*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

Full report on promotion, dissemination and industry migration, including impact assessment of this activity

[Milestone MS8]

Warsaw, March 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

This document contains the specification of activities aimed at **CREATE project promotion** using electronic and traditional media **(actions taken within WP6)** as well as the specification of activities aimed at **knowledge transfer** such as open business lectures, the conference "Where biology meets physical chemistry and business" and ELAD+ database **(actions taken within WP5)**.

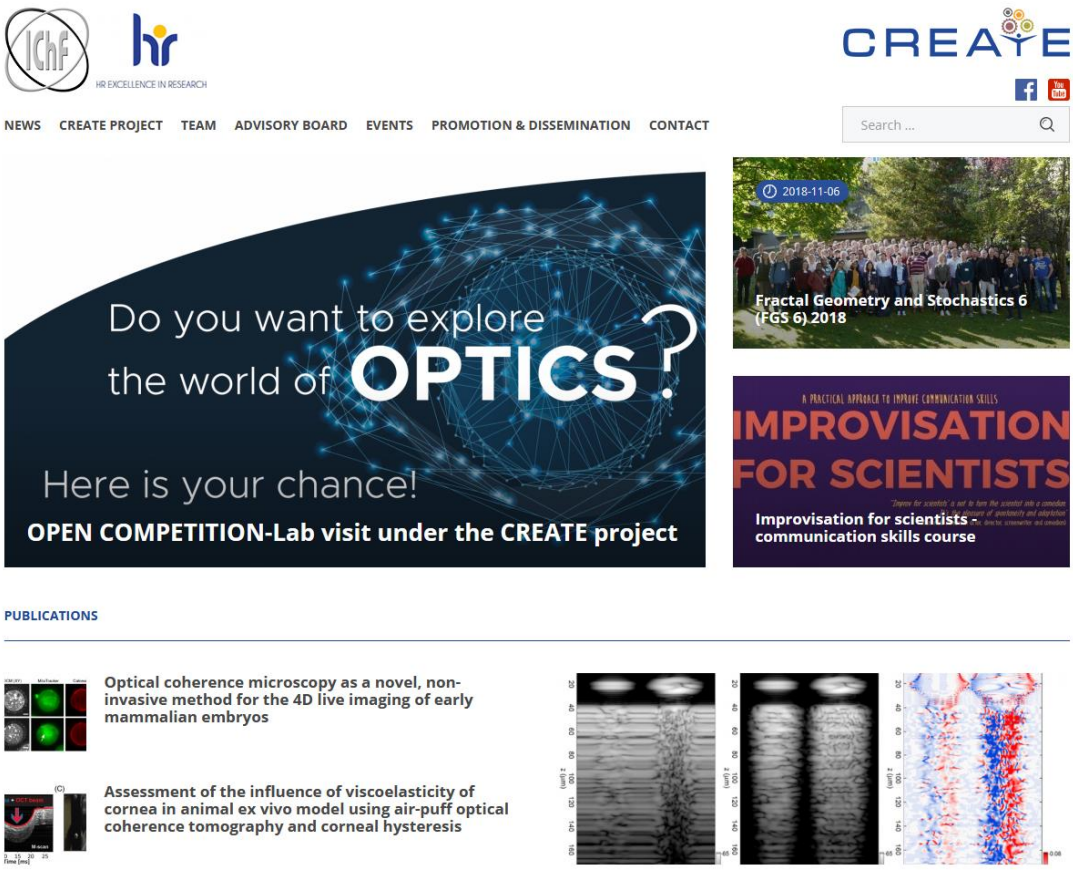
2. Electronic promotion of the CREATE project

2.1 CREATE website

Under WP6 a **project webpage** (www.create.edu.pl) was designed and launched. The CREATE webpage contains current information related to the implementation of the project, incl. description of:

- the project objectives,
- individual work packages,
- structure of the new Department,
- the profile and achievements of the ERA Chair holder,
- profiles of researchers employed at the new Department,
- research infrastructure and equipment of the new lab,
- events related to the project implementation, i.e. lectures, symposia, conferences, etc.

Besides, the project webpage contains EU emblem and the following text: *"This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 666295."* The webpage is kept active and regularly updated, using materials from events organised by the Institute, delivered lectures, and photos from these events.



Moreover, the CREATE webpage is regularly updated and enriched with new information consistent with the needs of IPC stakeholders (public institutions, companies, authorities & investors). Recently we have added the list of publications and patents. All reports having "PUBLIC" status are also placed on the webpage.

To make the project more visible – a **logotype** of the project was designed and uploaded to the project webpage.

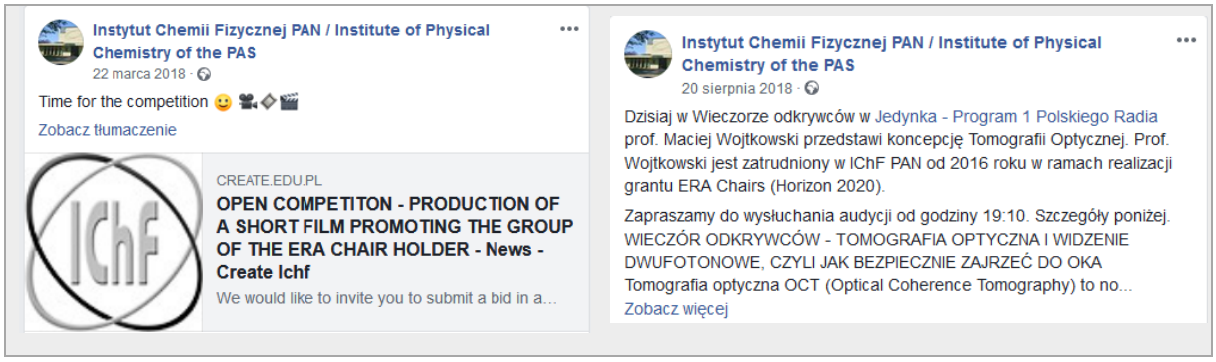
2.2 Social network channels: Facebook, Youtube

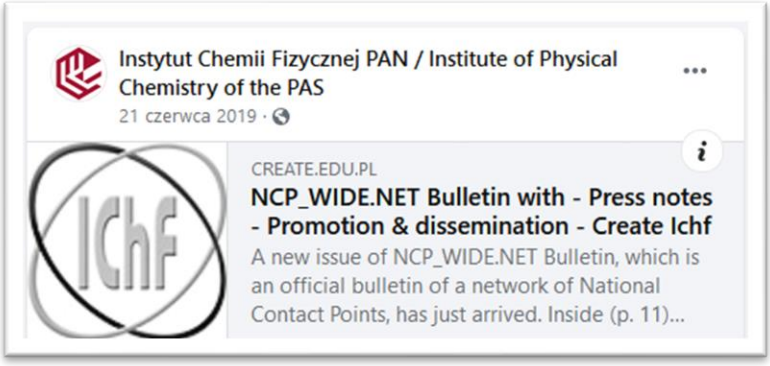
IPC Facebook profile and IPC YouTube channel are subsequently supplemented with relevant information related to the progress of the CREATE project (**54 posts**) – examples below:

Facebook:

- ✓ *Winner of the top scientific prizes in Poland to create a new department at IPC PAS*
- ✓ *The best will establish a new Chair: The launch of the prestigious ERA Chair grant competition*
- ✓ *Meanwhile, in POB - Physical Optics & Biophotonics. We are making STAR WARS SCIENTIFIC episode.*
- ✓ *22 Science Picnic – Movement*
- ✓ *Children Science Festival*
- ✓ *Open day in Physical Optics and Biophotonics group*
- ✓ *Lessons with prof. Wojtkowski at the IPC PAS*
- ✓ *Look what we have created!*

- ✓ *CREATE in the NCP newsletter*
- ✓ *I-POB conference*





YouTube:

- ✓ *Light is an amazing phenomenon*
- ✓ *Industrialization Potential of Optics in Biomedicine. i-POB by POB*
- ✓ *i-POB by POB*
- ✓ *Reakcje samozapłonu (Self-ignition reactions)*
- ✓ *Dwutlenek węgla i efekt cieplarniany (Carbon dioxide and the greenhouse effect)*

2.3 Press notes – an electronic version

Press notes are an effective way to disseminate the project's results and arousing the interest of various target groups. The following press articles related to CRETAE project were prepared and published at the project, IPC, Alpha Galileo and/or EurekAlert! websites as well as on Facebook:

- *The European ERA Chair grant awaits a top academic,*
- *The best will establish a new Chair: The launch of the prestigious ERA Chair grant competition,*
- *Winner of the "Polish Nobel Prize" to create a new department at the IPC PAS,*
- *Inspiration needs new tools,*
- *IPC PAS starts cooperation with a leading university in China*
- *State Key Laboratory of Medicinal Chemical Biology signed an Agreement with Institute of Physical Chemistry - Polish Academy of Sciences* (Nankai University in China website)
- *The Polish physicist is revolutionising global diagnostics (*Rzeczpospolita newspaper, in addition "Development of research in medicine and biotechnology", p. 4) – interview with the ERA Chair holder and prof. Marcin Opallo, IPC Director
- *Small droplets are a surprise: they disappear more slowly than they should*

- *With more light, chemistry speeds up*
- *A new device under development for a more effective fight against antibiotic-resistant bacteria* (additionally at BacterOMIC Ltd. website)
- *The new method of analysis in record high speed DNA assay device*
- *A super resolution view of chemical reactions*
- *Photoreactors the size of a hair*
- *SERSitive: New substrates make it possible to routinely detect one molecule in a million*
- *NCP_WIDE.NET Bulletin about CREATE*
- *Cells: live stream*
- *The CREATE project presentation at NCP in Warsaw*
- *CREATE among most recent success stories on DG Research portal*
- *To see the Invisible*
- *Look into the mirror*
- *Industrialisation Potential of Optics in Biomedicine conference*

The purpose of publishing the abovementioned articles was to:

- spread information on opening call for the position of the ERA Chair holder,
- promote the CREATE project,
- promote a candidate (namely: Professor Maciej Wojtkowski) selected for the position of the ERA Chair holder,
- spread information on the conference organised under CREATE,
- promote the new specialisation.

It is aimed at improving visibility and positioning IPC better at the regional, national and international level. The press notes are mainly dedicated to the increase of awareness of the society and promote a profession of a researcher as a valuable and satisfying career path.

Moreover, three articles promoting the CREATE project were published on external websites:

- **"ERA Chairs: where innovation is CREATED" at NCP_WIDE.NET Bulletin** https://www.ncpwidenet.eu/wp-content/uploads/2021/01/NWN_Bulletin-5edition_May-2019.pdf
- **"Keeping a closer eye on non-invasive microscopic bio-imaging" at DG Research and Innovation, EU** https://ec.europa.eu/research/infocentre/article_en.cfm?artid=50685
- **CZELO Brochure: Good Practice Examples of H2020 Projects in Visegrad countries** https://czelo.tc.cz/en/we-recommended/czelo-brochure-good-practice-examples-of-h2020-projects-in

2.4 Scientific Chairs

A promotional film on the CREATE project was published in September 2019.

How light affects humans? How we perceive it and react to it? How one can conquer and harness the light to work for us and make our life longer, better. The ERA Chair holder and his team members talk about their light related fascinations, research, and new challenges.

It was displayed during different events, including IPC seminars, symposia and during the beaks of the conference "Where biology meets physical chemistry and business".

The full film has been deposited at our YouTube channel:

https://www.youtube.com/watch?v=sgsNGPhYV_I

3. Traditional promotion of the CREATE project

3.1 Promotional materials

To make the CREATE project visible, we have prepared and distributed the following promotional materials:

- ✓ **Pencils, pens, mugs, notebooks, and bags** were distributed during the 1st and 2nd scientific symposia. These promotional materials were marked with the CREATE project's logotype, the source of funding, and the project website/POB website.

- ✓ **T-shirts** with CREATE logo and the source of funding have been prepared to promote the projects during Science Picnics and Children Science Festivals:

- ✓ **Rollup** with the logotype of the project and the source of funding was designed to make the project more visible during public events (on the left) as well as **rollup** promoting the i-POB conference was prepared and presented as a background during the event (on the right):

✓ **<u>Banners and posters with a QR code linking to the film "Light is an amazing phenomenon</u>**"- the film promoting the group of the ERA Chair holder. The banners were placed on the fence of the Institute of Physical Chemistry, Polish Academy of Sciences (IPC), while the posters were placed on the notice boards at IPC:

- ✓ **Posters promoting the CREATE 1st and 2nd Scientific Symposium** with the project logo and source of funding was designed and distributed to increase the visibility of the project and increase the dissemination of the events.

Moreover, to increase the visibility of the CREATE project, the following promotion measures were taken:

- **Advertisements for all positions** contained information that it was a part of the CREATE project and were marked with the project logotype and information on the source of funding.
- **Infrastructure and equipment purchased under the CREATE project**, as well as labs and rooms of the employees of the new Dept. were marked with labels containing information on project funding.
- **Contracts for visiting professors and other incoming guests** were supplemented by project logotype and information on the source of funding.

3.2 Participation in fairs, informational events and international conferences

As part of activities supporting the promotion of the project, the following events took place:

- **"Cognitive adventures" conference** (ca. 200 participants), 10/2017, Poland

The conference was an attempt to integrate current knowledge on the subject of learning with the aim to improve education in STEM subjects (science, technology, engineering and mathematics). During the conference, Dr. Roman Luboradzki & Aleksandra Kapuścińska-Bernatek presented 2 posters: "Chemical Experiments – the Way to Show and Explain Research Results to Non-specialists" and "Simple Steps to Knowledge".

- **Widening Lithuanian Research Potential** (ca. 70 participants), 11/2017, Lithuania

The aim of the conference, attended by dr Patrycja Nitoń & dr Monika Kuczyńska-Wydorska, was to discuss H2020 measures under "Spreading Excellence and Widening Participation" & share experiences related to applying and participating in the Teaming, Twinning and ERA Chairs projects. Patrycja presented the CREATE project.

- **Inspiration Day** (ca. 100 participants), 02/2018 and 02/2019, Poland

"Inspiration Day" was organised by the Warsaw Rotary Club at the orphanage in Gostynin. The purpose of the event was not only to popularise science but also to show young listeners various possible ways of personal development. Roman showed experiments related to optics and spectroscopy: spectroscope, the spectrum of different light sources, Newton's disk & Bencham's disk.

- **4. EDITION OF THE COMPETITION "THE GLASS & EYE"** (ca. 200 participants), 03/2018, Poland

The Institute took the patronage of this event, organised by the Saint Thomas Aquinas Primary School, Junior High and High School in Józefów. The aim of the competition was to popularise natural sciences among students, to identify talents and to stimulate the cognitive curiosity and creative activity of students. Dr. Roman Luboradzki was a member of the Competition Jury and gave a lecture on "What is modern chemistry?". The lecture presented, among others, modern analytical methods, including physicochemical imaging methods developed by the group of prof. Wojtkowski.

- **The Science Picnic in Nidzica** (ca. 500 participants), 04/2018, Poland

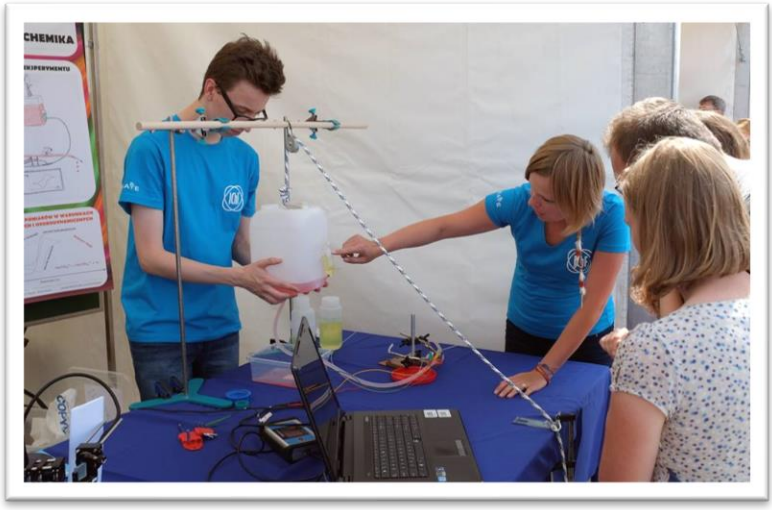
Dr. Roman Luboradzki/ Aleksandra Kapuścińska-Bernatek presented experiences in optics, mixing colors, Benham's and Newton disc. Participants could also experiment on their own and create a Benham's disk by own project. Dr Luboradzki also gave a short interview for the local television on the course of the demonstration, as well as IPC itself its profile.

- **22. Science Picnic – Movement** (ca. 100 K participants, IPC stand - ca. 2 K), 06/2018, Poland

  23. Science Picnic – We and the machines (ca. 50 K participants), 05/2019, Poland

Dr. Roman Luboradzki/ Aleksandra Kapuścińska-Bernatek presented several experiments connected to the main theme and to research conducted by ERA Chair Holder's research group - The Physical Optics & Biophotonics Group. PCBS presented effects that can be obtained by using an ultrafast camera and several optic experiments. The IPC employees also presented Newton's and Bencham's disk as related to both optic and movement as well as demonstrations related to electrochemistry and reaction kinetics. They also prepared demonstrations related to mechanochemistry, Raman spectroscopy and new materials.

As the Picnic is usually visited by audiences of all ages, our stand was intended for both children and adults representing different levels of chemical knowledge.



- **ESOF 2018** (ca. 4 K participants, "Science in the City"- ca. 200), 07/2018, France

Dr. Roman Luboradzki/ Aleksandra Kapuścińska-Bernatek presented a poster: "An experiment - a powerful tool in science popularisation (use it wisely)" describing their experience in popularising science. They have described activities such as Open Day lectures [part of the CREATE project], Research Workshops and Internships, and Student Internships, as well as 'The Sparks at the Interface of Sciences - University of Young Explorers', an educational project for primary school students. In addition, they took part in science in the City' festival and presented experiments related to optics and camera Obscura. Their show was entitled 'Pinhole in the City'.

- **22. Science Festival** (ca. 160 participants), 09/2018, Poland
  23. Science Festival (ca. 160 participants), 09/2019, Poland

The idea of the festival to show the scientists workplace: laboratories, experimental and seminar rooms. Speakers are scientists working in public institutions. This formula allows to show demonstrations and experiments and makes an opportunity to visit laboratories. During the Festival, IPC delivered different lectures dedicated to both primary and secondary school students:

- "**New Technologies in the Imaging of Living Tissues and Cells"** – lesson developed and delivered by prof. Maciej Wojtkowski, dedicated to students of the last year of high school

interested in research and science. The lecture discussed the latest problems of optical imaging and the achievement of this field, however, in a form accessible to non-advanced listeners.

- **"Gases, liquids, solids"** – lesson with experiments and hands-on activities focused on states of matter and phase transitions, also underlining the role of the experiment in natural sciences. The lesson was delivered by dr Roman Luboradzki.
- **"How physicist and chemist look at life - what for a biologist needs physicochemistry?"** – lesson combining history and latest achievements in the field of optical imaging (delivered by dr Roman Luboradzki).

➢ **"Children Science Festival"** (IPC stand - 200 participants) 09/2018 and 09/2019, Poland

The Institute proposed appropriately adapted experiments in optics and physiology of colour perception, combined with workshops and hands-on activities. It was also a perfect opportunity to activate young researchers and PhD students who took part in the festival as volunteers.

- **Presentation delivered by the Project Manager, Agnieszka Tadrzak, promoting the CREATE project (meeting organised by Regional Contact Point):**

The presentation entitled "*CREATE project at IPC - experience of the preparation and implementation of an ERA Chairs grant*" was delivered as a part of an event: "*The ERA Chairs project as a chance of development of a research unit*" took place in Cracow on the 24th Oct. 2016. Ca. 60 persons participated in the event. The meeting was a good occasion to advise other research units on how to apply for the ERA Chairs grant and share experiences related to the project.

- **Twinning and ERA Chairs for the advanced** (ca. 50 participants), 09/2019, Poland

The aim of the workshops, led by Agnieszka Tadrzak, was to discuss H2020 measures under "Spreading Excellence and Widening Participation" and the key success factors when applying for the Teaming, Twinning and the ERA Chairs projects.

Agnieszka Tadrzak, the CREATE project manager, presented the CREATE project. She shared the experiences in the preparation of a project application, the course of the CREATE project and its main results. This event allowed promoting the CREATE project as well as prof. Wojtkowski as the ERA Chair holder.

3.3 The organisation of local events

- **Open Days in IPC**

To promote the new Department, new specialisation and the IPC PAS the Open Days in X-ray lab [headed by Dr Luboradzki] and optical lab [headed by Prof. Wojtkowski] were organised. Scientists talked about their work, problems and performed some laboratory demonstrations. Participants had the possibility to see unique research equipment and learn more about the results that can be obtained through its use.

- **Open day in the X-ray laboratory**

  Visits in the X-ray laboratory included a demonstration of the X-ray diffractometer and preparation of the monocrystalline sample. Participants could prepare their own sucrose crystal samples and check what diffraction pattern they will get. Dr Luboradzki, the head of the lab, explained first of all the importance of knowledge of the crystal structure in modern chemistry and physics. He mentioned the correlation of the structure of the molecule with its reactivity and chemical properties. He also talked about the difficulties associated with the measurement of very complex molecules such as proteins or DNA and the fascinating history of crystallography. The discussion also focused on more general topics such as symmetry and its impact on everyday life. The visit took place on April 23th, 2017 and gathered about 25 people.

- **Open days in Physical Optics and Biophotonics group**

  On May 21th, 2018 and October 21, 2019, Prof prof. Wojtkowski and his POB team hosted totally about 50 visitors in his laboratory. Participants had the opportunity to see the unique, non-commercial equipment used during the research and listen prof. Wojtkowski talked about optical imaging of living tissues – the main research task. He discussed the latest problems of optical imaging and the achievement of this field, however, in a form affordable to non-advanced listeners. Additionally, visitors had the opportunity to observe simple experiments showing such optical phenomena as diffraction, interference or deflection of light. They could also build and test their own simple optical system using an optical table, lasers and professional equipment.

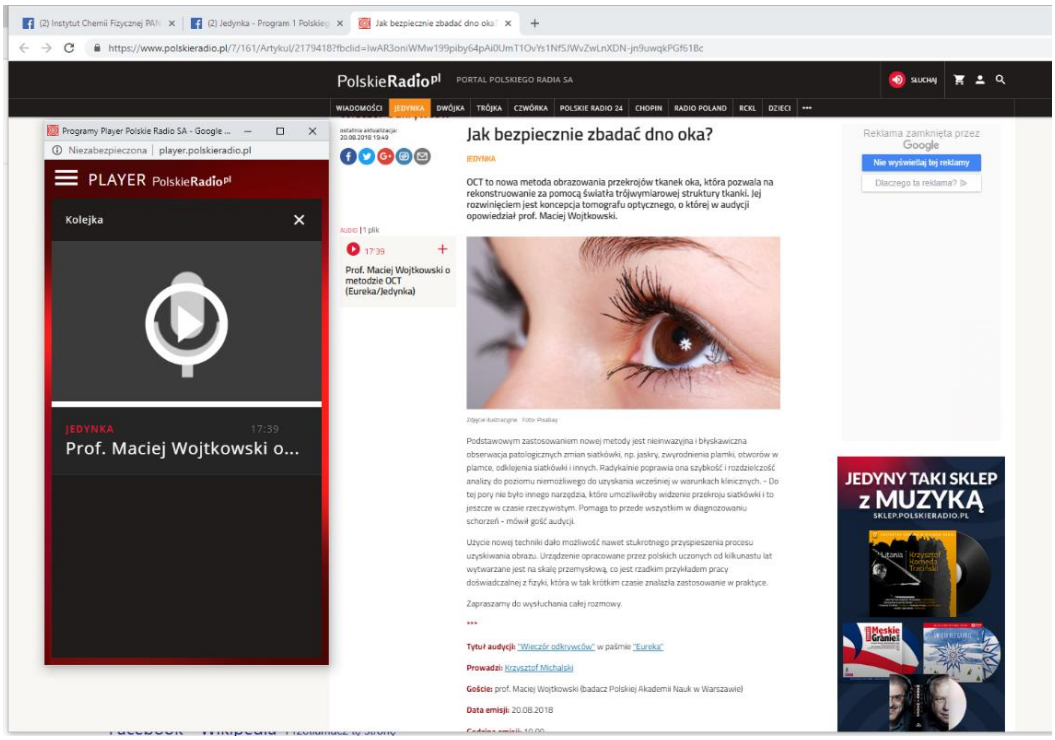
- **Popular Science Lectures**

The cycle of Popular Science Lectures proved to be so popular that we decided to include them into our regular offer.

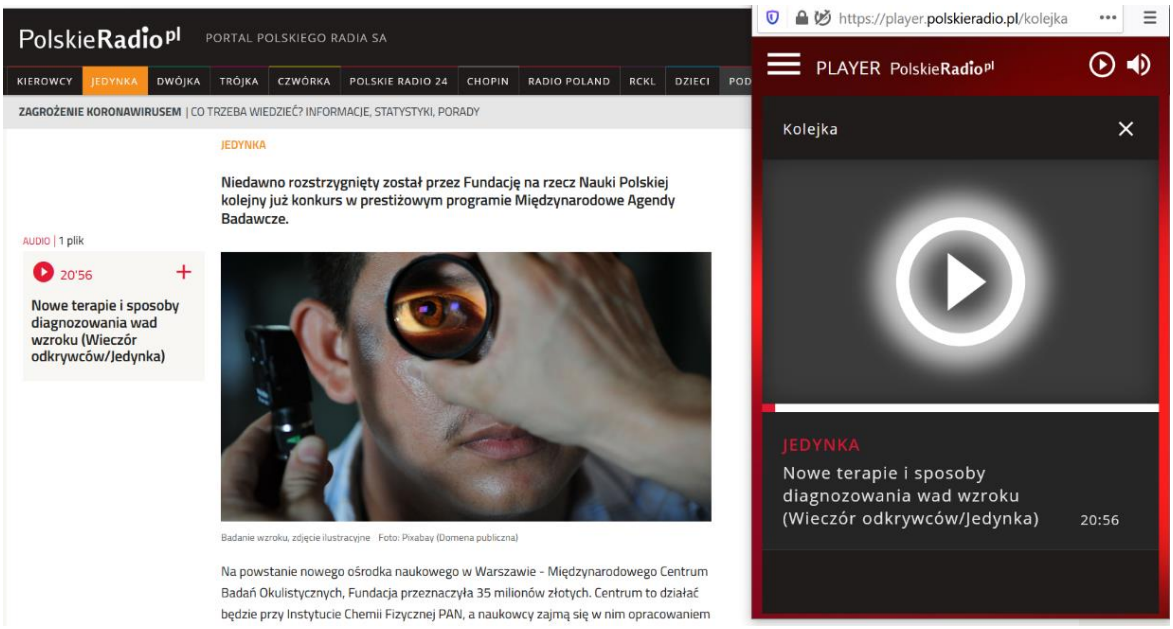
The lecture *"Gases, liquids, solids"* with experiments and hands-on activities (lecturer - dr Roman Luboradzki) was dedicated to Secondary Schools and High Schools students. During 47 lessons we hosted about 1720 students. Additionally, **the lesson entitled *"How physicist and chemist look at life - what for a biologist needs physicochemistry?"* was delivered**. The lesson was shown for the first time as part of the 21. Science Festival in 2018 and now is a part of IPC regular educational activities. The scenario was created in cooperation with prof. Wojtkowski group and contains some of their research results.

3.4 Others

- **Interview with professor Maciej Wojtkowski – 1st Program of the Polish Radio (20 Sept., 2018)**



- **Interview with professor Maciej Wojtkowski – 1st Programme of the Polish Radio (20 Febr., 2019)**



4. Open Access database – ELAD+

Under Noblesse project (FP7), the IPC created an **Electronic Laboratory Equipment Database (ELAD)**. The main aim of ELAD was to accumulate information on laboratory equipment resources of IPC and collaborating research units in the region with the objective of its popularisation. ELAD helped to:

- **establish relations and new common research projects** between research entities and enterprises,
- **widen the range of exploitation of laboratory equipment available at IPC** for a wide group of potential users from research and industrial area.

However, to enhance collaboration, IPC identified the need to supplement this database by information on the fields of expertise of our researchers and inventions offered for business application (ELAD+). It aimed to strengthen collaboration, i.a. providing our stakeholders with IPC researchers contact details and information on the ownership of the patent rights.

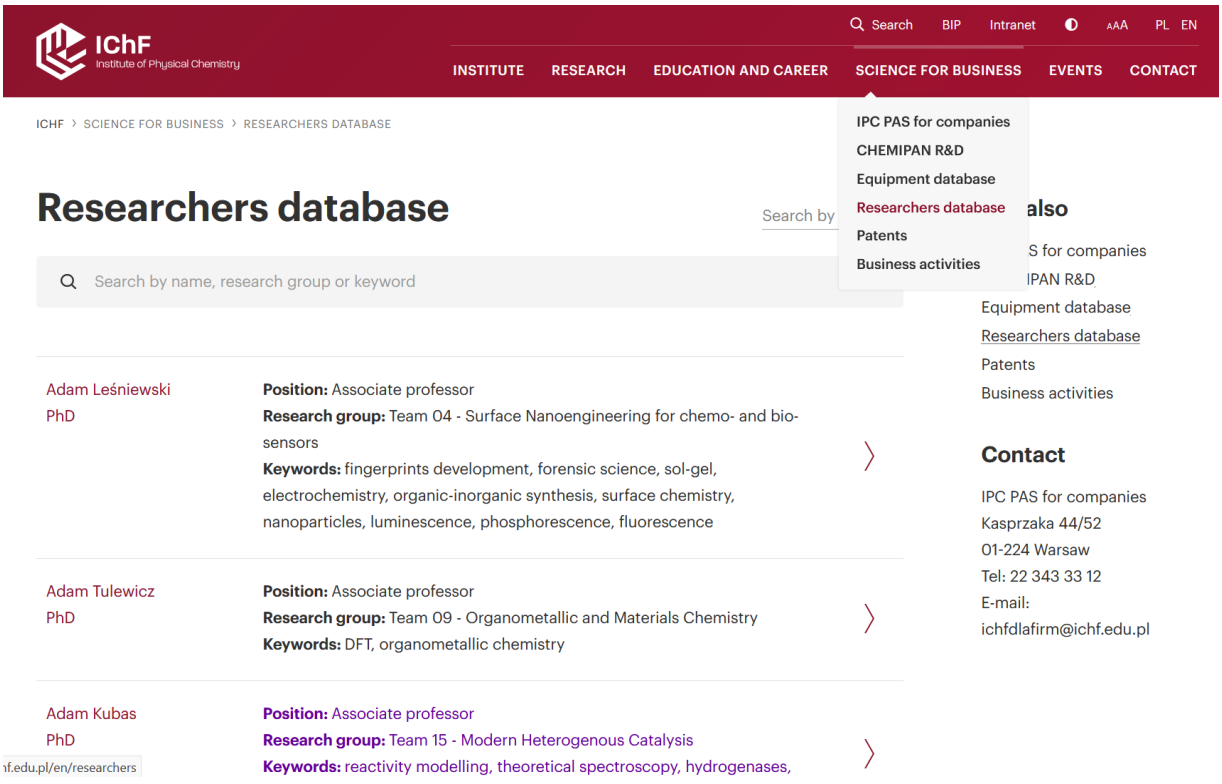
The extended database was called ELAD+. The database is available in Polish and English.

Since recently, we have also launched a revamped webservice for our stakeholders with a new IPC visualisation (including a new logo). The ELAD+ database was transferred to this new webpage (subpage: "Science for business").

To the previous version of ELAD we have added new modules (forming the new ELAD+ database), such as:

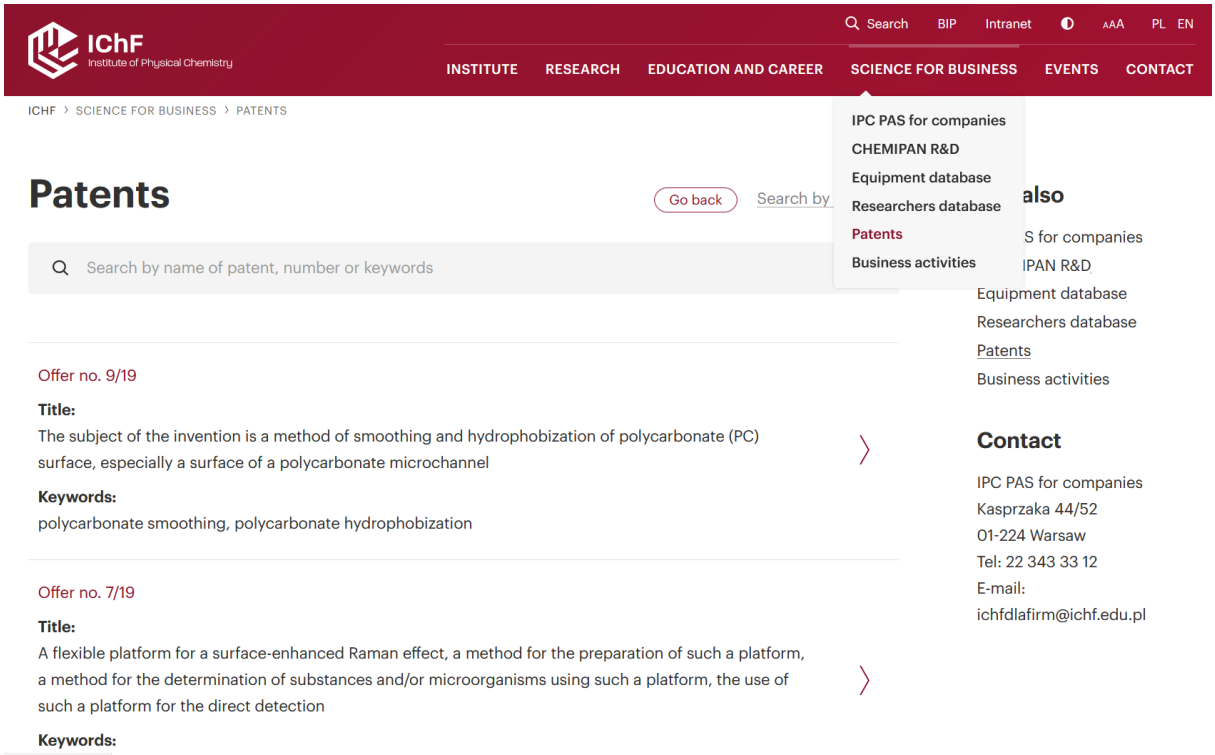
a) **"Researchers"** (https://ichf.edu.pl/en/researchers):

The module lists the fields of expertise of IPC and, in detail, our researchers (incl. the new IPC specialisation – i.e. chemistry inspired by biology). Users may search the records using a dedicated machine broken by: researcher's name, research group or keywords. **Currently, this module has 155 records** (only those scientists who agreed to be listed).



b) **"Patents"** (https://ichf.edu.pl/en/patents):

The module specifies industrial protection rights, i.e. patent applications or granted patent rights, securing research results. Users may search the records using a dedicated machine by: subject, offer no., title, summary and keywords. This module has 83 records.



5. Conference "Where biology meets physical chemistry and business"

The conference entitled "Industrialization Potential of Optics in Biomedicine" was organised to promote the new ERA Chair of IPC, its expertise and excellence, and to increase the new Department's visibility and new specialisation. The conference took place on the 7th and 8th of October, 2020, and due to the pandemic, the event had an online form.

All lectures and talks were broadcast via the conference channel (Pine conference platform) and streamed live on YouTube and FB.

To promote this event, we have designed and launched a conference website - http://i-pob.edu.pl/. The webpage contained all information related to the event, incl. description of the conference, keynote speakers specification, conference programme, information on how to register to the event.

The conference focused on the past, current and future developments of optical biomedical imaging techniques. The i-POB conference programme provided an opportunity to share the experience and tribulations of taking discovery to the global market, successfully implementing new technologies and running the high-tech company. It provided a platform for interaction between scientist, innovators and entrepreneurs. It was especially instructive for junior researchers and inventors interested in the development of novel imaging technologies. On the second day, we also organised a poster session to stimulate the development of young scientists. The best posters were awarded diploma and an offer to join the ERA Chair for internships.

The video reportage from the i-POB conference is available on the IPC YouTube channel: https://www.youtube.com/watch?v=uT95u__Svkk

Full conference recordings are available here:

Day 1 – https://www.youtube.com/watch?v=IxQWSGfwRgo&t=2256s
Day 2 – https://www.youtube.com/watch?v=iaok1UukKVw&t=6s

6. "Innovation source" lectures

Under WP5 a series of lecture, "Innovation source" was organised at the Institute of Physical Chemistry PAS (IPC). The purpose of these lectures is to update scientists' knowledge of current technological trends and innovation in chemistry-related sectors, support researchers interested in the commercial application of their own ideas, as well as the establishment of relations with industry.

Name:	**Sarai Kemp**
Position/Institution:	**Trendlines company, Israel**
Date:	**26/10/2016**

***"The Israeli start-ups' eco-system* - How to commercialise technologies from the Academia"**

During the lecture, Sarai Kemp referring to the Israeli start-up ecosystem, listed the greatest challenges needed to be overcome in order to successfully commercialise research results. The interactive way of conducting the lecture allowed for an active discussion. The whole society of IPC, including all the IPC researchers, and doctoral students was invited.

After the lecture, Sarai Kemp visited several laboratories and research groups of the Institute, as well as two spin-off operating on the premises of IPC. These meetings enabled individual researchers to consult problems they face at various stages of commercialisation of their research results.

Name:	**Vincent Laban**
Position/Institution:	**CFO of VSParticle - a Dutch startup company from Delft University of Technology**
Date:	**28/03/2017**

"VSParticle: spin-off company of the Technical University Delft – Production of nanoparticle"

The course of lecture:

- ✓ description of Vincent Laban career path – from a researcher, through an employer of a corporation to an entrepreneur and at the same – an employer;
- ✓ **history behind the establishment of his spin-off company**, indicating some of the biggest challenges which founders (scientists and young entrepreneurs at the same time) need to face at the first stage of running own business.
- ✓ defined the **timeframes and resources** needed to transfer the ideas from the laboratory to business unit
- ✓ explanation of methods used by VSParticle to produce the particles
- ✓ indication of areas where VSParticle company is supposed to developed in the future:
    - Catalysis (industrial production of chemicals),
    - Printed electronics,
    - Life sciences (nanomedicine and sensors).

Name:	**Justyna Garstecka**
Position/Institution:	**Founder and owner of the Motherhood company**
Date:	**10/05/2018**

„ How to start, and keep (!) your own business"

Abstract of the seminar

The lecture was focused on practical aspects of running a business and included the following issues:

- ✓ How to start your own business?
- ✓ How to keep it up and running?
- ✓ Why all obvious things are not so obvious while doing business?
- ✓ And how come that running through the nettles can also be motivating?
- ✓ Want to be your own boss? Be aware that you will also be your own employee!

Name:	**Radosław Kwapiszewski**
Position/Institution:	**R&D Project Manager in the Drug Discovery Department at Adamed Group**
Date:	**6/06/2018**

"Academic scientists and Pharmaceutical R&D: what can they offer each other?"

The course of lecture:

- ✓ description of Radosław Kwapizewski career path – from a researcher at academia to R&D project manager at pharma company;
- ✓ profile of Adamed Group, its most important areas of interest and career development opportunities in this company;
- ✓ differences between pharma and academia structure;
- ✓ indicators which motivate people to do science, like the thrill of new discoveries, stress level, freedom to choose your own directions, money – with discussion which factors could be found doing research in the academy in comparison with pharma;
- ✓ guidance to those wanting to transition between these two sectors – based on Radosław Kwapiszewski experience;

During the seminar, strengths as well as limitations of both, academia and industry sectors were pointed out. Simultaneously, dr. Kwapiszewski stressed the importance of cooperation between academia and industry, putting forward great public health victories resulting from such collaborative works.

Name:	**Prof. Christophe Gorecki**
Position/Institution:	**Director of research at CNRS and Head of the MOEMS team at the FEMTO-ST Institute**
Date:	**19/11/2018**

"How to convert EU-funded research in MEMS and MOEMS technologies into a success story with market-oriented exploitation"

During the seminar Prof. Gorecki discussed the examples of possible and most successful innovation pathways, explaining what can be exploited in EU-funded technologies projects. General factors of successful management were also presented, together with innovation cycle and technology readiness levels.

Preceding the seminar, Christophe Gorecki visited Physical Optics and Biophotonics research group and had individual discussions with researchers from this team. These meetings enabled individual researchers to present and consult projects they are involved in, to get a new perspective from industry oriented specialist.

Name:	**Rafał Bator**
Position/Institution:	**Partner, Enterprise Investors, Poland**
Date:	**31/05/2019**

"How to deal with the investment of a Venture Capital fund"

Abstract of the seminar

Time to market has become the key factor for growing successful companies to leading positions/ a leading position on the global market. A growth can be accelerated by external financing, including funding by venture capital funds. How to approach a potential investment from a VC fund? What is 'a value added' by VC fund? How to work with them? Understanding of above questions is important for successful cooperation with potential investors/a potential investor who usually stays in the company as an investor, for 4-6 years. The venture capital industry has been the worst asset class in Europe for the past 20 years. It is full of losers and bureaucrats/bureaucracy. How to recognise and avoid them?

Rafał will also share his experience of leading investments of different companies/businesses that became European or global leaders.

Name:	**Prof. Tomasz Ciach**
Position/Institution:	**Professor at the Warsaw University of Technology, head of the BioMedLab and the division of Biotechnology and Bioprocess Engineering at the Faculty of Chemical and Process Engineering, Poland**
Date:	**11/06/2019**

"From labs to hospitals, a long and complex journey"

Abstract of the seminar

Lecture "From labs to hospitals, a long and complex journey" describes the current situation in knowledge transfer from academic and scientific institutes to industrial practice and finally to hospitals. It presents typical routes: patenting, licensing, founding spinoff and startups, as a way to make use of scientific research results in industry and business. Lecture also includes description of the driving force for the process of knowledge transfer – national and private money sources as well as universities and companies incomes and licensing rates. The lecture will mainly focus on problems and examples from medical biotechnology and bioengineering areas. All data and examples are presented as comparison between America, Europe and Polish scientific and business environments with examples of researchers and companies, presenting successful and unsuccessful stories from these markets. It is also a source of practical information for everybody who wants to follow the dark side of science.

Name:	**Prof. Leon Gradoń**
Position/Institution:	**Professor at Warsaw University of Technology, Poland**
Date:	**19/06/2019**

„ From phenomenological investigations towards industrial applications. Production of CCV filters for automotive industry"

Abstract of the seminar

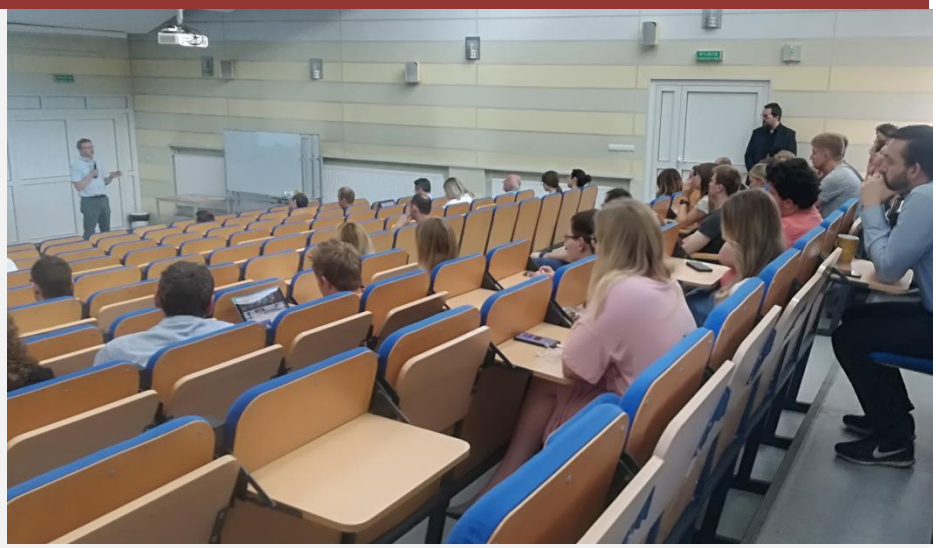
Separation of the liquid droplets from the stable mist system is a crucial process in industrial technologies natural gas cleaning, crank case ventilation CCV systems in Diesel engines, and many other applications.

The most efficient devices for such separations are fibrous filters (coalescers). A properly designed structure, defined through the space distribution of the local porosity and filter diameter in the filter volume, involves the phenomena of a droplet coalescing in the bulk, deposition of droplets on the fiber, coalescing of moved droplet on the fiber and the drainage of the loaded filter fibers. Theoretical analysis of the droplet behavior in the micro- and mesoscale is extended to the model describing the entire filter performance with its filtration efficiency, pressure drop and the lifetime of the filter.

The knowledge of the filtration process defines the filter structure, and then involvement of the process of formation of designed fibrous structure. The advanced melt-blown technique is used for filter production. The defined filter structure is produced on line in the system where fiber is formed in the nozzle and extended to the required diameter due to tangential stress resulting from the hot air flow around melted polymer filament. Final fiber, after solidification, is collected on the mandrel and formed to desired filter shape. Controlled process parameters determine local porosity and fiber distribution of the filtration layer. Incidentally our research on coalescers comes together with new regulations by Environmental Protection Agency for necessity of reduction of volatile organic compounds in the Diesel engine exhaust gases.

The biggest producer of Diesel engines, Cummins Inc. (USA), was looking for the best solution of the problem. In the multi-stage procedure our proposal won. We have built technological line for production of coalescers with the production ability 3 mln filters/year. All steps of the above will be presented.

Name:	**Prof. Jakub Gołąb**
Position/Institution:	**Professor in the Department of Immunology at the Medical University of Warsaw, Poland**
Date:	**25/06/2019**



"Academic exploring industry - a case study"

Abstract of the seminar

Life consists of many accidental opportunities. It is expected that you choose wisely, but in fact you never know what is the best path. In 2010 I was elected to become a member of the first Research Council of National Science Centre. I joined the board as a successful researcher with lots of ideas and numerous research projects carried out with an expanding group of excellent researchers. During one of the first meetings, for the sake of transparency, we voted that the members of the Research Council will not be allowed to apply for funds from NCN. It meant that I will not be able to get funding for my basic research for the next 4 years! Fortunately at that time I still had a decent grant from Foundation for Polish Science (TEAM) and an additional funding within MISTRZ programme of the same institution. However, the perspectives for further grants in basic research seemed rather murky. Together with members of my team we decided to apply to NCBiR with a brilliant idea to develop a novel technology for human antibodies production. We have started a small company called HUMON, but despite huge efforts of the team we failed to develop the technology. But in 2011 I received a call from prof. Ryszard Ostaszewski from the Institute of Organic Chemistry, Polish Academy of Sciences in Warsaw, with whom I was developing novel

anticancer compounds, that two of his colleagues (Adam Gołębiowski and Staszek Pikul) that worked for many years in the pharma industry in the USA would like to start a drug discovery company in Poland and Ryszard has recommended me as a suitable partner in the biology field. I was very intrigued and soon after I was called by Dr. Jacek Olczak, a third member of the forming group, who was running a typical chemical CRO company in Lodz (Trimen Chemicals). Jacek visited me in my lab and we had a very interesting conversation that convinced me that joining this group of excellent medicinal chemists will be a good choice. After dozens of phone calls, meetings and hundreds of e-mails we have finally started OncoArendi Therapeutics. With a huge organisational effort OncoArendi has become one of the most successful Polish drug discover companies that develops drugs for asthma, chronic inflammatory diseases and cancer. Two years ago I left the company to stay in academia. I was not able to commit my full time for a company. But the experience and lessons learned from this experience led me to join Jacek Jemielity, Joanna Kowalska and Dominika Nowis with a new idea to develop personalised cancer vaccines based on cap-modified mRNA delivery. We have started ExPLoRNA Therapeutics, a spin-off company from Warsaw University that will soon deliver new therapeutics to cancer patients. The presentation will cover these industrial adventures with pros and cons from academic perspective.

Name:	**Sarai Kemp and dr Nitza Kardish**
Position/Institution:	**Trendlines company, Israel**
Date:	**28/10/2019**

On October, 28 a course on "***How to become an entrepreneur"*** was held under "*Innovation source*" open lecture series. The event consisted of **two seminars** and a **workshop**, delivered by **Sarai Kemp,** and **dr. Nitza Kardish –** representatives of *Trendlines*, an Israeli company offering commercialisation services at the field of life sciences. **Dr. Nitza Kardish** has 20 years of experience working at senior management positions at life science companies. **Sarai Kemp** has experience in business development, including fund-raising strategies for early-stage companies developing innovative technologies and products. In particular, this event aimed to support a transfer of ideas generated at our Institute to business.

The first lecture, entitled "***Israeli 'Startup Nation' landscape and what it takes to become a successful entrepreneur***", was delivered by **Sarai Kemp.**

Sarai described the Israeli entrepreneurship environment and gave an overview of key parameters contributing to the opinion that Israel is a Startup Nation. She also explained what it takes to become a successful entrepreneur. She started with examples of start-up companies such as *Waze (universal navigation software), Mobileye (vision-safety technology)* and a description of their path to success – i.e. acquisition by global companies like Google or Intel. Israel is in the top 12 Most Innovative Economics. It is a worldwide leader in innovation. Sarai Kemp indicated components of such a flourishing ecosystem. The seminar ended with a discussion in which Polish researchers' real

problems engaged in commercialisation were thoroughly discussed. The government's role in supporting inventions was emphasised.
The second lecture: ***"The process of tech transfer from academia to a start-up"*** was delivered by dr. Nitza Kardish. She gave a detailed overview of the feasibility study of a technology developed in academia. Dr. Kardish shared her experiences in moving the invention from academia to start up and explained, "*How much academia change the world*". She stressed the great importance of basic sciences in the innovation process. She also emphasised that academia is the engine of a global transformation. She also listed the main challenges for innovation. Dr. Kardish stressed that it is crucial to assess the innovation at its early stage quickly. For the implementation factor, dr. Kardish indicated that people and their professionalism are the most critical elements.

Name:	**Prof. Yoon-Kyoung Cho**
Position/Institution:	**Professor in Biomedical Engineering at UNIST, Republic of Korea**
Date:	**31/10/2019**

"Microfluidic chips to study cell to cell communication and translational research towards precision medicine"

Abstract of the seminar

In the tumor microenvironment, various tumor-associated cells such as vascular, fibroblast, and immune cells interact with tumor cells to promote the development of cancer cells, indicating ***the importance of understanding the communication between these different cell types in developing cancer therapeutics***. In this presentation we will discuss our recent studies on extracellular vesicles (EVs)-based cancer diagnostics inspired by widespread recognition that EVs may be pivotal in intercellular communication. We examine clinical samples by analysing multiple kinds of proteins and RNA of EVs from cancer patient's plasma or urine samples and show that the EVs could be a potentially useful biomarker in cancer diagnostics. Next, we introduce the microfluidic chip equipped with biologically interfaced platelet membrane-cloaked surface (PLT-Chip), which could specifically capture EVs from multiple types of cancer cell lines than the normal cell-derived EVs and clearly distinguish the plasma of cancer patients from that of normal healthy controls. We believe that this revolutionary method can contribute to accelerate the acceptance of CTC or EV-based cancer diagnostics as a standard practice in clinical settings. ***Based on the presented academic research, the key technologies including lab-on-a-disc systems equipped with the fluid-assisted separation technology (FAST) are now translated into liquid biopsy products commercialised by two start-up companies. In this talk, the personal experience of translational research both at industry (Samsung) and academia (UNIST) will be discussed***. Taken all together, we believe understanding the critical role of cell-to-cell communication in cancer progression will provide insights critical to not only the development of improved cancer therapeutics (societal impact) but to basic science of cell biology (basic science).

Name:	**Prof. Hywel Morgan**
Position/Institution:	**Professor of Bioelectronics in the School of Electronics and Computer Science, University of Southampton, UK**
Date:	**4-5/11/2019**

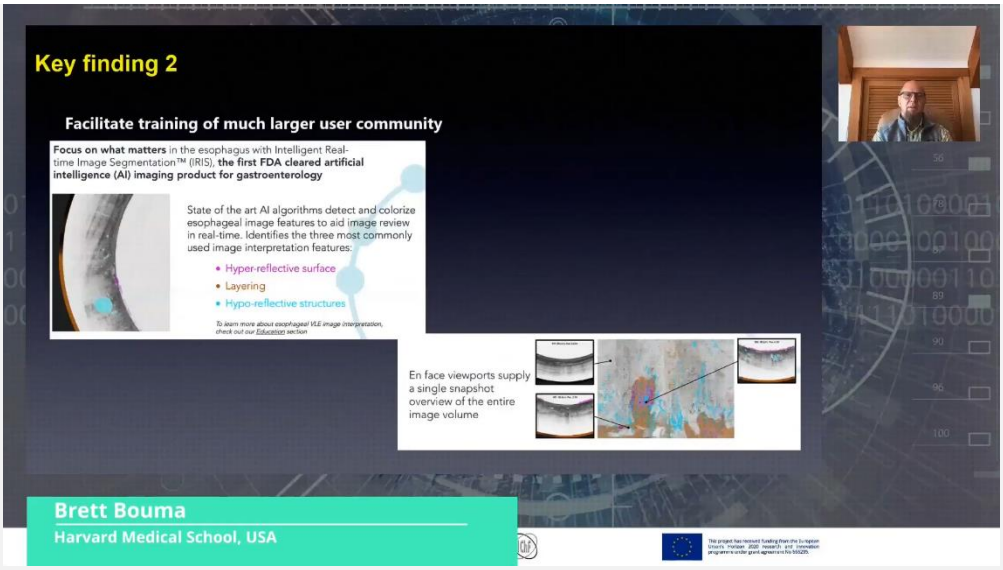
"From Smartphones to Diagnostics"

Abstract of the seminar

We have been developing miniature analytical systems that exploit low-cost consumer electronics for both sample processing/manipulation and sensing. In a collaboration with Sharp Labs, we have developed a new generation of digital microfluidic (DMF) platforms for programmable droplet manipulation. Unlike conventional microfluidic systems, DMF manipulates and processes hundreds of discrete nanolitre droplets of liquid. The chips contain thousands of electrodes, manufactured using Thin Film Transistor (TFT) technology as used in mobile phone screens.

The system supports a wide range of different chemical and biochemical assays, for example immuno-assays and genomic data analysis. The talk will describe recent developments in electrical impedance cytometry for label-free analysis of single cells and bacteria at high speed. The technique has been used to analyse a wide range of cells, but we are now exploring applications in areas such cell mechanics. We have also recently developed an impedance-based rapid antimicrobial susceptibility test (AST) that can analyse the resistance profile of infectious agent in 30 minutes compared with the current 48 to 72 hours. Finally, I will describe our research in the development of a miniature wireless and battery-less implantable sensor that continuously monitors biophysical parameters in-vivo, and the route to the commercialisation of this product.

Name:	**Prof. Brett Bouma**
Position/Institution:	**Professor of Dermatology and Health Sciences and Technology, Harvard Medical School Physicist, Massachusetts General Hospital Director, USA**
Date:	**7/10/2020**

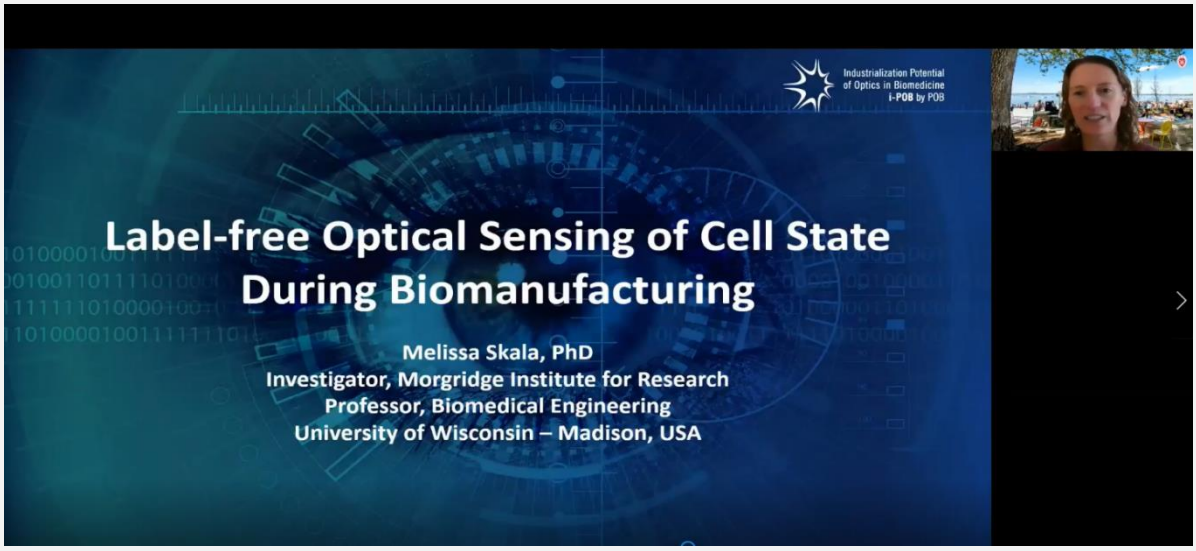


"The development and commercialisation of endoscopic OCT technology"

Abstract of the seminar

The lecture will include an overview of the clinical challenges associated with esophageal adenocarcinoma and its precursor condition Barrett's Esophagus. The requirements for screening and surveillance were identified as primary motivators that drove the development of endoscopic OCT. The image features associated with dysplasia and intramucosal cancer were presented, and the strategy for imaging and laser marking was discussed. The pathway of commercialisation that has resulted in the clinical availability of OCT systems for endoscopic use was reviewed.

Name:	**Prof. Melissa Skala**
Position/Institution:	**Professor at Morgridge Institute for Research, University of Wisconsin, USA**
Date:	**7/10/2020**



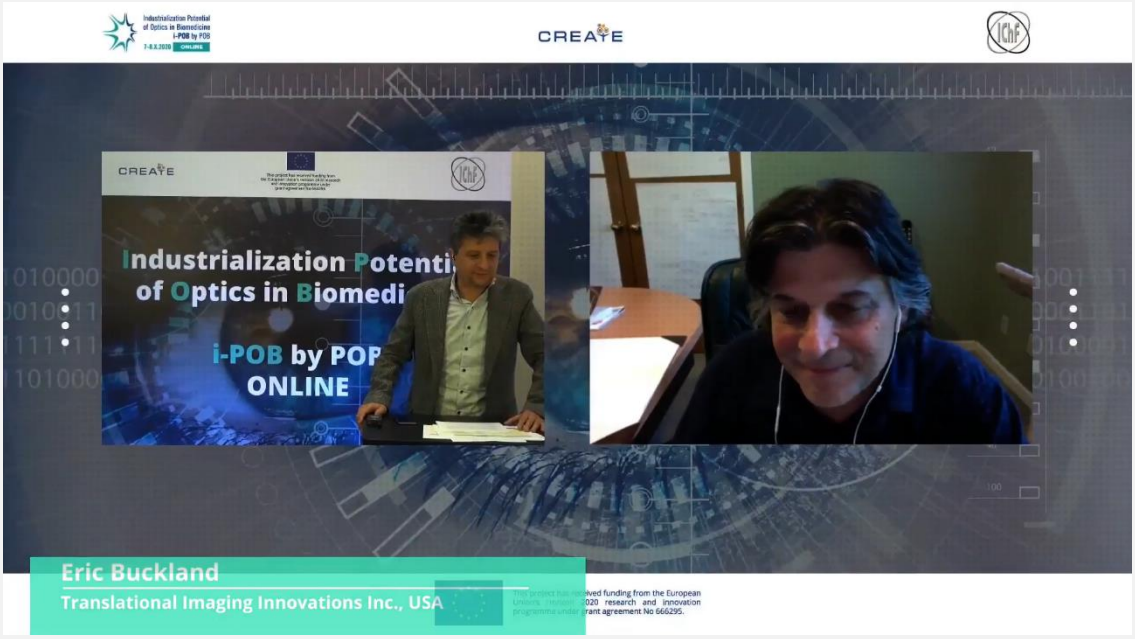
„ Label-free Optical Sensing of Cell State During Biomanufacturing"

Abstract of the seminar

Cell-based therapies have the potential to treat or even cure a myriad of diseases. However, these complex biological products display intrinsic variability within a tightly regulated industry. Process optimisation and thorough product characterisation prior to clinical development is critical. Typical quality assessments require labels to characterise functional subsets of cells. However, standard analytics are laborious, time-consuming, susceptible

to reagent quality variability, and may potentially alter cell function. To improve the fidelity of quality assessments, we have developed a label-free, nondestructive optical detection approach to quantify overall cell state, viability, and activation with single-cell resolution. The technology is based on the autofluorescence lifetime of the metabolic co-enzyme NAD(P)H. T cells isolated from human peripheral blood and activated in culture using tetrameric antibodies against the surface ligands CD2, CD3 and CD28 showed specific activation-state-dependent patterns of autofluorescence NAD(P)H lifetime. Logistic regression models and random forest models classified T cells according to activation state with 97–99% accuracy and according to activation state (quiescent or activated) and subtype (CD3+CD8+ or CD3+CD4+) with 97% accuracy. The hardware, optics, and analytical algorithms are readily integrated into a variety of quantitative imaging technologies, such as flow and image cytometry, enabling non-destructive assessment for early stage cell manufacturing process optimisation and streamlining product development as therapies transition to commercial scale manufacture.

Name:	**Dr. Eric Buckland**
Position/Institution:	**Founder and CEO at Translational Imaging Innovations, USA**
Date:	**7/10/2020**



"Romancing the Start-up: Starting the Entrepreneurial Journey on the Right Foot"

Abstract of the seminar

Start-ups are romantic, even mythical. There is perhaps nothing more exciting in a career than capturing a Unicorn with the better-mousetrap we invented during our Ph. D. programs. The problem is that Unicorns are rare, and better mousetraps seem to be everywhere. To succeed with sanity intact, we need to come down to earth and get real. Taking the right steps from the beginning maximises our chance at building not just a better mousetrap, but a business worthy of growing into that elusive Unicorn. We will discuss the earliest stages of business formation, starting with our co-founders, and proceeding through our first phases of funding, development, and market validation. We will discuss essential topics such as founder agreements, intellectual property rights, and negotiating licenses from our institutions, establishing product-market fit, and early-stage financing. Our objective is to remove the mythology from the start-up experience. We can retain the romance.