.8 | 4431-4442	Dorota Stachowiak, Jakub Bogusławski, Aleksander Głuszek, Zbigniew Łaszczych, Maciej Wojtkowski, and Grzegorz Soboń	https://doi.org/10.1364/BOE.396878
23.	*Longitudinal in-vivo OCM imaging of glioblastoma development in the mouse brain*	**Biomedical Optics Express** 2020 | Vol. 11, No.9 | 5003-5016	Hubert Dolezyczek, Mounika Rapolu, Paulina Niedzwiedziuk, Karol Karnowski, Dawid Borycki, Joanna Dzwonek, Grzegorz Wilczynski, Monika Malinowska, and Maciej Wojtkowski	https://doi.org/10.1364/BOE.400723
24.	*Influence of tissue fixation on depth-resolved birefringence of oral cavity tissue samples*	**Journal of Biomedical Optics** 2020 | Vol. 25(9) | 096003-1	Karol Karnowski, Qingyun Li, Anima Poudyal, Martin Villiger, Camile S. Farah, David D. Sampson	https://doi.org/10.1117/1.JBO.25.9.096003
25.	*Time-domain diffuse correlation spectroscopy (TD-DCS) for noninvasive, depth-dependent blood flow quantification in human tissue in vivo.*	**Scientific Reports** 2021 | 11, Article number: 1817	Samaei, S., Sawosz, P., Kacprzak, M., Pastuszak, Ż., Borycki, D., & Liebert, A.	https://doi.org/10.1038/s41598-021-81448-5

2.2. Publications co-authored by the members of synergistic research teams

No.	Publication title	Journal	Authors	Synergestic team	DOI
1.	*Dense Layer of Bacteriophages Ordered in Alternating Electric Field and Immobilized by Surface Chemical Modification as Sensing Element for Bacteria Detection*	**ACS APPL. MATER. INTERFACES** 2017 | 9 | 19622−19629	Łukasz Richter, Krzysztof Bielec, Adam Lesniewski, Marcin Łos, Jan Paczesny, and Robert Hołyst	**SCM**	https://pubs.acs.org/doi/abs/10.1021/acsami.7b03497
2.	*Scaling Equation for Viscosity of Polymer Mixtures in Solutions with Application to Diffusion of Molecular Probes*	**MACROMOLECULES** 2017 | 50 | 4555−4561	Agnieszka Wisniewska, Krzysztof Sozanski, Tomasz Kalwarczyk, Karolina Kedra-Krolik, and Robert Holyst	**SCM**	https://doi.org/10.1021/acs.macromol.7b00545
3.	*Quantitative fluorescence correlation spectroscopy in three-dimensional systems under stimulated emission depletion conditions*	**Optica** 2017 |Vol. 4 | No. 8, Aug	Krzysztof Sozanski, Evangelos Sisamakis, Xuzhu Zhang, and Robert Holyst	**SCM**	https://doi.org/10.1364/OPTICA.4.000982
4.	*Nanoscopic Approach to Quantification of Equilibrium and Rate Constants of Complex Formation at Single-Molecule Level*	**J. Phys. Chem. Lett.** 2017 | 8 | 5785−5791	Xuzhu Zhang, Evangelos Sisamakis, Krzysztof Sozanski, and Robert Holyst	**SCM**	https://doi.org/10.1021/acs.jpclett.7b02742
5.	*High-Throughput Monitoring of Bacterial Cell Density in Nanoliter Droplets: Label-Free Detection of Unmodified Gram-Positive and Gram-Negative Bacteria*	**Anal. Chem.** 2021 | 93, 2 | 843–850	Natalia Pacocha, Jakub Bogusławski, Michał Horka, Karol Makuch, Kamil Liżewski, Maciej Wojtkowski, and Piotr Garstecki	**MCF**	https://doi.org/10.1021/acs.analchem.0c03408

**SCM - Research team of Soft Condensed Matter (head: Prof Robert Hołyst)*

MCF - Research team of Microfluidics & Complex Fluids (head: Prof Piotr Garstecki)