*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

Report on the visit of Prof. Pablo Artal

[WP3]

Level of dissemination: PUBLIC

Warsaw, May 2018

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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INTRODUCTION

Professor Pablo Artal was invited to the Institute of Physical Chemistry of the Polish Academy of Sciences (IPC PAS) by the ERA Chair holder, under a series of cyclical lectures on interdisciplinary emerging research.

The main goal of his visit was to:

- deliver a scientific seminar and participate in meetings with synergetic teams, to support mentoring activity of the ERA Chair holder,
- take part in the consultations on required changes at IPC to improve our performance.

Prof. Pablo Artal received his M.Sc. degree in Physics from the University of Zaragoza, Spain, and the Ph.D. degree in Physics (Optics) from the University Complutense of Madrid in 1988. He was a post-doctoral fellow at the Institut d'Optique, Orsay, France in 1989-90 and a senior researcher at the Instituto de Optica (CSIC) in Madrid from 1990 to 1994. Since 1994, he is full Professor of Optics at the University of Murcia, Spain. He spent several periods doing collaborative research in laboratories in Europe, Australia and USA. Since 2006 is the director of the Center for Research in Optics and Nanophysics at Murcia University. He is a member of SEDO, EOS, ARVO and SPIE. He was elected fellow member of the Optical Society of America (OSA) in 1999. Prof. Artal received a number of national and international research awards. Prof. Artal is the founder and director of the Laboratorio de Optica at the University of Murcia with about 20 co-workers. He has published more than 120 reviewed papers (with more than 3000 citations), presented more than 100 invited talks in international meetings and around 120 seminars in research institutions around the world. He has been funded by more than 4 Million € grant money since 1993 and is also a co-inventor in a number of international patents.

Mr. Artal's research interests are centered in the optics of eye and the retina and the development of optical and electronic imaging techniques to be applied in Vision, Ophthalmology and Biomedicine. He has pioneered a number of highly innovative and significant advances in the methods for studying the optics of the eye and has contributed substantially to our understanding of the factors that limit human visual resolution. In addition, several of his results and ideas in the area of ophthalmic instrumentation over the last years have been introduced in instruments and devices currently in use in Vision and Ophthalmology. During the last years, he built from scratch an Optics Laboratory in Murcia University (south-east Spain), a location without any previous tradition in Optics. He was instrumental to continuously attract external financial support from government and private international companies. Pablo Artal is a pioneer in exploring the human eye with new technologies and designed new ways of optical corrections that will improve vision in patients. Several of his proposed solutions and instrument are currently in use in the clinical practice. He is dedicated to the excellence in basic research to be transferred to real life applications.

COURSE OF THE VISIT

The visit took place between 22-24 May 2018 [see annex 1 for agenda] and included planned seminar lecture and several meetings at IPC PAS. Last day was dedicated to the visit at Nicolaus Copernicus University in Toruń, in a laboratory cooperating with the ERA Chair holder Group.

During the first day of his visit, Prof. Artal delivered a seminar titled ***"Optics for better vision"***. The seminar was held in the assembly hall of the IPC PAS. All researchers and PhD students employed in the IPC PAS were invited to participate in this seminar - the seminar was attended by approx. 70 people.

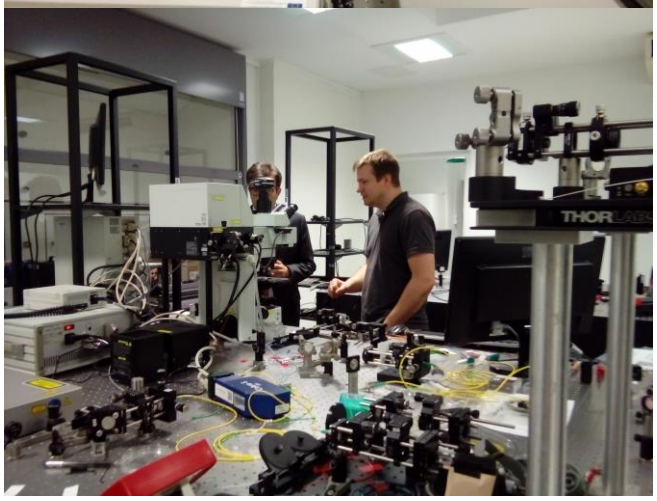
The seminar of Prof. Pablo Artal, assembly hall, 19 June 2018

Abstract of the seminar

The human eye is a simple optical system, but very well adapted to the special requirements of our visual system. A better understanding of the optical physics properties of the eye allowed to develop new technologies to improve vision in many people.

Topics: presentation of several recent results ranging from the nature of the lens movements, the development of new types of intraocular lenses to new opto-electronic instruments for the correction of cataracts and presbyopia.

Apart from the seminar, there were several laboratory visits planned on 22 May 2018. Professor Artal met with members of Physical Optics and Biophotonics group, as well two selected synergetic groups from Institute of Physical Chemistry PAS. The aim of these laboratory visits was to familiarize Pablo Artal with IPC PAS, establish contacts with synergic groups supporting the ERA Chair holder team and discuss the possibility for future cooperation:

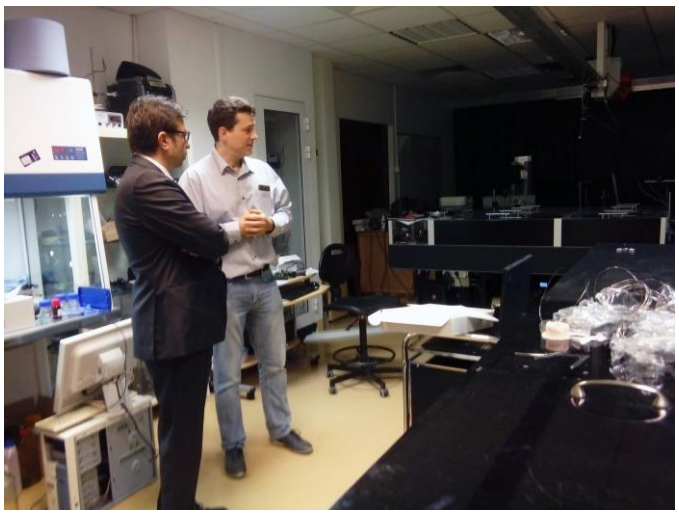


Physical Optics and Biophotonics Group, Department of Physical Chemistry of Biological Systems

Professor Artal met with selected POB group members including the head of the group - prof. Maciej Wojtkowski, ERA Chair holder. The guest was introduced to POB's high throughput swept source full field OCT system.

Department of Soft Condensed Matter, Microfluidics and Complex Fluids Research Group

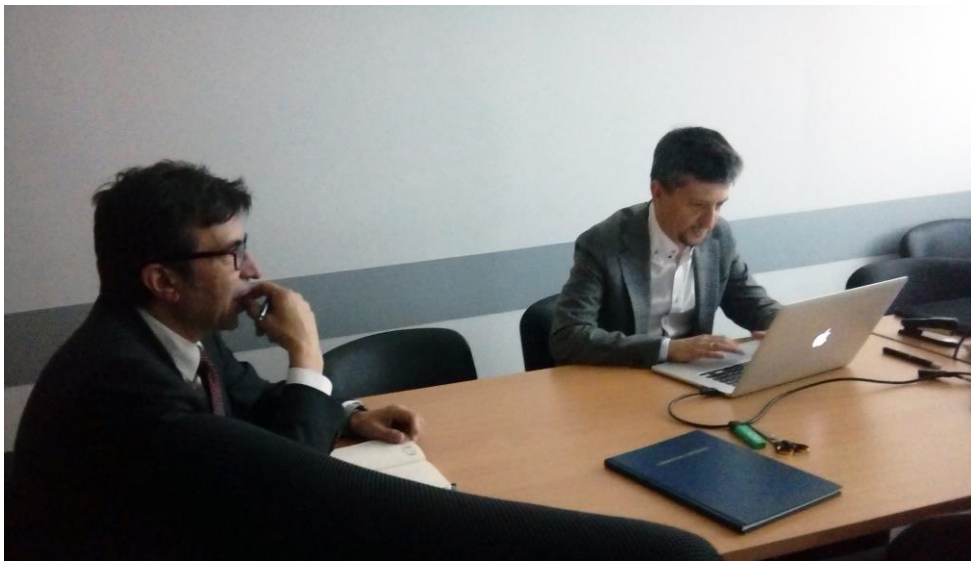
Prof. Blumberger visited laboratories of the Soft Condended Matter Group, where he was guided by PhD student, Kinga Matuła. The visit was focused on the examination of influence of physical and chemical factors on growth and evolution of living cells.



Department of photochemistry and spectroscopy, Laser Centre

Laser Centre Group is focused on development and exploration of experimental techniques to study ultrafast physical and chemical processes. Dr. Stepanenko presented numerous experimental systems, e.g. Yb:fiber femtosecond laser amplifier for micromachining applications and time-resolved Raman spectroscopy setup based on home-built femtosecond noncollinear optical parametric amplifier laser source.

On the second day of the visit, Prof. Artal had a meeting with ERA Chair project management team, to share his ideas regarding most valuable changes at the Centro de Investigación Óptica y Nanofísica which improved the excellence in research there and how to apply them at IPC PAS. Discussed topics included professional management of research institution and ways to ensure sustainability of such organization.



Meeting with CREATE Management team, 23 May 2018

Last day was focused on a working visit at Nicolaus Copernicus University in Toruń with the members of Optical Biomedical Imaging Group form the Institute of Physics, to execute several measurements.

ANNEX 1.

Full agenda of the visit

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CREATE lectures

The Institute of Physical Chemistry of the Polish Academy of Sciences

Agenda

22 May 2018

9:30 – 11:40 am **Lab visits**

Physical Optics and Biophotonics Group (POB), Department of Physical Chemistry of Biological Systems:

9:30 – 9:45	**Prof. Maciej Wojtkowski**
9:45 – 10:00	**Dawid Borycki, PhD**
10:00 – 10:15	**Łukasz Kornaszewski, PhD**
10:15 – 10:30	**Paweł Wnuk, PhD**
10:30 – 10:45	**Mounika Rapolu**
10:45 – 11:00	**Egidijus Auksorius, PhD**

Laser Centre, Department of photochemistry and spectroscopy:

11:00 - 11:20 am **Yuriy Stepanenko, PhD**

Soft Condensed Matter Group, Department of Soft Condensed Matter:

11:20 - 11:40 am **Kinga Matuła**

11:40 – 1:00 pm **Lunch break**

1:00 – 2:00 pm **Seminar – Prof. Pablo Artal**

"Optics for better vision"

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23 May 2018

10:00 – 11:00 am **Meeting with ERA Chair Project Coordinator and ERA Chair holder**

Short discussion, visit summary and recommendations for IPC PAS

24 May 2018

Visit to Nicolaus Copernicus University in Toruń, Institute of Physics.

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