



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

MEETING REPORT

TOPIC AND DATES

MEETING TOPIC	MEETING DATE	REPORT DATE	PREPARED BY
The Belousov–Zhabotinsky reaction	25/10/2016	11/30/2016	Dawid Borycki

MEETING PARTICIPANTS

CREATE GROUP

Prof. Maciej Wojtkowski
Dr Patrycjusz Stremplewski
Dr Dawid Borycki
Michał Hamkało, M.Sc.

GUEST GROUP: CHEMICAL INFORMATION PROCESSING (CIP)

Prof. Jerzy Górecki

MEETING SUMMARY

Meeting discussion was started by CSCIP group. Prof. Górecki discussed the history, chemical basis and research developments on Belousov–Zhabotinsky (BZ) reaction, related to oscillatory chemical reactions in droplets. Next, the interesting results from CSCIP group achieved using BZ reaction were presented.

CREATE group was told on several research projects performed by CIP within the information processing. CIP presented several algorithms implemented using BZ reaction, e.g. basic logical gates (AND, XOR), parallel image processing, and also machine learning for tumor detection.

Finally, CIP group described their problems in visualizing BZ reaction in droplets. Optical imaging is the area of CREATE group expertise. To solve CIP's imaging problem, dr Stremplewski proposed an optical



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setup. The latter could utilize thermal effects to induce the oscillations of the absorbing layers of the sample. Three dimensional detection of the oscillations would be realized with full-field optical lock-in setup. Such optical arrangement can be possibly used to visualize chemical oscillations within droplets.

CONCLUSIONS AND FUTURE PLANS

From the CREATE group perspective oscillatory effects are very similar to those seen in optics. Specifically, one of the research topics is related to optical wave propagation in turbid media. Here, CREATE group also meets oscillatory (wave) effects but at much faster time-scale. Hence, some information processing ideas could be possibly explored using optics. This would significantly increase processing speed but as the first step CREATE group will try to design and develop optical system to visualize oscillatory effects in droplets to help solving urgent issues faced by CIP.



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