



# SAFEMILK

*project*

## Kickoff Meeting

22.4.2021



# SESSION I.

17:00-17:25 (25 min)

## Introduction to Kickoff Meeting



Time	Session	Presenter
17:00-17:25 (25 min)	<b>I. Introduction to Kickoff Meeting</b> <ul style="list-style-type: none"> <li>• Welcome and opening meeting</li> <li>• Agenda</li> <li>• General rules &amp; tips an easy meeting</li> <li>• Introduction of project partners (max 2 minutes presentation each):</li> <li>• Q/A</li> </ul>	
17:25-17:30 (5 min)	<i>Coffee break 1</i>	
17:30 -18:25 (55 min)	<b>II. Project informations and instructions</b> <ul style="list-style-type: none"> <li>• Consortium</li> <li>• Project objectives</li> <li>• Work Plan</li> <li>• Milestones</li> <li>• Deliverables</li> <li>• Publications</li> <li>• Communication strategy</li> <li>• Secondments</li> <li>• Financial (possible audit)</li> <li>• Reporting (Regularly update, reporting tabs)</li> <li>• Q/A</li> </ul>	
18:25 - 18:30 (5 min)	<i>Coffee break 2</i>	

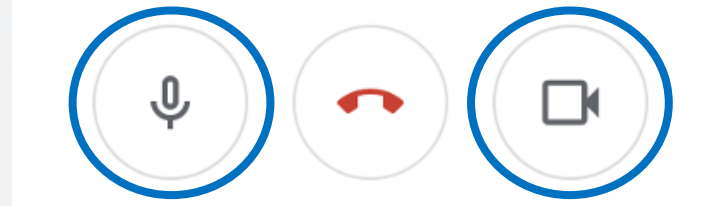
Time	Session	Presenter
18:30 - 19:00 (30 min)	<b>III. Work Packages (5 minutes presentation each):</b> <ul style="list-style-type: none"> <li>• WP-1 / Ethics requirements</li> <li>• WP-2 / Surface nanofabrication</li> <li>• WP-3 / Development of biosensors</li> <li>• WP-4 / Transfer of technology</li> <li>• WP-5 / Workshops and summer schools</li> <li>• WP-6 / Management</li> <li>• Q/A</li> </ul>	
19:00 - 19:05 (5 min)	<i>Coffee break 3</i>	
19:05 - 19:15 (10 min)	<b>IV. Conclusion and short summary</b> <ul style="list-style-type: none"> <li>• Upcoming events</li> <li>• Q/A</li> <li>• Farewell</li> </ul>	

## General rules

- No comments or questions during the presentations.
- The room will be open for comments / questions after each presentation.
- Speakers to stick to the time allocated for their presentation.
- Mute your microphone when you are not talking.
- Don't forget to unmute your microphone when you speak.
- Place yourself in a silent room without background noise.
- **Use Video only for** "Welcome", "Farewell" and during presenting to reduce internet traffic (some connections are slow) / during the presentation, please off your cam.



Mute microphone Camera OFF



UnMute microphone Camera ON

## Introduction of project partners and labs (*2 minutes presentation each*)

1. **PTEC - POWERTEC S.R.O.**
2. **CUB** - Comenius University in Bratislava
3. **RCNS** - Research Centre of Natural Sciences
4. **HDRI** - Hungarian Dairy Research Institute
5. **NKUA** - National and Kapodistrian University of Athens
6. **DEM** - National Center for Scientific Research "DEMOKRITOS,,
7. **IMD** - Intermedical Nanodiagnostics Laboratories
8. **UTR** - *University of Toronto*
9. **SKOL** - *Skolkovo Institute of Science and Technology*
10. **UCSD** - *University of California San Diego*
11. **CNMS** - *Center of Nanophase Materials Sciences*



### *Who we are, our main activity*

Powertec is a R&D company in Slovakia, focused on integration of electronic devices and development of innovative sensorics systems with focus on organic electronics. The company composed of 7 full-time and over 10 half-time research workers strengthened yearly by extra 2 master and PhD degree students. Several research projects are being resolved yearly, mostly in field of design of special measurement devices, measurement modules for testing and characterization. High precision bioelectronics devices and measurement testers were developed within the previous company projects with strong focus on short "time-to-market" period of product research and implementation.

### *Website*

[www.powertec.sk](http://www.powertec.sk)

### *Type of partnership*

Industrial partner

### *Experiences*

Project management, project leading, R&D in the field of electronics and mechanics, small series production

### *Facilities*

Laboratory equipment for the development of electronic systems such as (oscilloscopes, signal generators, spectrum analyzers, network analyzers, programmable power supplies, Lock-in amplifiers. , EMC laboratory, simulation software, etc.). Equipment in the field of mechanics such as CNC machining systems, 3D printers, welding systems, 3D CAD systems, thin film Deposition machine, etc.

### *Close collaboration with partners*

CUB, UTR, RCNS, HDRI, CNMS, UCSD



## Our role in SAFEMILK project

Administrative and financial coordinator of the project. Leader for WP1, WP4, WP6

## Our objectives

- **WP-1** / Ethics requirements
- **WP-4** / Transfer of technology
- **WP-6** / Management

## Our expectations

- Development of a new portable version of the EMPAS device with controlling software and subsequent commercialization of function system.
- Upgrade and adaptation of miniature potentiostat from previous project.
- Reinforce the links with our academic and industrial partners, find technical solutions to achieve our objectives.
- Acquire new knowledge in the field of research and development with subsequent transformation in the industry.
- PTEC will lead the consortium to works through successful project with market application potential.

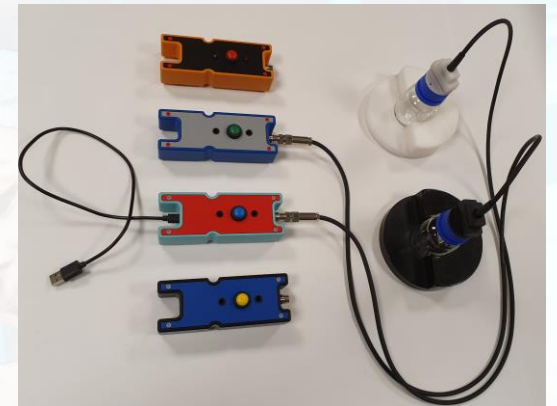
## Responsible persons

- Dr. Martin Donoval - The project coordinator, Legal representative of PTEC – [martin.donoval@powertec.sk](mailto:martin.donoval@powertec.sk)
- MSc. Michal Hanic - Administrative manager, Lead person for WP-1, WP-4, WP6 – [michal.hanic@powertec.sk](mailto:michal.hanic@powertec.sk), ([miso.hanic@gmail.com](mailto:miso.hanic@gmail.com))
- Dr. Michal Mičjan - Project manager, Lead person for WP-1, WP6 - [michal.mician@powertec.sk](mailto:michal.mician@powertec.sk)



## References

(References from previous project – Formilk. R&D of Potentiostat with process of commercialization)



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## Who we are, our main activity

Comenius University is oldest and largest university in Slovakia. **Laboratory of Biophysics** at the Faculty of Mathematics, Physics and Informatics is composed of 6 full-time teaching and research staffs, one half-time, 3 PhD and 3 undergraduate students. The laboratory is focused on development of acoustic and electrochemical biosensors based on DNA aptamers, on the mechanisms of protease activity as well as on the study of the mechanisms of interaction of nanoparticles with biomembranes and model membranes in respect of targeted drug delivery. Laboratory conducting 3 domestic projects supported by grant agencies VEGA and APVV. Since 1995 the laboratory participated on large number of projects practically in all programs of European Union.

## Website

[www.fmph.uniba.sk](http://www.fmph.uniba.sk); [www.formilk.fmph.uniba.sk](http://www.formilk.fmph.uniba.sk)

## Type of partnership

Academic partner

## Experiences

Project management, project leading, R&D in the field of acoustic and electrochemical biosensors, nanoparticle preparation and modification, aptamer engineering and immobilization at surfaces, biophysical study of biomembranes and model membranes and mechanisms of molecular interactions. Organization of international conferences, schools and workshops.

## Facilities

Five laboratories: 1. Molecular acoustics (QCM, network analyzers, elipsometer), 2. Electrochemistry (Potentiostats, EQCM), 3. Biocolloids (Ultrasonic spectrometer, precise density meter, UV-VIS, FTIR, fluorescence spectroscopy, HPLC) 4. Nanotechnology laboratory (ZetaSizer Nano, Langmuir troughs), 5. Cell laboratory (preparation of cell cultures and their characterization).

## Close collaboration with partners (in previous FORMILK project)

UTR, CNMS, UCSD, HDRI, RCNS, PTEC



## Our role in SAFEMILK project

Leader for WP3 – Development of biosensors

## Our objectives

- **WP-2** / Characterization of surfaces with antifouling properties; testing of nanoporous surfaces by electrochemical methods; aptamer engineering
- **WP-3** / Development of electrochemical and acoustic aptasensors for detection bacteria and antibiotics. Application of magnetic nanostructures for amplification of detection bacteria
- **WP-4** / Testing the EMPAS and miniature potentiostat with developed biosensors
- **WP-5** / Organization of workshop in collaboration with POWERTEC „Acoustic methods in the study of affinity interaction at surfaces“ (Bratislava, 2021); summer school "Surface modification and application of electrochemical and acoustic techniques for detection affinity interaction using DNA aptamers as receptors" (Bratislava, 2023). Participation in Open door days and European researchers night events.
- **WP-6** / Management of WP3

## Our expectations

- Optimisation of immobilization of aptamers at nanofabricated surfaces
- Development of acoustic and electrochemical aptasensors for detection selected bacteria and antibiotics in milk
- Testing of EMPAS and miniature potentiostat
- Organization of one workshop and one summer school

## Responsible persons

- Prof. Tibor Hianik – Management of WP3, scientific management – [tibor.hianik@fmph.uniba.sk](mailto:tibor.hianik@fmph.uniba.sk)
- Dr. Marek Tatarko – Development of acoustic aptasensors, testing of EMPAS – [mtatarko1@gmail.com](mailto:mtatarko1@gmail.com)
- Dr. Veronika Šubjaková – Development of electrochemical aptasensors, testing of miniature potentiostat - [subjakov@gmail.com](mailto:subjakov@gmail.com)
- Dr. Zuzana Garaiová – Preparation of nanoparticles and their modification by aptamers – [garaiova.zuzana7@gmail.com](mailto:garaiova.zuzana7@gmail.com)

## References

Relevant publications: [www.formilk.fmph.uniba.sk/Publications/](http://www.formilk.fmph.uniba.sk/Publications/)

### Laboratory of molecular acoustics (F1-342)



### Laboratory of electrochemical biosensors (F1-347)



### Laboratory of biocolloids (F1-350 A)



### Nanotech laboratory (F1-350B)



### Cell culture laboratory (F1-343)



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## RCNS - Research Centre for Natural Sciences

### *Who we are, our main activity*

Research Centre for Natural Sciences is based in Budapest, Hungary and devoted to multidisciplinary research activities in natural sciences, in the fields of enzymology, organic chemistry, cognitive neuroscience and psychology, as well as materials- and environmental chemistry. In material science the a special emphasis is given on the exploratory research in the field of nanoscale functional materials and application of the results in integrated nano/micro systems.

### *Website*

[www.ttk.hu](http://www.ttk.hu)

### *Type of partnership*

Academic partner

### *Experiences*

Institute of Materials and Environmental Chemistry, Functional Interfaces Research Group:

R&D in material science, with special emphasis on preparation and characterisation of nanostructured surfaces. Studies in the field of organised molecular thin layers and electroactive films in sensor constructions, as well as electrochemical characterisation of coatings and energy storage materials in industrial applications.

### *Facilities*

Electrochemical workstations, combined electrochemical-acoustic measurement set-ups, microscopy (optical, fluorescence, scanning probe microscopies (AFM, STM, SECM), UV-Vis and fluorescence spectrophotometers, particle size measuring units (DLS), synthetic chemistry labware, sterile workstation.

Collaborative instrument network of RCNS.

### *Close collaboration with partners*

All project partners



## Our role in SAFEMILK project

Contribution to sensor developments and industrial testing  
Leader for WP5

### Our objectives

- **WP-2 / Surface nanofabrication**

Task 2.1 Preparation of the surfaces with antifouling properties: RCNS - testing by EMPAS and QCM, characterization

Task 2.2 The development of nanoporous materials based on TiO<sub>2</sub>:Mn: optimization of aptamer-zwitterionic peptide modification

- **WP3 - Development of biosensors**

Task 3.1. EMPAS and multiharmonic QCM sensors for detection bacteria

Task 3.3. Electrochemical sensors for detection antibiotics : RCNS (responsible) nanostructured surface development, surface coverage studies, testing

Task 3.4. Optical biosensors for detection of bacteria and antibiotics: testing

- **WP4 - Transfer of technology**

Task 4.1. Development of EMPAS hardware and software as well as flow cell applicable for mass detection of bacteria using aptamers as receptors: construction and testing of flow cell

Task 4.2. Verification of developed assay: milk sample preparation, comparison with standard bacterial detection

Task 4.3. Adaptation of miniature potentiostat for electrochemical detection of bacteria and antibiotics: testing

Task 4.4. Demonstration of novel analytical methods to end-users: meeting of potential end-users, demonstration of electrochemical methods using miniature potentiostat

- **WP-5 / Workshops and summer schools – WP leader**

### Our expectations

- Based on complementary expertise of project partners we expect to contribute to innovative sensor solutions helping to solve industrial problems.

### Responsible persons

- Dr. Keresztes Zsófia – lead person of WP5 - [keresztes.zsofia@ttk.hu](mailto:keresztes.zsofia@ttk.hu)
- Dr. Románszki Loránd – molecular monolayers – [romanszki.lorand@ttk.hu](mailto:romanszki.lorand@ttk.hu)
- Dr. Szabó Tamás – nanoparticles – [szabo.84.tams@ttk.hu](mailto:szabo.84.tams@ttk.hu)
- Dr. Marek Tamás – electropolymerisation – [marek.tamas@ttk.hu](mailto:marek.tamas@ttk.hu)
- Dr. Mészáros Gábor – EMPAS development – [meszaros.gabor@ttk.hu](mailto:meszaros.gabor@ttk.hu)
- Dr. Shaban Abdul – QCM measurements – [shaban.abdul@ttk.hu](mailto:shaban.abdul@ttk.hu)



# References

<http://www.ttk.hu/aki/en/functional-interfaces-research-group/>



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## *Who we are, our main activity*

The Hungarian Dairy Research Institute (HDRI) was established in 1903 by the State of Hungary in Mosonmagyaróvár under the name Hungarian Royal Dairy Experimental Station. The goal and mission of HDRI have been to support milk production and dairy farms, to develop innovative dairy products of outstanding quality, and to improve food quality and food safety. The Institute employs some 90 people. Since 2004 the HDRI has been manufacturing and distributing milk-based dietary supplements under its brand: Bonolact®. Our Institute has a pilot plant that enables product development. The accredited Research, Food Inspection and Raw Milk Testing Laboratory have been carrying out a complex microbiological and physico-chemical examination of food, feed, dietary supplements, functional products and pharmaceuticals.

## *Website*

[www.mtki.hu](http://www.mtki.hu)

## *Type of partnership*

Industrial partner

## *Experiences*

HDRI is an expert in the application of standard methods and detection of pathogenic bacteria.

## *Facilities*

HDRI has excellent facilities for microbial food analysis (e.g. microbiological safety cabinet Class II, ELISA plate reader, NanoDrop 2000 spectrophotometer, real time PCR equipment: BIO-RAD CFX 96 and Agilent ARIA MX).

## *Close collaboration with partners*

CUB, RCNS, DEM, IMD, PTEC, UTR



## Our role in SAFEMILK project

Industrial partner of the SAFEMILK project

## Our objectives

HDRI Ltd. will participate in the following Workpackages:

- **WP-2 / Surface nanofabrication**
- **WP-3 / Development of biosensors**

## Our expectations

- Training centre for microbiological methods focused on isolation and characterization pathogens by conventional methods including plate culturing, PCR and ELISA assays
- Optimization of milk sample preparation for further analysis by partners.
- Participation in verification of EMPAS for pathogen detection, electrochemical and optical methods for detection antibiotics in milk.

## Responsible persons

- dr Robert Kocsis – Manager of HDRI Ltd. - [rkocsis@mtki.hu](mailto:rkocsis@mtki.hu)
- Zsuzsanna Radnics PhD – Business Manager of HDRI Ltd. – [zradnics@mtki.hu](mailto:zradnics@mtki.hu)
- Attila Hucker – Project Manager of H2020 SAFEMILK project – [ahucker@mtki.hu](mailto:ahucker@mtki.hu)
- Katalin Szabó – Deputy Project Manager of H2020 SAFEMILK project - [kszabo@mtki.hu](mailto:kszabo@mtki.hu)
- Judit Süle PhD – Administrator of H2020 SAFEMILK project - [jsule@mtki.hu](mailto:jsule@mtki.hu)



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**LABORATORY OF ANALYTICAL CHEMISTRY**  
**DEPARTMENT OF CHEMISTRY**  
**NATIONAL AND KAPODITRIAN UNIVERSITY OF ATHENS**

## A BRIEF HISTORY

- The National and Kapodistrian University of Athens (NKUA) was founded in 1837
  - It is one the most active national centres of funded academic and applied research via the implementation of numerous basic and applied research projects.
  - It ranks 1<sup>st</sup> in Greece, 74<sup>th</sup> in Europe and 224<sup>th</sup> in the world, according to Webometrics.
- 
- The Department of Chemistry in NKUA was founded in 1918
  - The Laboratory of Analytical Chemistry ([http://www.chem.uoa.gr/?page\\_id=53733&lang=en](http://www.chem.uoa.gr/?page_id=53733&lang=en)) has been established in 1968
  - It is involved in the development of analytical instrumentation, analytical techniques and methods for a vast variety of applications, including environment, pharmaceuticals, clinical chemistry, food and industrial products.





## SENSORS LAB

- The Sensors Lab (<http://scholar.uoa.gr/christok>) is devoted to the development of low-cost electrochemical and optical sensors for the determination of heavy metal cations and organic compounds in the environment as well as in food and clinical samples.
- Cutting-edge manufacturing technologies (such as 3D printing, screen-printing, microengineering approaches and injection-molding) are utilized for on-site and point-of-care (bio)sensing
- It consists of 2 members of staff (Professor A. Economou and Assistant Professor Christos Kokkinos), 2 postdoctoral workers, 4 PhD students and several MSc students.
- The Group is well equipped with electrochemical and optical analytical instrumentation and manufacturing instrumentation (3D printers, x-y plotters) and has access to large-scale facilities (such as MS instruments, imaging techniques, microengineering fabrication)
- The Group has developed a wide range of national and international collaborations

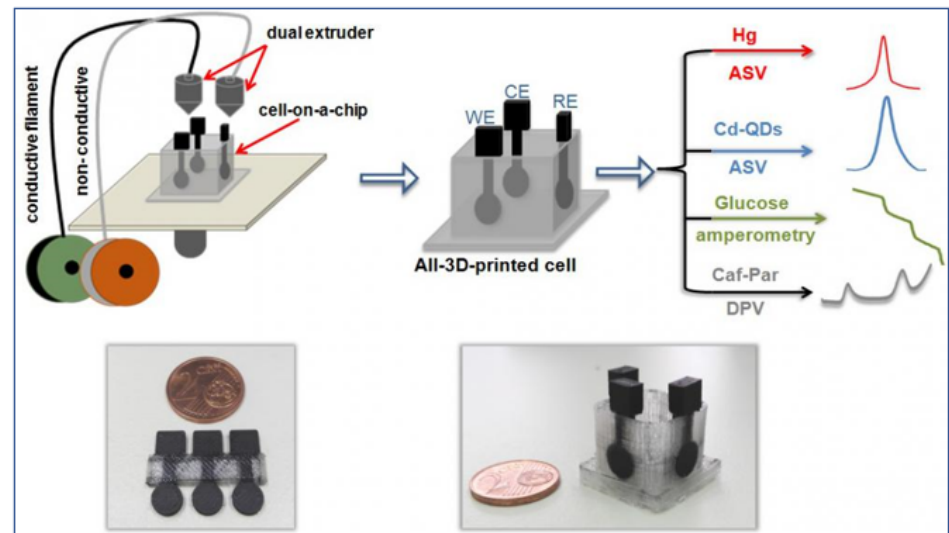
## KEY PEOPLE

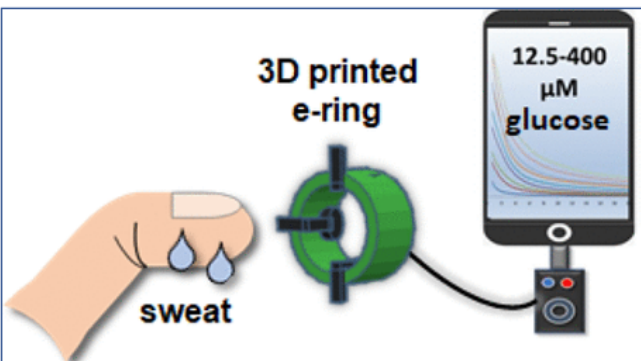
**Prof. Anastasios Economou** is specialized in sensor technology, instrumentation and analytical electrochemistry. He has supervised 6 PhD (+3 in progress) and 3 postdoctoral researchers. He has published >140 articles and 7 book chapters, has >6,000 citations, h-index 43, Scopus. He has participated in many research projects, related to (bio)sensing funded from national and international sources.

**Associate Prof. Christos Kokkinos** is specialized in the development (design, fabrication, characterization) of electrochemical sensors and biosensors using microengineering (sputtering, photolithography) and 3D-printing technologies on various supports (silicon wafer, plastics, paper), the development of microfluidic devices for electrochemical sensing and biosensing and the development of analytical protocols for the electrochemical determination of trace metals and for the quantitative determination of biomolecules (proteins, DNA) using nanoparticles labelling. He has published 41 articles and 2 book chapters and he is the principal investigator in 2 research projects related to the development of biosensors using macrofabrication technologies.

## KEY TECHNOLOGIES

### 3D Printing

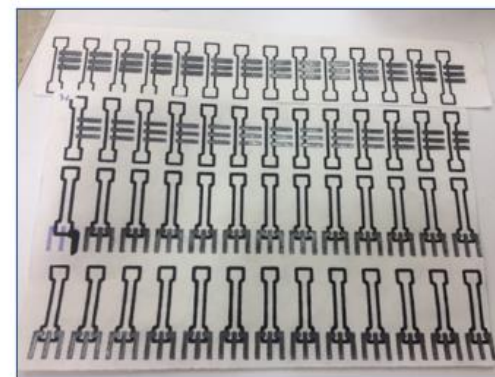
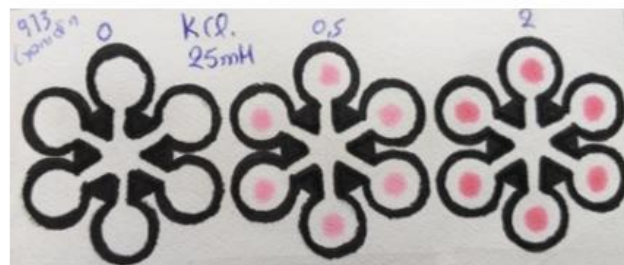
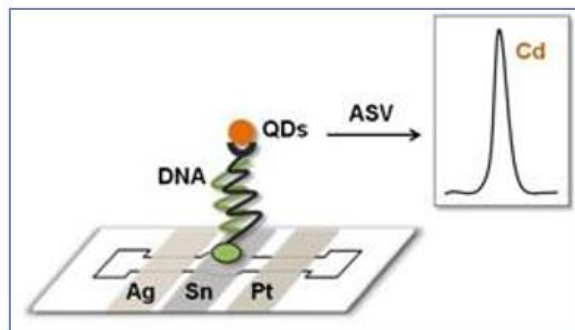




- 1) "Smartphone-Addressable 3D-Printed Electrochemical Ring for Nonenzymatic Self-Monitoring of Glucose in Human Sweat", *Analytical Chemistry*, 2021, 93, 7, 3331-3336
- 2) "3D printed microcell featuring a disposable nanocomposite Sb/Sn immunosensor for quantum dot-based electrochemical determination of adulteration of ewe/goat's cheese with cow's milk", *Sensors and Actuators B*, 334 (2021) 129614

## KEY TECHNOLOGIES

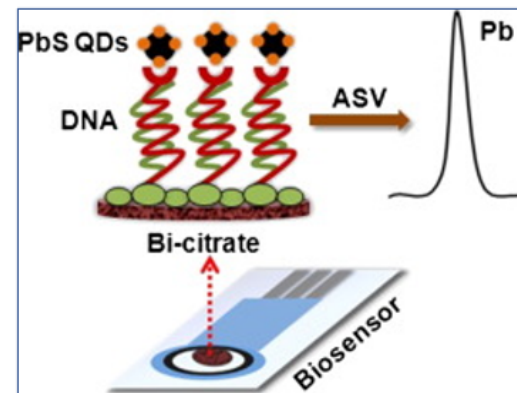
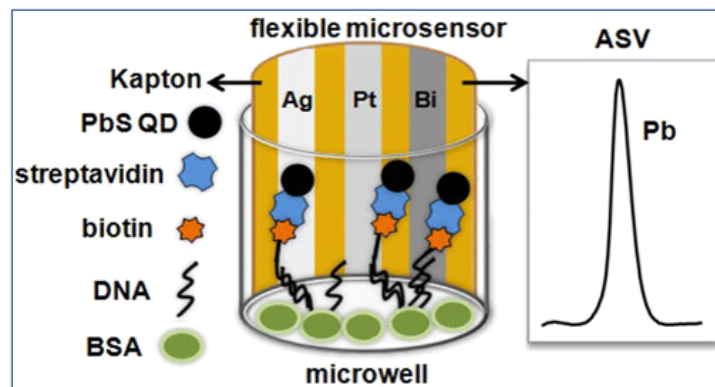
### Paper-based Devices



- 1) "Paper-based microfluidic device with integrated sputtered electrodes for stripping voltammetric determination of DNA via quantum dot labeling", *Analytical Chemistry*, 2018, 90, 1092-109
- 2) "Lab-on-a-membrane foldable devices for duplex drop-volume electrochemical biosensing using quantum dot tags". *Analytical Chemistry*, 2016, 88, 6897-6904.

## KEY TECHNOLOGIES

### Nanomaterial-based Sensors



- 1) "Flexible microfabricated film sensors for the in situ quantum dot-based voltammetric detection of DNA hybridization in microwells" *Analytical Chemistry*, 2015, 87, 853-857.
- 2) "Quantum dot-based electrochemical DNA biosensor using a screen-printed graphite surface with embedded bismuth precursor" *Electrochemistry Communications*, 2015, 60, 47-51.

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## Who we are, our main activity

The **National Centre for Scientific Research "Demokritos" (NCSR-D)** is the largest Research Centre in Greece for interdisciplinary R&D. The Centre consists of five independent Institutes focusing on different scientific fields, namely **Institute of Nuclear and Particle Physics, Institute of Biosciences & Applications, Institute of Informatics & Telecommunications, Institute of Nanoscience and Nanotechnology, and Institute of Nuclear & Radiological Sciences & Technology, Energy & Safety (INRASTES)**. The **Immunoassays-Immunosensors Lab is part of the Biodiagnostics Division of INRASTES** and specializes in the development of immunoassays, immunosensors & DNA sensors for the determination of analytes, including bacteria, in biological, food and environmental samples.

## Website

<https://inrastes.demokritos.gr/>

## Type of partnership

Research institution

## Experiences

Research in the field of immunosensors based on optical or electrical transducers, new materials for immunochemical applications (antibodies, labels, substrates, etc). During the last 10 years the Lab has participated in and/or coordinated the following EU projects in a) the areas of Health and Disease Diagnostics: NEMOSLAB (FP6-IST-027804), PYTHIA (FP7-2007-ICT-2-224030), and b) food safety: FOODSNIFFER (FP7-ICT-2011-8-318319) and FOODSCAN (FP7-SME-2011-286442). Currently, besides to the SAFEMILK project, the lab participates in 4 projects funded from the General Secretariat of Research and Technology regarding bacteria and toxic substances detection in biological and food samples as well as of disease markers in biological samples.

## Facilities

The facilities include a 300 m<sup>2</sup> lab appropriately equipped to develop radio-, enzyme- fluorescence and luminescence immunoassays ( $\gamma$ -counter, multi-label 96-well plate reader), chemical and biological activation of surfaces (microarray spotter), and characterization of functionalized surfaces (optical and fluorescence microscope). In addition, it possesses prototype sensor instrumentation for label-free detection of analytes including two White Light Interference Spectroscopy (WLRs) set-ups.

## Close collaboration with partners

NKUA, IMB, SKOL, HDRI, CNMS, UTR, UCSD, PTEC

## Our role in SAFEMILK project

DEM will develop WLRS optical methods for the detection of bacteria and antibiotics. To this context will collaborate with CMNS, SCOL and UTR in developing methods for aptamer immobilization onto the surface of the optical transducer and its characterization thereof (WP1). It will also collaborate with HDRI for the evaluation of the methods for detection of bacteria and antibiotics in milk (WP2).

## Our objectives

- **WP-2** / Characterization of aptamer immobilization methods with optical methods
- **WP-3** / Development of WLRs sensor for bacteria and antibiotics
- **WP-5**/ Organization of workshop on "Optical methods in biosensing"
- **WP-6** / Management

## Our expectations

- Develop sensitive and fast assays for bacteria and antibiotics determination in milk samples using the already established WLRS sensor.
- Acquire new knowledge regarding the implementation of aptamers as binding molecules in the in-house developed optical sensors.
- Gain more experience in electrochemical aptamer sensors.

## Responsible persons and the group

- Dr. S. Kakabakos (Director of Research) will supervise the development of optical sensors - [skakab@rrp.demokritos.gr](mailto:skakab@rrp.demokritos.gr)
- Dr. P. Petrou (Director of Research) will be responsible for development of methods for aptamer immobilization onto the sensors – [ypetrou@rrp.demokritos.gr](mailto:ypetrou@rrp.demokritos.gr)
- Dr. M. Angelopoulou (Post-Doc) will be responsible for development of assays for bacteria detection – [mikangel@ipta.demokritos.gr](mailto:mikangel@ipta.demokritos.gr)
- D. Tsounidi (PhD student) will develop assays for antibiotics detection – [dimitratsounidi@gmail.com](mailto:dimitratsounidi@gmail.com)



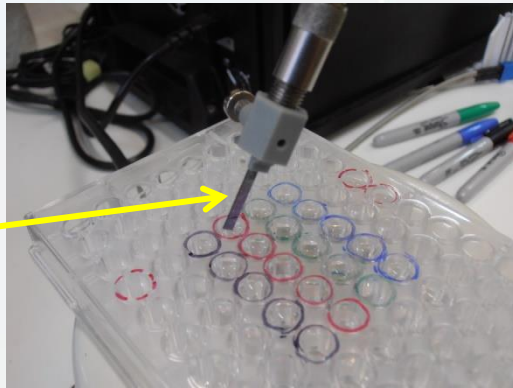
## References

- [1] V. Anastasiadis, G. Koukouvinos, P. Petrou, A. Economou, J. Dekker, M. Harjanne, P. Heimala, D. Goustouridis, I. Raptis, S. Kakabakos, Multiplexed mycotoxins determination employing white light reflectance spectroscopy and silicon chips with silicon oxide areas of different thickness. *Biosens. Bioelectron.* 153 (2020) 112035;
- [2] D. Tsounidi, G. Koukouvinos, P. Petrou, K. Misiakos, G. Zisism D. Goustouridis, I. Raptis, S.E. Kakabakos, Rapid and sensitive label-free determination of aflatoxin M1 levels in milk through a white light reflectance spectroscopy immunosensor, *Sens. Actuator B* 282 (2019) 104-111;
- [3] M. Angelopoulou, P.S. Petrou, E. Makarona, W. Haasnoot, I. Moser, G. Jobst, D. Goustouridis, M. Lees, K. Kalatzi, I. Raptis, K. Misiakos, S.E. Kakabakos, Ultrafast multiplexed-allergen detection through advanced fluidic design and monolithic interferometric silicon chips, *Anal. Chem.* 90 (2018) 9559-9567;
- [4] M. Angelopoulou, A. Botsialas, A. Salapatas, P.S. Petrou, W. Haasnoot, E. Makarona, G. Jobst, D. Goustouridis, A. Sifaka-Kapadai, I. Raptis, K. Misiakos, S.E. Kakabakos, Assessment of goat milk adulteration with a label-free monolithically integrated optoelectronic biosensor. *Anal. Bioanal. Chem.* 407 (2015) 3995-4004.

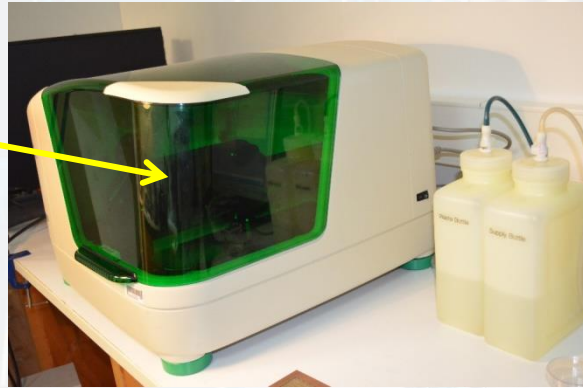


Multi-label 96-well plate reader

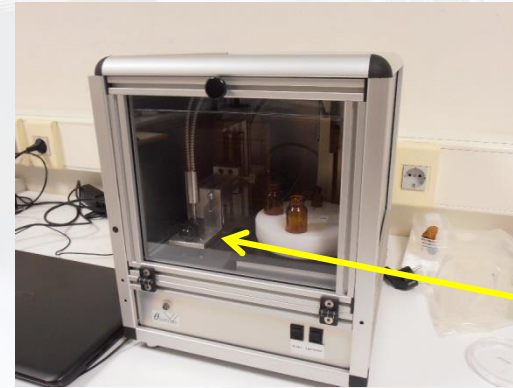
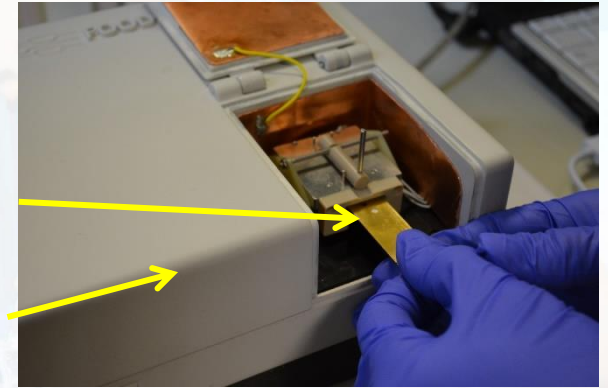
The immersible Mach-Zehnder interferometric chip



Robotic microarray spotter



The FOODSNIFFER chip & the portable device



The WLRs sensor

## Introduction of project partners and labs (2 minutes presentation each)

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3. **RCNS** - Research Centre of Natural Sciences
4. **HDRI** - Hungarian Dairy Research Institute
5. **NKUA** - National and Kapodistrian University of Athens
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7. **IMD** - Intermedical Nanodiagnostics Laboratories
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10. **UCSD** - *University of California San Diego*
11. **CNMS** - *Center of Nanophase Materials Sciences*





# IMD LABORATORIES

Nanodiagnostics and materials R&D

@ Lefkippos Technology Park, NCSR Demokritos  
Athens, Greece

HEAD OFFICE: El. Venizelou 29, Athens 12351 Greece

[www.imdlaboratories.gr](http://www.imdlaboratories.gr)





**IMD Laboratories is a dynamic company specializing in**

- **advanced nanomaterials for biosensing applications**
- **novel biosensor solutions based on electrochemical principles.**
- **Water disinfection solutions based on nanomaterials with parallel electricity production**

**IMD Laboratories was originally focused in the area of classical biodiagnostics offering services such as classical biodiagnostics, microbiology, hematology and clinical chemistry, including water quality analysis and still remains commercially active at El. Venizelou 29 and Perikleous 1, 12351 Athens.**

## Introduction of project partners and labs (2 minutes presentation each)

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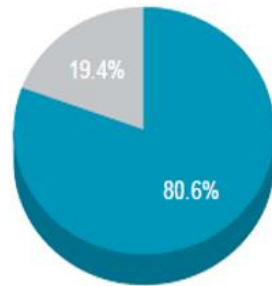


Ranked the **most livable cities in the world** (*The Economist*, 2015), Toronto is Canada's largest center of research, commerce and cultural diversity.



# CANADA'S LEADING UNIVERSITY

Total



■ Undergraduate  
 ■ Graduate

**68,114**

UNDERGRADUATE

**56,220**

DOMESTIC

**11,894**

INTERNATIONAL

**16,442**

GRADUATE

**13,927**

DOMESTIC

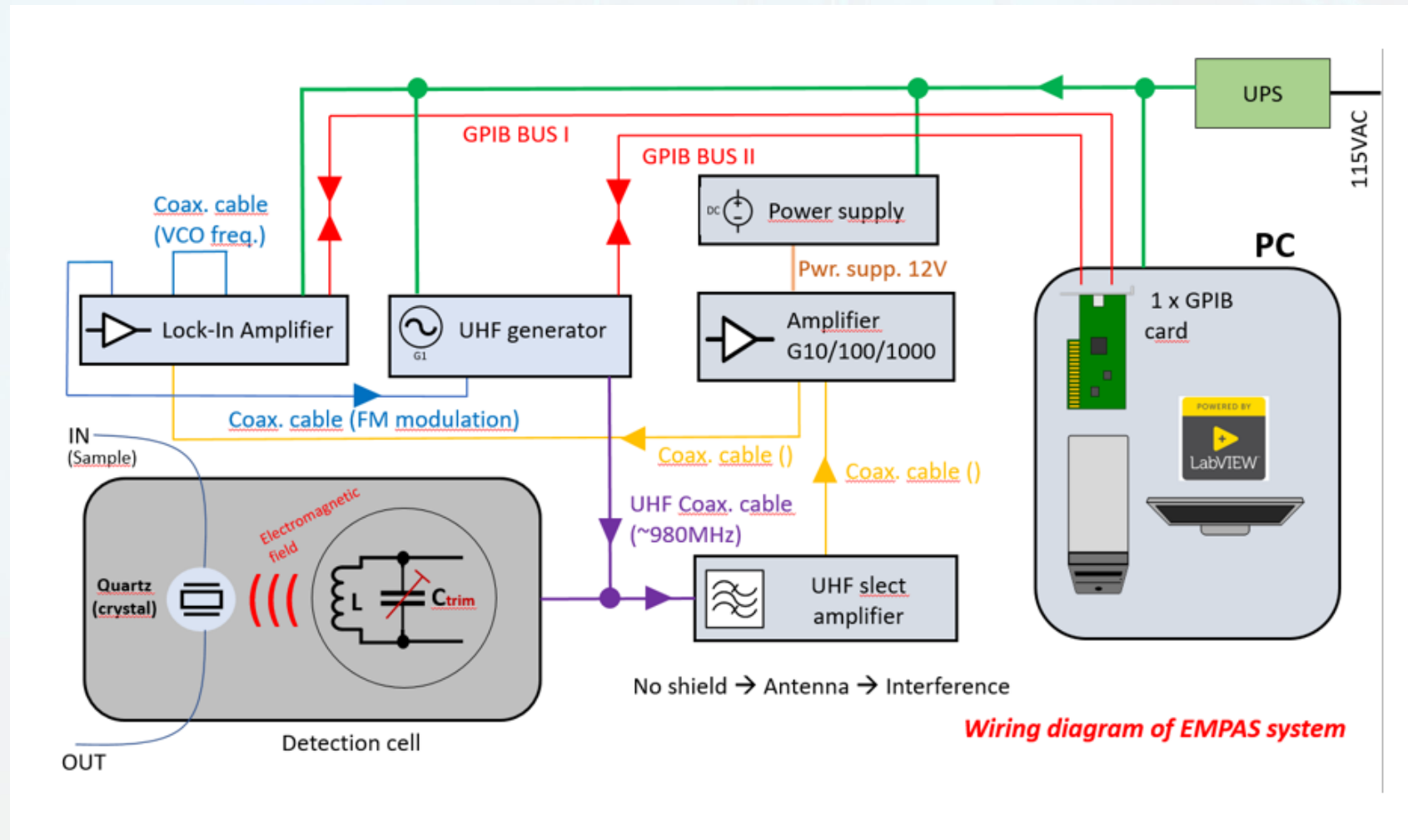
**2,515**

INTERNATIONAL

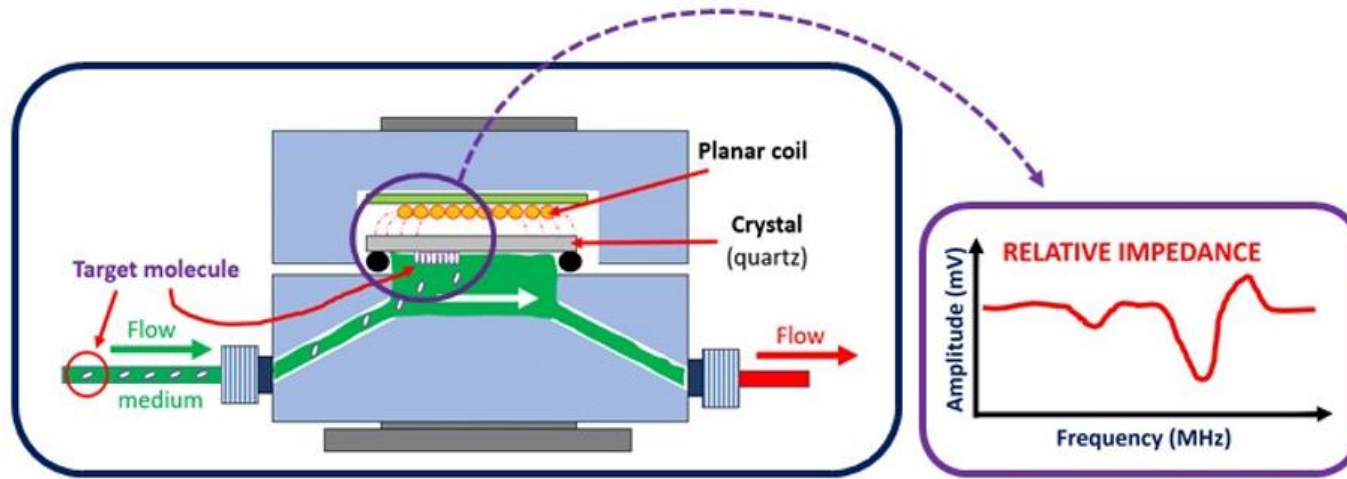
 **13,239**  
 Faculty  
 Members\*

 **6,470**  
 Staff  
 Members

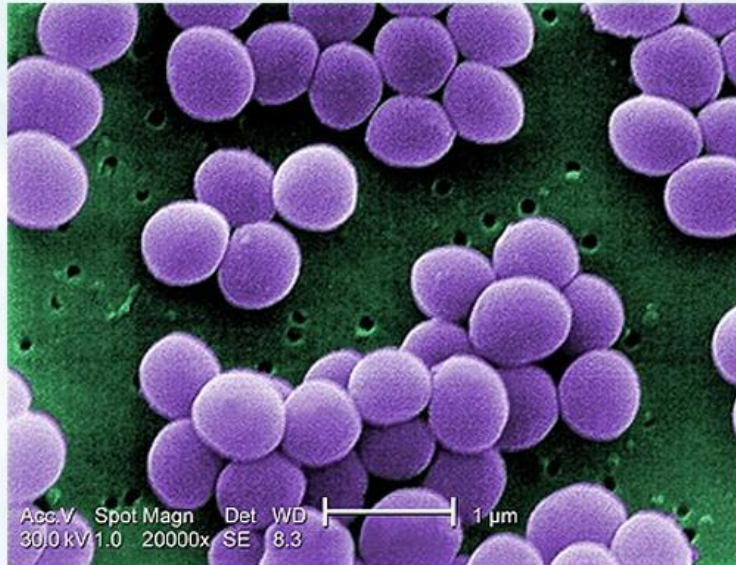
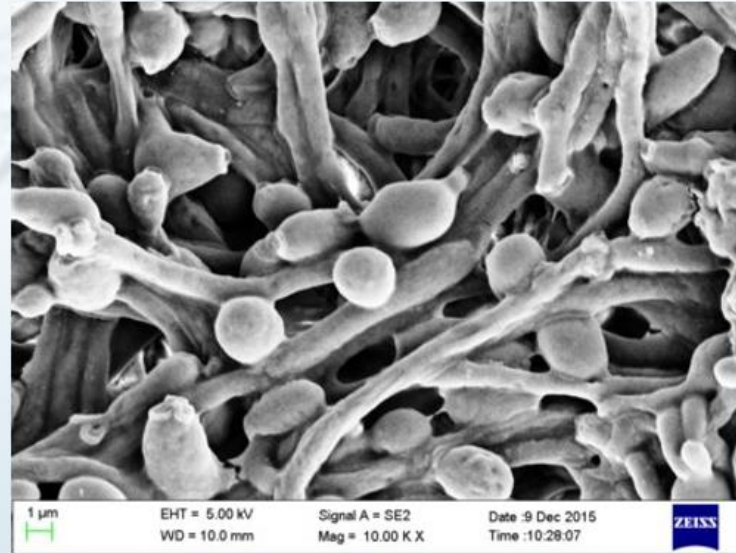
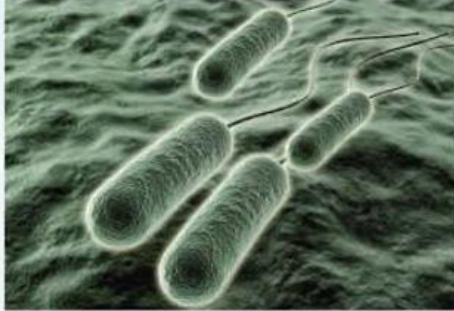
 **141**  
 Librarians



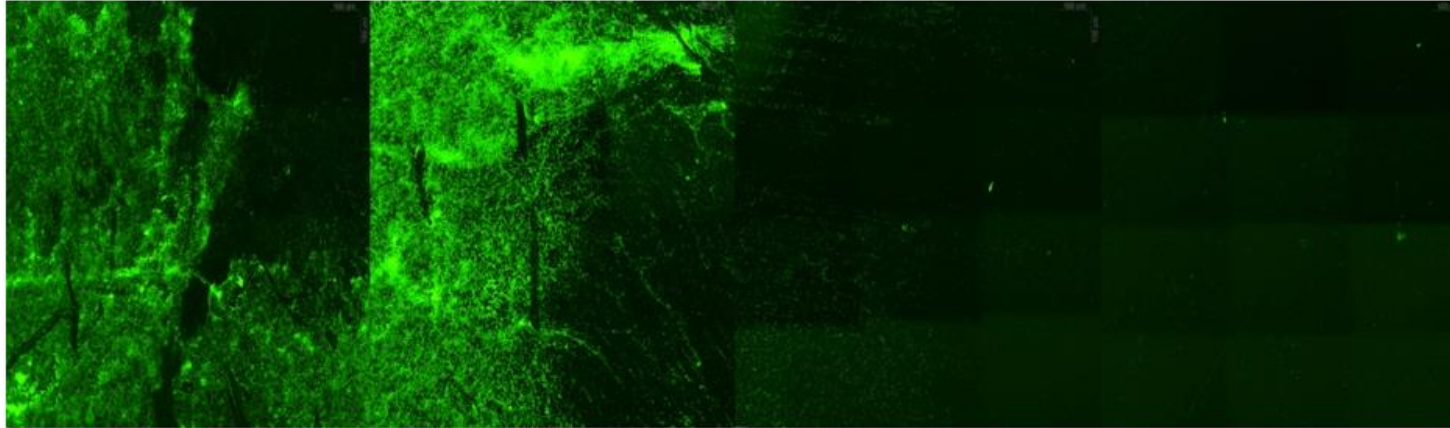




# Pseudomonas aeruginosa (PAO1), Candida (Fungus), Staphylococcus aureus



## MEG-OH Antibiofouling Cont.



- 20X magnification of the edges of the biofilms on PVC control samples (left two images), and areas of representative fouling on MEG-OH surfaces (right)

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### *Who we are, our main activity*

Skoltech was founded in 2011 in a partnership with MIT with the vision of being a world-leading academic institute of science and technology. As an academic institution, Skoltech primary mission is academic excellence in target domains. This includes performing cutting-edge basic and applied research and educating next generation of science, technology and business leaders. Therefore, Skoltech reinforces Russia's technology excellence in target domains and bridges the gap between research and industry. My lab is working with modified oligonucleotides to develop novel RNA therapeutics and diagnostics and to study molecular mechanisms of disease.

### *Website*

<https://crei.skoltech.ru/cls/research-projects/zatsepin-laboratory-projects/>

### *Type of partnership*

Academic and research institution

### *Experiences*

Research and Development in the fields of in vitro diagnostics (PCR, isothermic amplification, etc.) and RNA therapeutics

### *Facilities*

Laboratory equipment for the oligonucleotide (aptamer) synthesis, analysis and purification (RP- and IE-HPLC, HPLC-MS). Also we have equipment for in vitro/in vivo studies that can be hardly applied in this project.

### *Close collaboration with partners*

CUB, RCNS



## ***Our role in SAFEMILK project***

engineering and chemical modification of aptamers. Contribution to WP2

## ***Our objectives***

- **WP3 / Development of biosensors**

## ***Our expectations***

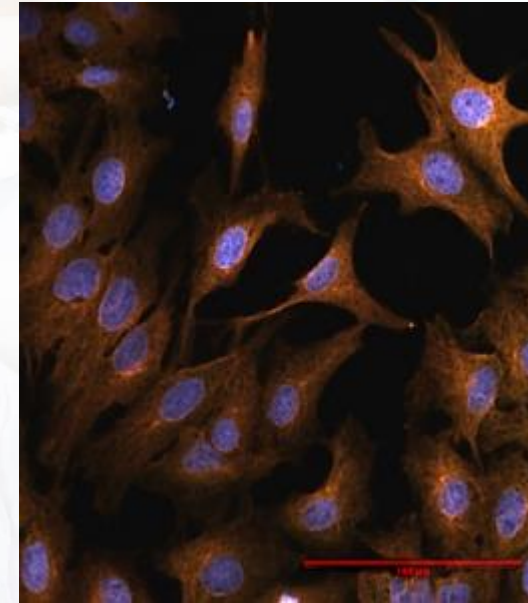
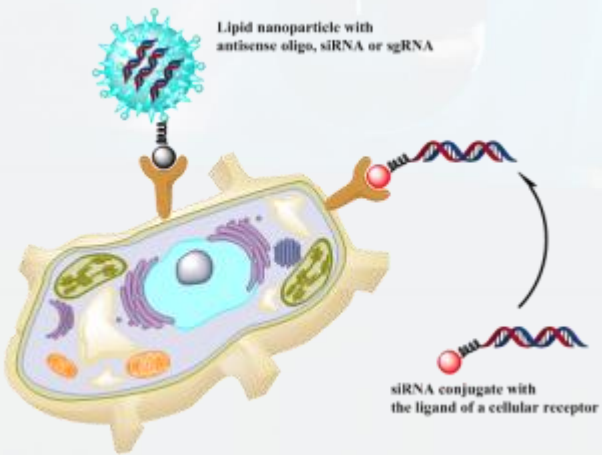
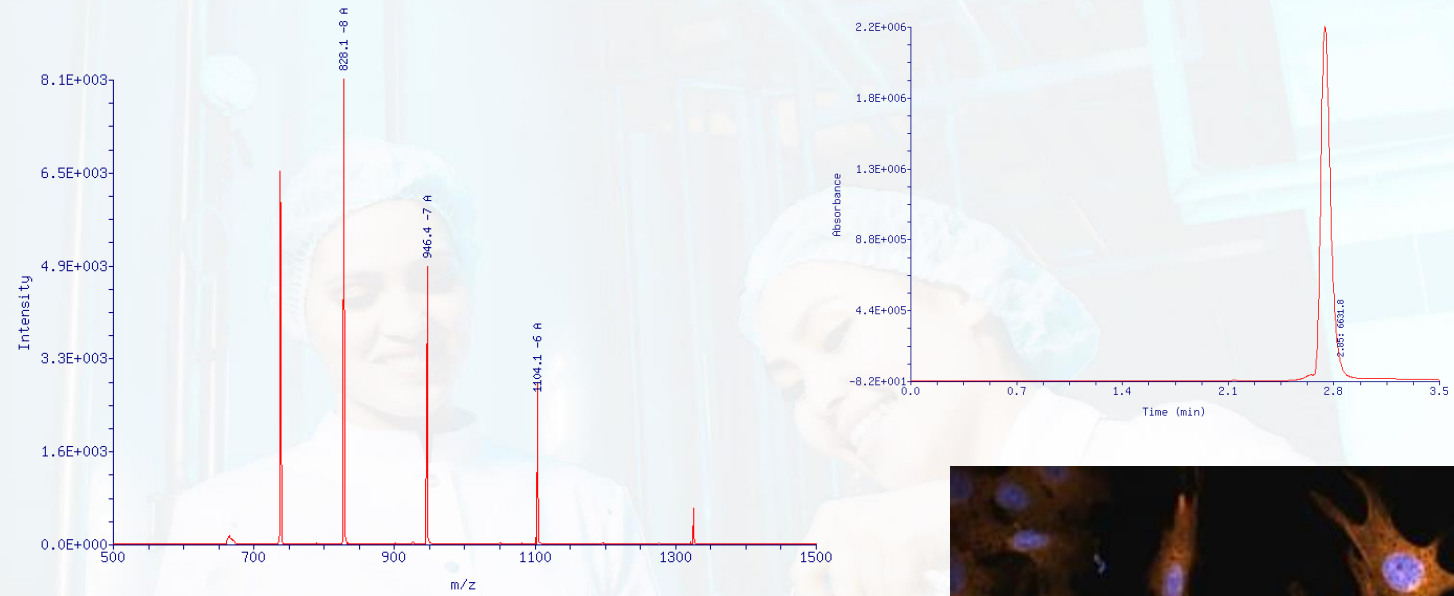
- Optimization of aptamer stability by chemical modification.
- Comparison of several linkers/chemistries for aptamer immobilization.
- Scale up of aptamer synthesis/purification for the industrial application.

## ***Responsible persons***

- Prof. Timofei Zatsepin – Head of the lab – [t.zatsepin@skoltech.ru](mailto:t.zatsepin@skoltech.ru)
- MSc. Denis Melnik – PhD student – [denis.melnik@skoltech.ru](mailto:denis.melnik@skoltech.ru)
- MSc. Svetlana Dukova – Research engineer – [s.dukova@skoltech.ru](mailto:s.dukova@skoltech.ru)



# References

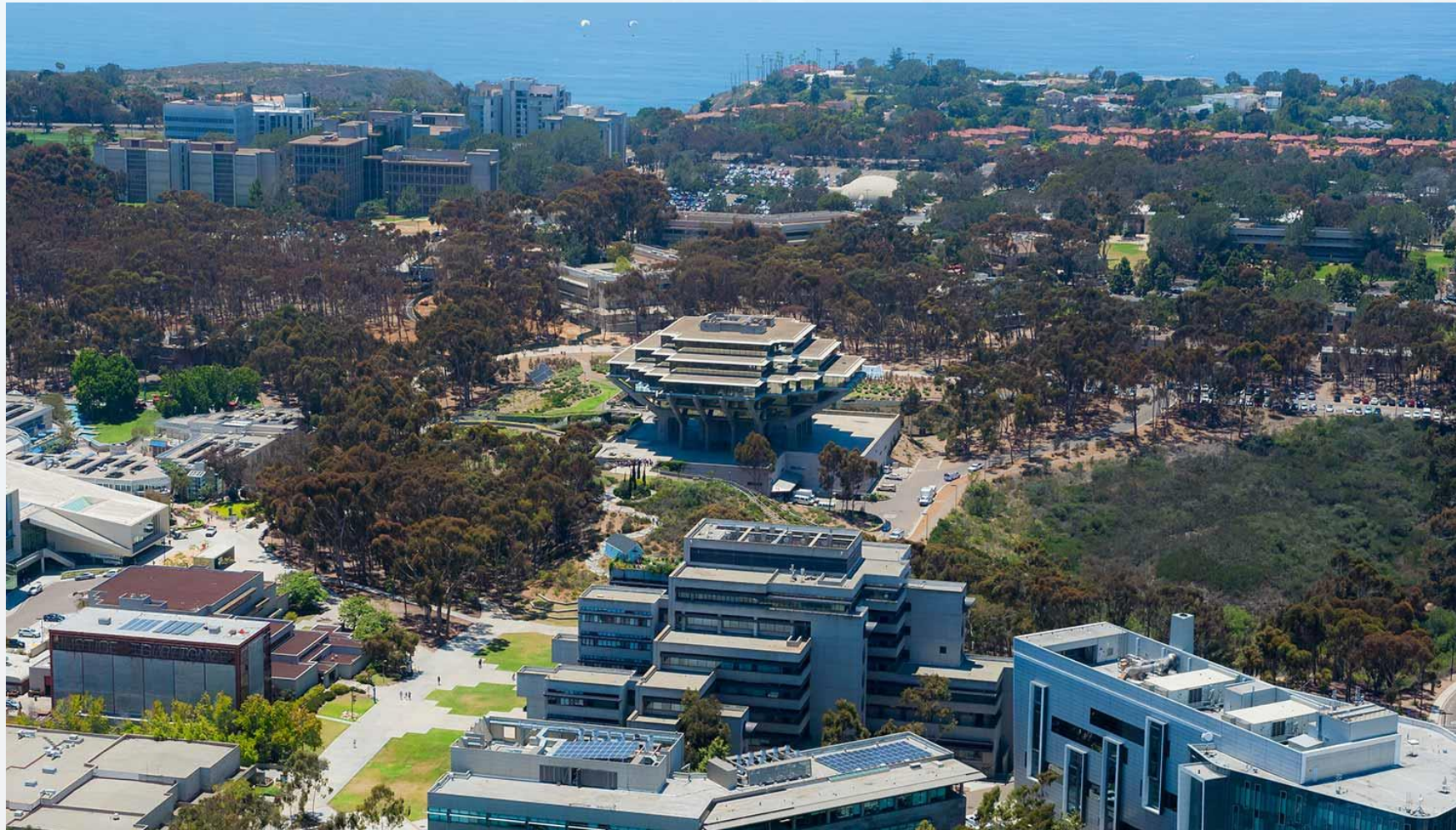


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CNMS (ILIA)



## Questions & Answers

If you have a question, you can also send it to an email and it will be answered later.

[miso.hanic@gmail.com](mailto:miso.hanic@gmail.com)



# Coffee break 1

17:25-17:30 (5 min)



# SESSION II.

17:30 -18:25 (55 min)

## Project informations and instructions



# Consortium

The SAFEMILK consortium consists of 6 well-established participants originating from 3 European member states and 4 member of Third countries constituting a balanced mix of research and industry with complementary skills and expertise.

## European member

POWERTEC S.R.O., BRATISLAVA, SLOVAKIA



UNIVERZITA KOMENSKÉHO V BRATISLAVE,  
BRATISLAVA, SLOVAKIA



TERMEZETTUDOMANYI KUTATOKOZPONT,  
BUDAPEST, HUNGARY



MAGYAR TEJGAZDASÁGI KISERLETI INTÉZET  
KORLATOLT FELELŐSÉGŰ TÁRSASÁG,  
MOSONMAGYAROVAR, HUNGARY



ETHNIKO KAI KAPODISTRIAKO PANEPISTIMIO  
ATHINON, ATHENS, GREECE



NATIONAL CENTER FOR SCIENTIFIC RESEARCH,  
AGIA PARASKEVI, GREECE



INTERMEDICAL NANODIAGNOSTICS LABORATORIES  
IDIOTIKA DIAGNOSTIKA KAI EREUNITIKA ERGASTIRIA  
MONOPROSOPHI IDIOTIKI KEFALAIOUCHIKI ETAIREIA,  
ATHENS, GREECE



## Member of Third countries

THE GOVERNING COUNCIL OF THE UNIVERSITY  
OF TORONTO, TORONTO, CANADA



SKOLKOVO INSTITUTE OF SCIENCE AND  
TECHNOLOGY, MOSCOW, RUSSIA



THE REGENTS OF THE UNIVERSITY OF  
CALIFORNIA, CA, UNITED STATES



UT BATTELLE LLC, OAK RIDGE,  
TENNESSEE, UNITED STATES



# Project objectives

This project is focused on the development of innovative methods for complex assay of food safety focused on rapid, sensitive and easy to use methods for detection pathogenic bacteria and antibiotics in milk and milk products.

The important result of the project is optimized complex assay for efficient assessment of milk safety, which could be commercialised by the project industrial participants.

The organization of training schools, workshops and transfer of novel technology will be among priorities of this proposal.





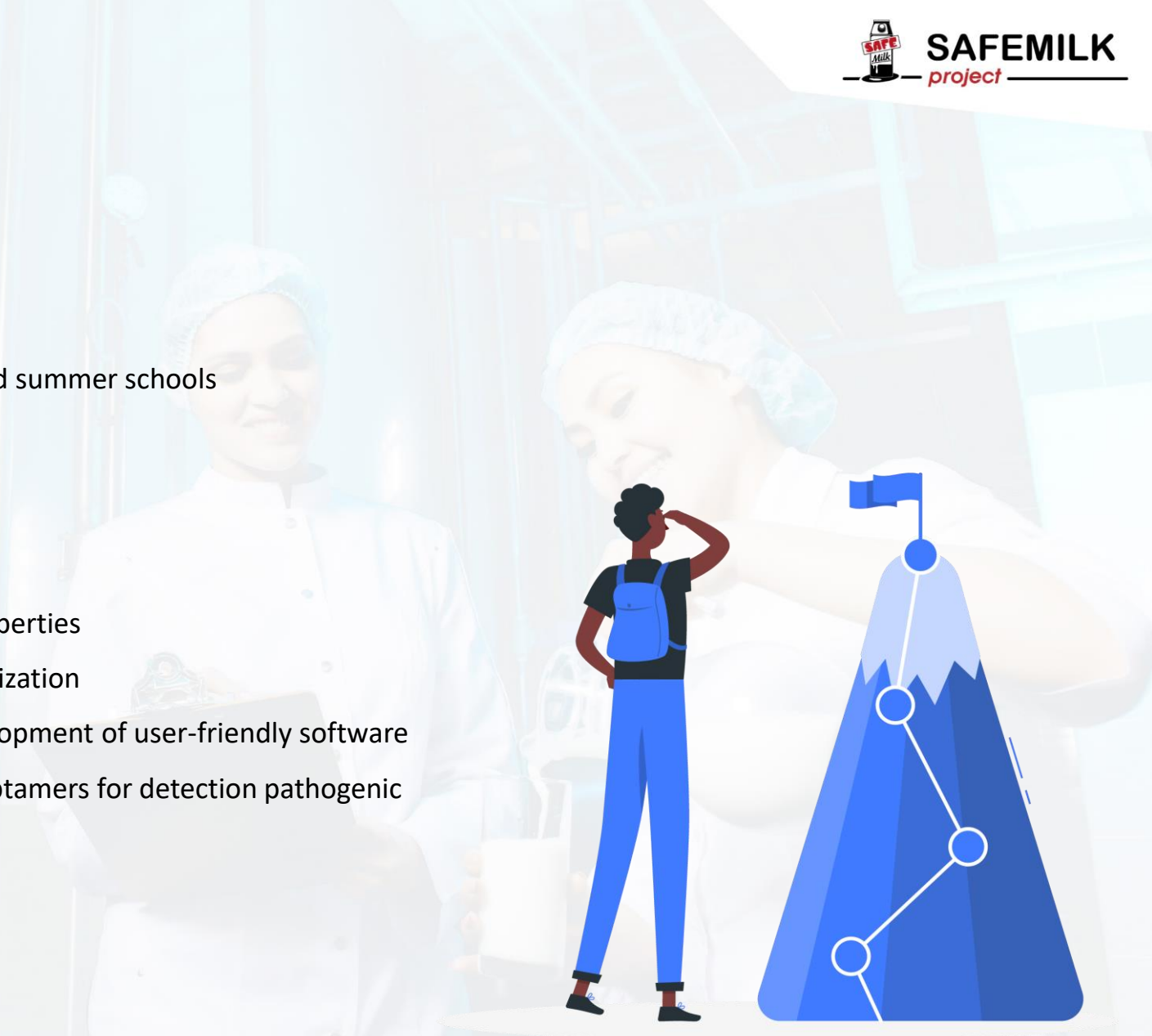
## Project objectives

The following key factors will determine the success of the project:

1. Excellent science
2. Transfer of technology
3. Training of the researchers through secondments, workshops and summer schools
4. Effective management

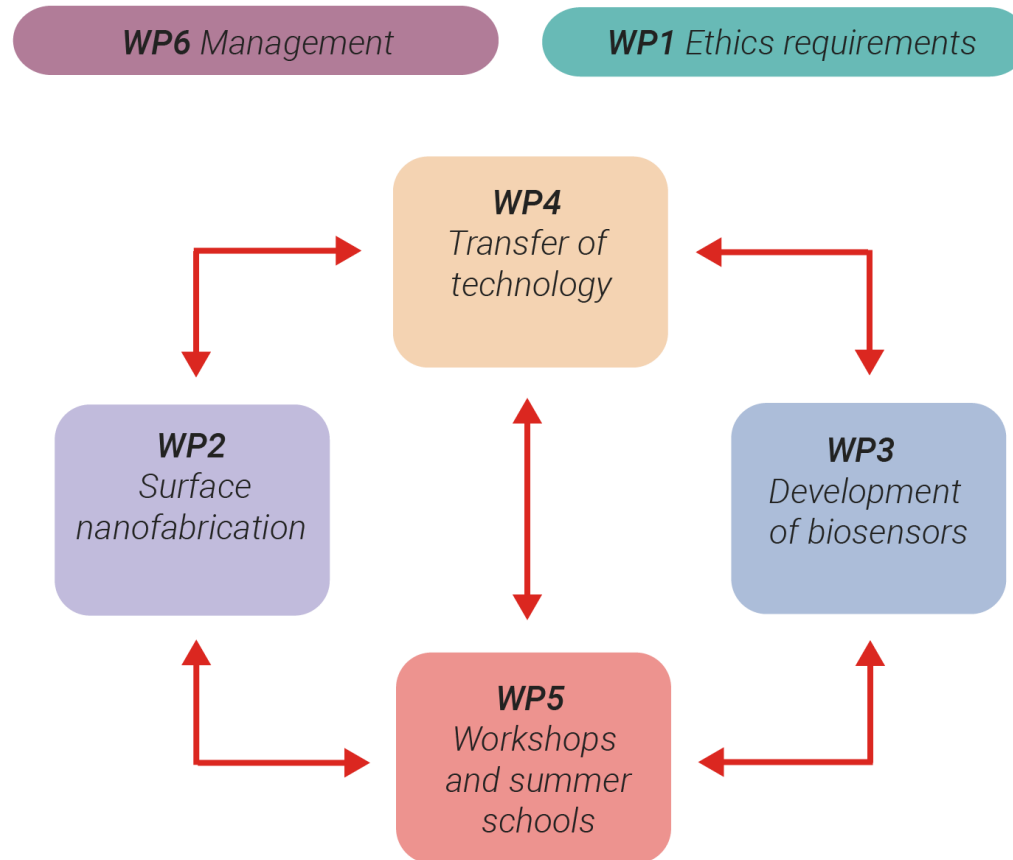
### Project priorities

1. first priority - preparation of sensing surface with antifouling properties
2. second priority - development of the methods for aptamer stabilization
3. third priority - construction of sensitive EMPAS system and development of user-friendly software
4. fourth priority - development of the biosensors based on DNA aptamers for detection pathogenic bacteria and antibiotics in milk



# Work plan

Pert chart for the SAFEMILK consortium



# Milestones

## Table of Milestones

Number	Title	Lead	Description	Work Package
M1	Chemical modification of aptamers	SKOL	Determination of affinity and structural properties by acoustics and CD spectroscopy	2
M2	Antifouling surfaces	CUB	Preparation of sensing surfaces with antifouling properties. Verification by acoustics and electrochemical methods	2
M3	Nanoporous surfaces	IMD	Preparation of nanoporous surfaces for optimized working electrodes	2
M4	Design and prototype of EMPAS	PTEC	Development of the prototype of EMPAS system.	4
M5	Biosensor for bacteria detection	CUB	Development of biosensors for detection pathogenic bacteria. Demonstration of optimize method, comparison with ELISA	3
M6	Biosensor for detection antibiotics	NKUA	Development of biosensors for detection antibiotics. Demonstration of optimized method comparison with ELISA.	3
M7	Summer school 1	CUB	Organisation of summer school "Surface modification and application of electrochemical acoustic techniques for detection affinity interaction using DNA aptamers as receptors"	3, 5
M8	Summer school 2	IMD	Summer school "IPR and patenting, transfer of knowledge from academia to industry"	4
M9	Summer school 3	RCNS	Summer school "Analytical methods and sensor technology for milk safety"	5
M10	Web site	PTEC	Establishment of the project web site	6

## Deliverables

Prepare the technical deliverables in the form of structured reports, by noting:

- Objective
- Work undertaken (link if to WP and secondments)
- Achievements / Results
- Conclusion / Follow up work (if applicable)



## Publications

### Open access to Peer Reviewed Publications (GA Art 29)

- Related to the project and the seconded researchers
- Link to the source of publication
- EU funding acknowledgment
- Open access - All papers must be published in Open Access International Journals



# Communication strategy

- The communication strategy will involve establishment of project web page, which will contain information on the institution's involvement, on the opportunities for study, postdoctoral fellowship and jobs.
- Facebook and Twitter will also be used for dissemination of the information about the project.
- The planned training schools, workshops and conferences will be based on open access strategy and will be available also for students and scientists from other institutions and industrial companies that are not members of the project consortium.

## Official logos of Safemilk project



### WEB [www.safemilkproject.com](http://www.safemilkproject.com)



### Facebook [SafeMilk project](#)



### Tweeter [SafeMilk project](#)



# Secondments

**Eligible Staff is linked to R&I activities of participant and at least for 1M prior to the secondment**

- Prepare well in advance (12 M, logistics/visas etc.)
- Keep an eye on implementation of all participants & try to mitigate delays (possible back-ups)
- Update Portal with **Research Declarations** (20 days)
- Secondments can be divided in split stays but each split must be recorded in the same RD

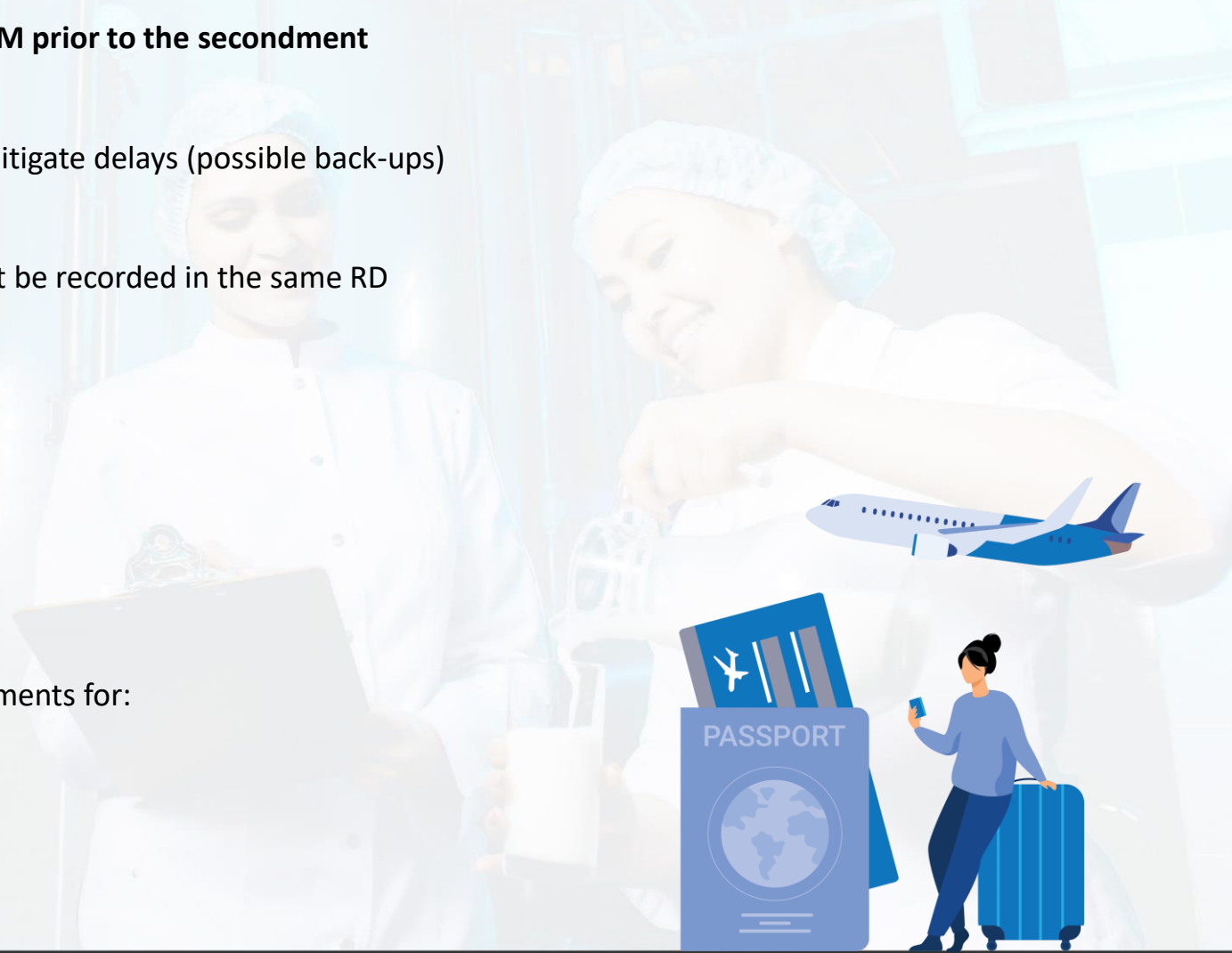
**Eligible secondments**

- each secondment must last  $\geq 1$  M
- duration of all RD for each staff must be  $\leq 12$  M

**Coordinator and Beneficiary must be prepared for possible AUDIT**

Each Beneficiary/AC declares secondments AND keep supporting documents for:

- their own staff who are seconded (check with HR)
- the staff coming from non-associated TC
- non associated TC do not sign GA / not responsible



## Secondments

### Eligibility of staff members

Staff eligible for secondments: (Seconded person must be employed at least 1 month full time prior first secondment)

- PhD
- External consultant
- Technical staff linked to R&I activities
- Managerial and administrative staff involved in R&I activities

### Special case:

Master students: generally lacking the necessary expertise/training to actively contribute to R&I activities performed in the frame of the project

(Master students are not eligible for secondments)

Type of relationships (employment contract, fellowship or other) is **NOT relevant** - as long as it:

- complies with national law
- complies with internal practices
- confers the necessary legal means in terms of controls and instructions





## Secondments

### In case of audit, to remain on the safe side:

- **Proof of payments to support the secondees:** cat A Researchers costs - 2100€, including bills for travel and accommodation for the duration of the secondment.
- **Secondment agreement:** certificate of participation signed by the host with planned/achieved research activities and reference to the WP & D.
- **Any proof of 100% laboratory activity:** including laboratory books, timesheets according to sending/hosting rules.
- **Report from the secondee** on specific activity performed during the secondment.
- **CV** of the secondees indicating working history and adequate qualifications and training.  
Templates related to the secondments will be sent to all PI (1. Agreement on secondment, 2. Secondment notebook, 3. Report on secondment, 4. Confirmation of secondment)



## Secondments

In case of audit, to remain on the safe side:

- Documents showing the **scientific expertise** of the person and relevant for the planned research activities (e.g. diploma, solid prior training/experience/qualifications).
- **Employment contract/legal contractual link** with the sending institution according to national/local law (check with your Human Resources) which continuously covers 100% of activity for more than 1 month before secondment and the secondment itself (legal document and bank transfers of salary – extensions of contract allowed).
- **Any proof of presence at the host:** bills at the corner's shops, renting agreement, boarding passes during secondment.



## Secondments

### Amendment secondments / TERA / add participant / extension

- Contact PO is you need to change secondments
- PO will tell if an amendment is needed and will provide instructions when relevant



## Financial (possible audit)

The coordinator shall redistribute of the funds to the Parties (EU project partners) not later than 10 calendar days after receiving them from Funding Authority.

- Each partner must have a **separate account** to receive funds from the SAFEMILK project (Funding Authority).
- Under no circumstances may other funds from another project appear on the beneficiary's account.
- Every **drawdown** of funds must be **justified** and properly **documented**.
- Funds can be **used only** in accordance with the EU directive defining the **purpose** of their use for this project.
- **It is necessary to have documents** in order concerning the use of funds for a possible **audit** from the EU.

### EU financial contribution in RISE action

- Calculated on basis of unit costs (fixed per PM)
- Critical to implement all planned secondments to receive the full EU contribution

### Payments – Transfer to TC

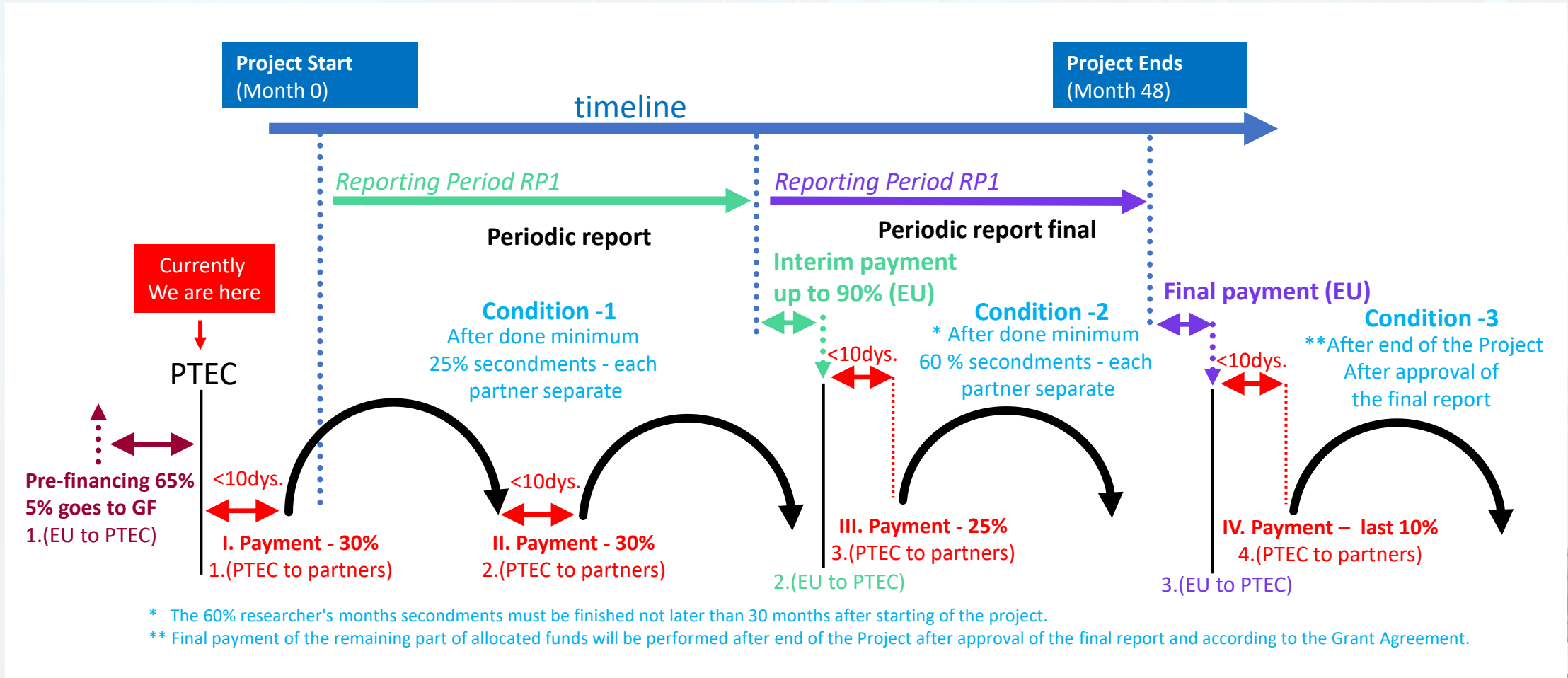
*Distribution of funds towards TC to be agreed in the Partnership Agreement*

- Beneficiaries may transfer funds to TC partners
- Possibility of relocation of funds from B category to A category (e.g. to complement category A for seconded staff)



# Financial (possible audit)

## Project Payments

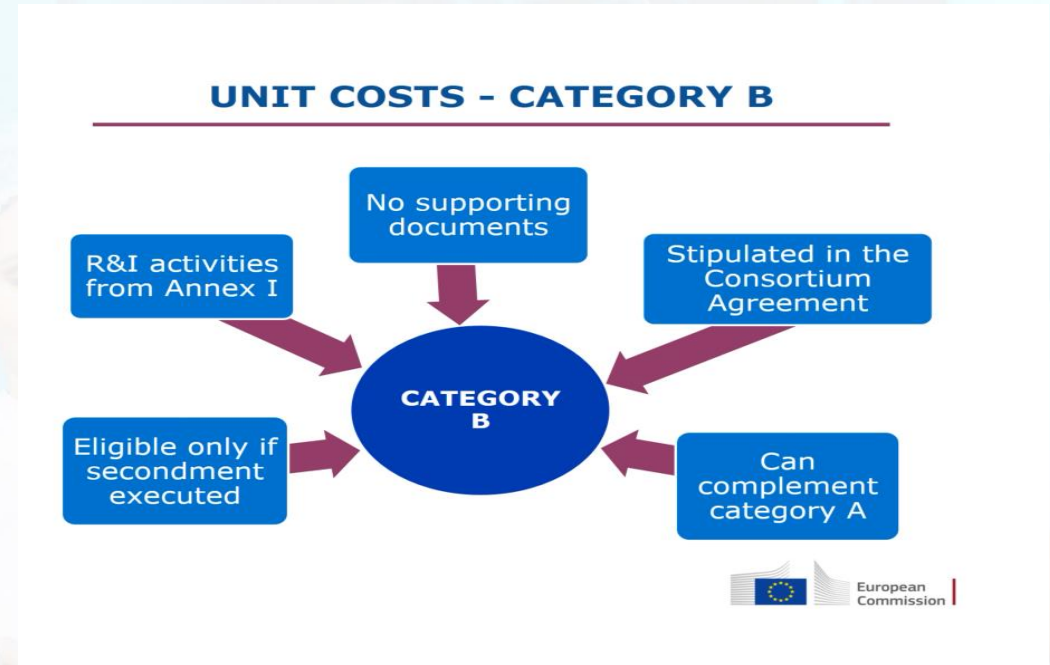


# Financial (possible audit)

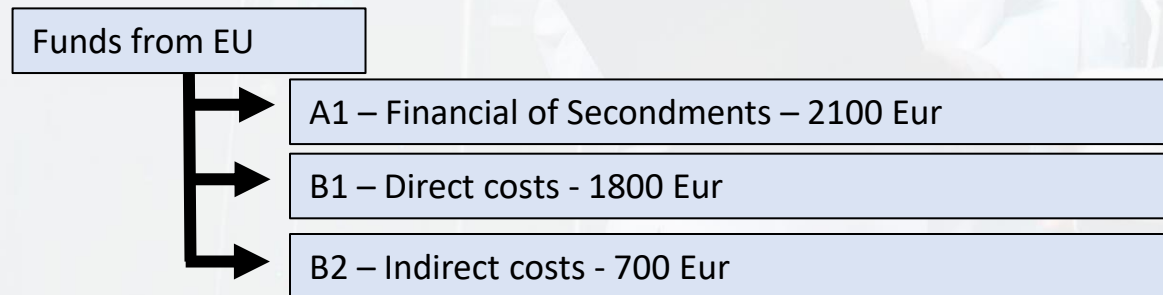
## Unit costs per researcher per month

### For secondments eligible for funding

Marie Skłodowska-Curie Action	Staff member unit cost * <i>person/month</i> Top-up allowance	Institutional unit cost * <i>person/month</i>	
		Research, training and networking costs	Management and indirect costs
Research and Innovation Staff Exchange	<b>2 100</b>	<b>1 800</b>	<b>700</b>



\*These unit costs are subject to a funding rate of 100% and no country coefficients apply.



## Reporting (Regularly update, reporting tabs)

### Make sure to submit reports on time

- Progress reports (deliverables at M13 & M37)
- **Mid Term Meeting** (M13-18; middle of period 1)
- Periodic reports (specific module at M24 & M48)
- Reflect early on MTM organisation (around M14-15)

### Regularly update Reporting tabs with info about:

- Publications & dissemination
- SME growth (if applicable, e.g. growth of employees/turnover)
- Gender aspects (females in research/workforce)
- Other tabs



# Reporting (Regularly update, reporting tabs)

## PERIODIC REPORTING

Grant Management		Project Periodic Report										
 MSCA-RISE <b>HORIZON 2020</b> <small>THE HORIZON PROGRAMME FOR RESEARCH AND INNOVATION</small> Period No: 1    Duration (months): 24 Reporting Period : [01 Jan 2015 - 31 Dec 2016]		Summary for publication	Deliverables	Critical Risks	Publications	Dissemination Communicati	Patents (IPR)	<b>SME Impact</b>	<b>Gender</b>	<b>Tech.Report (Part B)</b>	Financial Statements	Researchers
		✓	i	⚠	✓	✓	i	✓	✓	i	i	i

### SME impact / Gender

- Information to be filled in
- Answer to project impact assessment

### Part B of Periodic Report - Technical report

- Progress
- Deviations
- Links of secondments with tasks
- Delays
- Mid-term meeting recommendations





# Reporting (Regularly update, reporting tabs)

## PERIODIC REPORTING

Grant Management		Project Periodic Report										
 MSCA-RISE HORIZON 2020 Period No: 1 Duration (months): 24 Reporting Period : [01 Jan 2015 - 31 Dec 2016]		Summary for publication	Deliverables	Critical Risks	Publications	Dissemination Communicati	Patents (IPR)	SME Impact	Gender	Tech. Report (Part B)	Financial Statements	Researchers
		✓	i	⚠	✓	✓	i	✓	✓	i	i	i

### Researchers – RDs

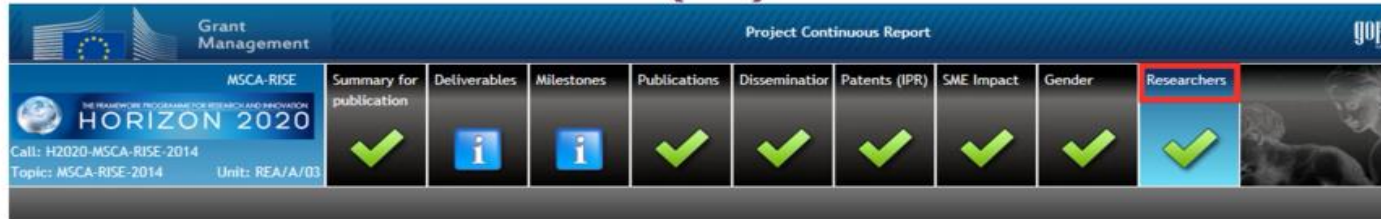
- All RDs in SYGMA
- Split stays
- Final period



# Reporting (Regularly update, reporting tabs)

## CONTINUOUS REPORTING

### Researcher Declarations (RD)



#### Researcher Declaration

Project's Researcher Library ← **Library of RDs: shows duplicate entries**

Fellow Id	First Name	Last Name	Gender	Birthdate	Nationality	Submitted Declarations
1	Domen	Domen	M	19-12-1989	SI - Slovenia	1 of 1
2	Valentina	Valentina	F	31-01-1980	IT - Italy	1 of 1
3	Greta	Greta	F	19-03-1975	IT - Italy	1 of 1
4	Jure	Jure	M	23-04-1989	SI - Slovenia	1 of 1

#### Researcher Declaration ← **Secondment Declarations**

Nc	Fellow Id	First Name	Last Name	Status	Sending Organisation	Secondment Organisation	Start Date	End Date	Working Time Commitr	Duration
1	1	Domen	Domen	SUBMIT	G	G	04-05-2011 04-10-2011 08-04-2011 06-10-2011	02-07-2011 02-11-2011 06-06-2011 04-12-2011	Full Time Full Time Full Time Full Time	6.93
2	2	Valentina	Valentina	SUBMIT	U	U	30-06-2011	13-08-2011	Full Time	1.5
3	3	Greta	Greta	SUBMIT	Pi	Pi	13-07-2011 13-07-2011 08-02-2011	12-01-2011 18-11-2011 31-03-2011	Full Time Full Time Full Time	12
4	4	Jure	Jure	SUBMIT	G	G	01-03-2011 30-08-2011	29-08-2011 25-11-2011	Full Time Full Time	8.83

**Splits correctly encoded** →



# Reporting (Regularly update, reporting tabs)

## PERIODIC REPORTING

Grant Management		Project Periodic Report										
 MSCA-RISE <b>HORIZON 2020</b> Period No: 1    Duration (months): 24 Reporting Period : [01 Jan 2015 - 31 Dec 2016]		Summary for publication	Deliverables	Critical Risks	Publications	Dissemination Communicati	Patents (IPR)	SME Impact	Gender	Tech. Report (Part B)	<b>Financial Statements</b>	Researchers
		✓	i	⚠	✓	✓	i	✓	✓	i	i	i

### Financial Statements – FSs

- Researcher Declarations (RDs)
- RD modified
- Beneficiary submits to COO
- Coordinator to REA
- Terminated beneficiaries
- Check Operating grant "0"

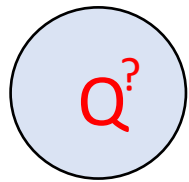


# Recommendation

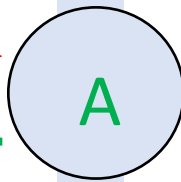
(It's better to ask questions first than to solve the following problems.)

## Q / A system - for more efficient and safer project management

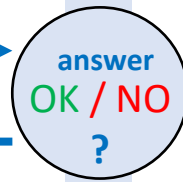
**Partner**  
(write your question and send it to coordinator)



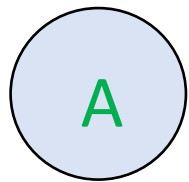
Process 1  
**Coordinator**



Process 2  
**Project officer (EU)**



**All Partners**

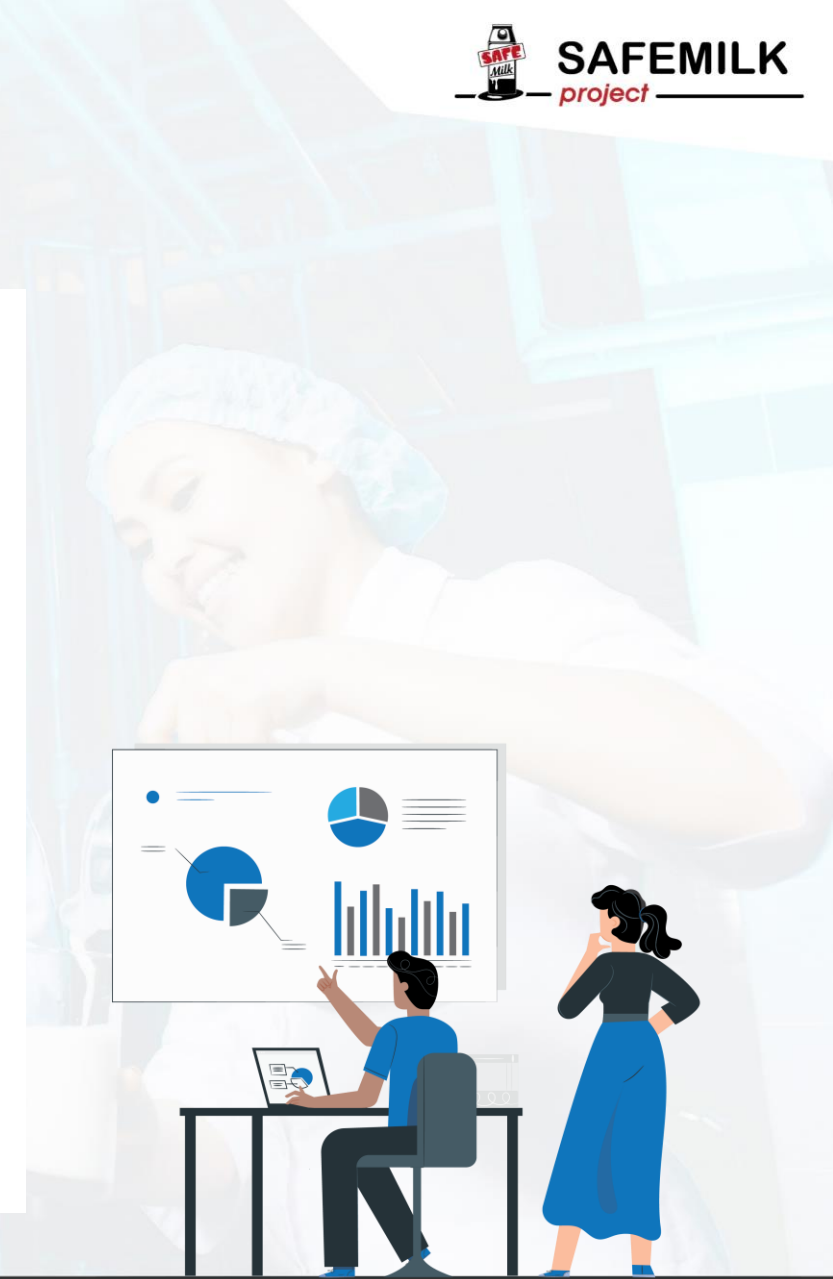


Process 3

**Process 1** - Evaluation of the question based on the subject of the question. If the question is risky, the answer is given to confirm the PO.

**Process 2** - PO confirms the answer or makes changes.

**Process 3** - If the question with the answer is important, it will be forwarded to all partners.



## Questions & Answers

If you have a question, you can also send it to an email and it will be answered later.

[miso.hanic@gmail.com](mailto:miso.hanic@gmail.com)



# Coffee break 2

18:25 - 18:30 (5 min)



## SESSION III.

18:30 - 19:00 (30 min)

### Work Packages - tasks for the next 6 months

(5 minutes presentation each)



## Work Package - 1 (WP-1) / Ethics requirements / PTEC

### Lead Beneficiary

PTEC

### Participating organisation

PTEC,

### Objectives

- The objective is to ensure compliance with the 'ethics requirements' set out in this work package.

### Description of Work and Role of Specific Beneficiaries / Partner organisations:

- The project coordinator Dr. Martin Donoval (PTEC) will be responsible for compliance of the ethic requirements.

### Deliverables

- D1.1 NEC - requirement No. 1
- D1.2 NEC - requirement No. 2
- D1.3 EPC - requirement No. 3



Workpackage 2

Months 1-48

- **Main Objectives:**
- 2.1 Preparation and optimization of surfaces with antifouling properties for aptamer immobilisation.
- 2.2 Preparation and study of nanoporous layers for electrochemical biosensing
- 2.3 Chemical modification of aptamers for use in electrochemical biosensing
- 2.4 Optimization of aptamer structures

## Task 2.1

- **Preparation and optimization of surfaces with antifouling properties for aptamer immobilisation.**

The recently developed MEG-Cl linker will be used for preparation of antifouling surfaces with immobilized DNA aptamers of various configurations. Antifouling properties in milk will be analyzed by acoustics methods. New linkers with improved properties will be developed such as monoethylene-glycol dithiolane. The molecular imaging methods such as AFM and SEM will be used for characterization of surface structure and topography

## Task 2.2

- **Preparation and study of nanoporous layers for electrochemical biosensing**
- TiO<sub>2</sub>:Mn layers will be deposited on the surface of carbon or gold electrodes for preparation of electrochemical aptasensors. In particular, aptamers modified by an amino group at one end will be adsorbed in carefully engineered nanopore surfaces. The density of aptamers will be controlled by optimizing the ratio of aptamer and zwitterionic peptides, which later will serve as antifouling agents.
- Work will also be conducted on the development of appropriate surface functionalization protocols for the integration of the aptamers into solid substrates (such as Cyclic Olefin Polymer). These protocols will be based both on wet chemistry as well as vapor deposition (CVD), while attention will be given to their reproducible application onto the surfaces.

## Task 2.3

- **Chemical modification of aptamers for use in electrochemical biosensing**
- In an aim to provide better flexibility of the DNA aptamers, they will be modified at one end by polyethylene glycol and at second end by methylene blue for application in electrochemical aptasensors. The length of the PEG will be optimised. Aptamer homo and heterodimers will be constructed for increasing affinity to bacteria or antibiotics.

## Task 2.4

- **Optimization of aptamer structures**
- We are planning of using Circular Dichroism spectroscopy for determination not only the binding constant of the interaction between the aptamers and their targets but also to gain a deeper understanding into the configurations acquired by the former in the presence of the target. Furthermore, and using **docking simulations**, the existing aptamers will be further optimized through the introduction of truncations and mutations at selected sites, thus validating the results of the simulation studies and ultimately resulting in aptameric sequences with higher affinities for their target analytes.

## Work Package - 3 (WP-3) / Development of biosensors / CUB

### Lead Beneficiary

Comenius University (CUB)

### Participating organisation

CUB, NKUA, DEM, HDRI, RCNS, IMD, PTEC, UTR, CNMS, UCSD, SKOL

### Objectives

- Development of electrochemical and acoustic aptasensors for detection pathogenic bacteria.
- Development of electrochemical, acoustic and optical aptasensors for detection antibiotics.
- Verification of aptasensors in milk.
- Training of researchers in biosensor technology.
- Transfer of biosensor technology to end-users.

### Tasks

- Task 3.1 – EMPAS and multiharmonic QCM sensors for detection bacteria (CUB)
- Task 3.2 – Electrochemical sensors for detection bacteria (CUB)
- Task 3.3 – Electrochemical sensors for detection antibiotics (RCNS)
- Task 3.4 – Optical sensors for detection bacteria and antibiotics (NKUA)

## Risks

### Issues: Sensitivity of biosensors and matrix effect

- **Too high matrix effect in aptasensors** – optimization of antifouling properties of aptasensors
- **Low sensitivity of electrochemical sensor** – optimization of the modification of aptamers by redox markers, improvement of conducting properties of the surfaces

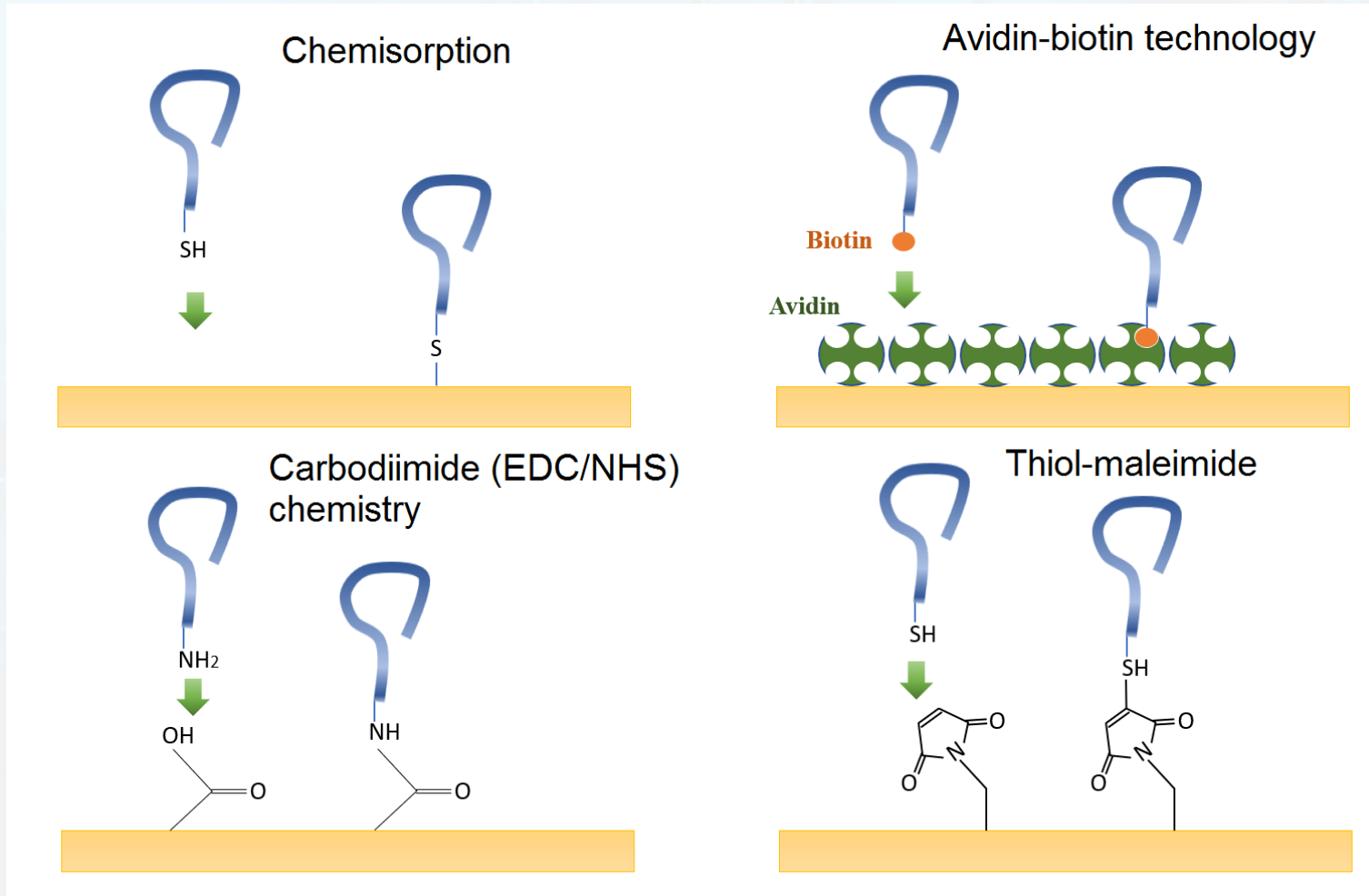
## Deliverables

- D3.1 (M48) Biosensing assay for detection bacteria in milk (**CUB - report**)
- D3.2 (M48) Biosensing assay for detection antibiotics in milk (**NKUA - report**)
- D3.3 (continuously) Articles in per-reviewed open access journals (**All partners**)

## Planned activity for the next 6 months

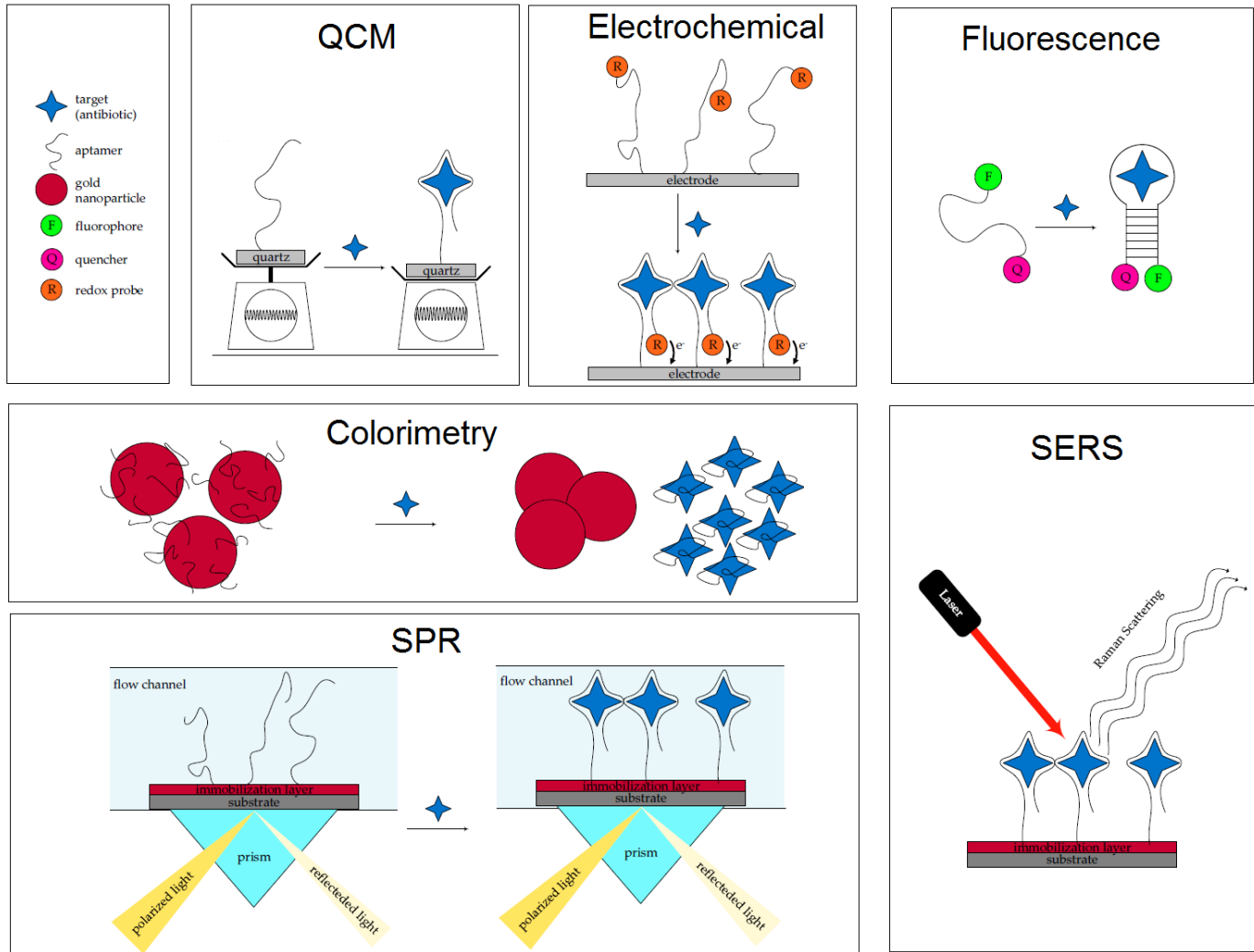
- Selection of aptamers for detection bacteria and antibiotics (CUB, SKOL).
- Aptamer synthesis and chemical modification (CUB, SKOL).
- Optimization of immobilization of aptamers at the nanofabricated surfaces (CUB, NKUA, IMD, UTR).
- Application of multiharmonic QCM for detection selected antibiotics (penicillin, ampicillin, oxytetracycline) (CUB, UTR, CNMS).
- Application of electrochemical methods for detection selected antibiotics (oxytetracycline) (RCNS, PTEC).
- Application of optical methods for detection selected antibiotics (penicillin, ampicillin, oxytetracycline) (NKUA, DEM, IMD).
- Preparation of the first workshop (CUB, PTEC)

# The principles of aptamer immobilization at surfaces

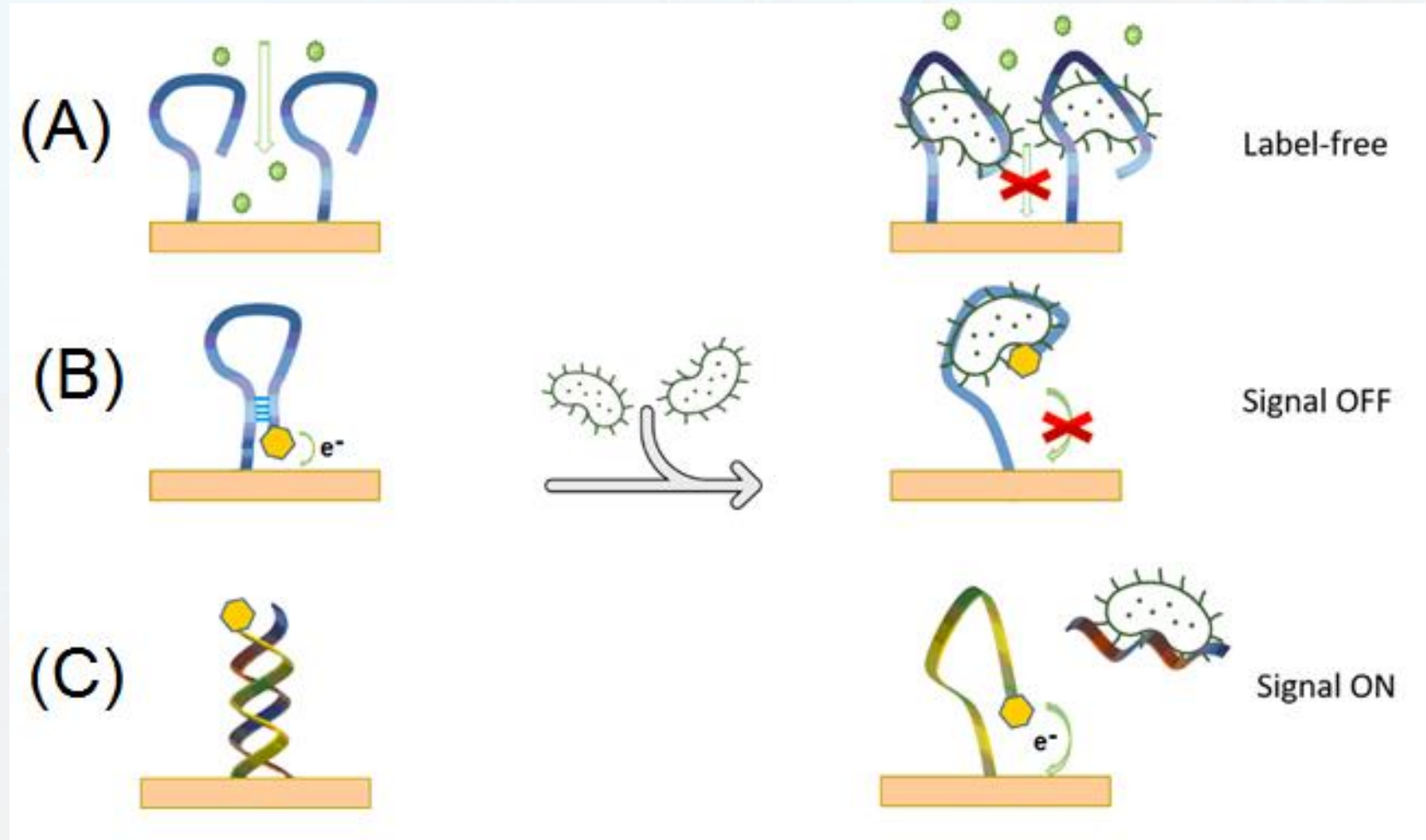




# The most used methods for aptamer-analyte detection



## The principles of electrochemical detection and aptamer configuration



## The examples of aptamer sequences for bacteria and antibiotics

### Aptamer for detection *Listeria innocua*

5': Supporting part

5'-TAC TAT CGC GGA GAC AGC GCG GGA GGC ACC GGG GA-3'

( $K_d=48.74$  nM)

#### References:

Duan et al. *Food Control* **2013**, 33, 239-243.

Trunzo and Hong *Int. J. Molec. Sci.* **2020**, 21, 5074. (Review)

### Aptamer for detection oxytetracycline

5': Supporting part

5'-CGA CGC ACA GTC GCT GGT GCG TAC CTG GTT GCC GTT GTG T- 3'

( $K_d=4.7$  nM)

#### References:

Kim et al. *Biosens. Bioelectron.* **2013**, 51, 426–430

Mehlhorn et al. *Biosensors* **2018**, 8, 54. (Review)

## How to order oligonucleotides (aptamers)

### **Biosearch Technologies, Denmark**

<https://www.biosearchtech.com>

eu@biosearchtech.com (Order form available)

Recommended synthesis scale: 1  $\mu$ M

Recommended purification: RP-HPLC



## Work Package - 4 (WP-4) / Transfer of technology / PTEC

### Lead Beneficiary

PTEC

### Participating organisation

PTEC, RCNS, CUB, HDRI, NKUA, SKOL

### Objectives

- Transfer of technology of developed biosensors for detection pathogenic bacteria and antibiotics in milk to end-users.
- Novel optimized electrodes for aptamer based sensing.
- Development of the prototype of EMPAS acoustics system.
- Adaptation of miniature potentiostat for electrochemical detection of antibiotics in milk.
- Main focus will be on R&I, transfer of knowledge of advanced analytical methods and in training of using EMPAS system and miniature potentiostat.

### Tasks

- Task 4.1 - Development of EMPAS
- Task 4.2 - Verification of developed assay
- Task 4.3 - Adaptation of miniature potentiostat
- Task 4.4 - Demonstration of novel analytical methods to end-users
- Task 4.5 - Commercialization of EMPAS system

## Risks

- **Issues with prototyping**

Problems within the realization of electronics (RF parts) and mechanical design of the detection chamber.

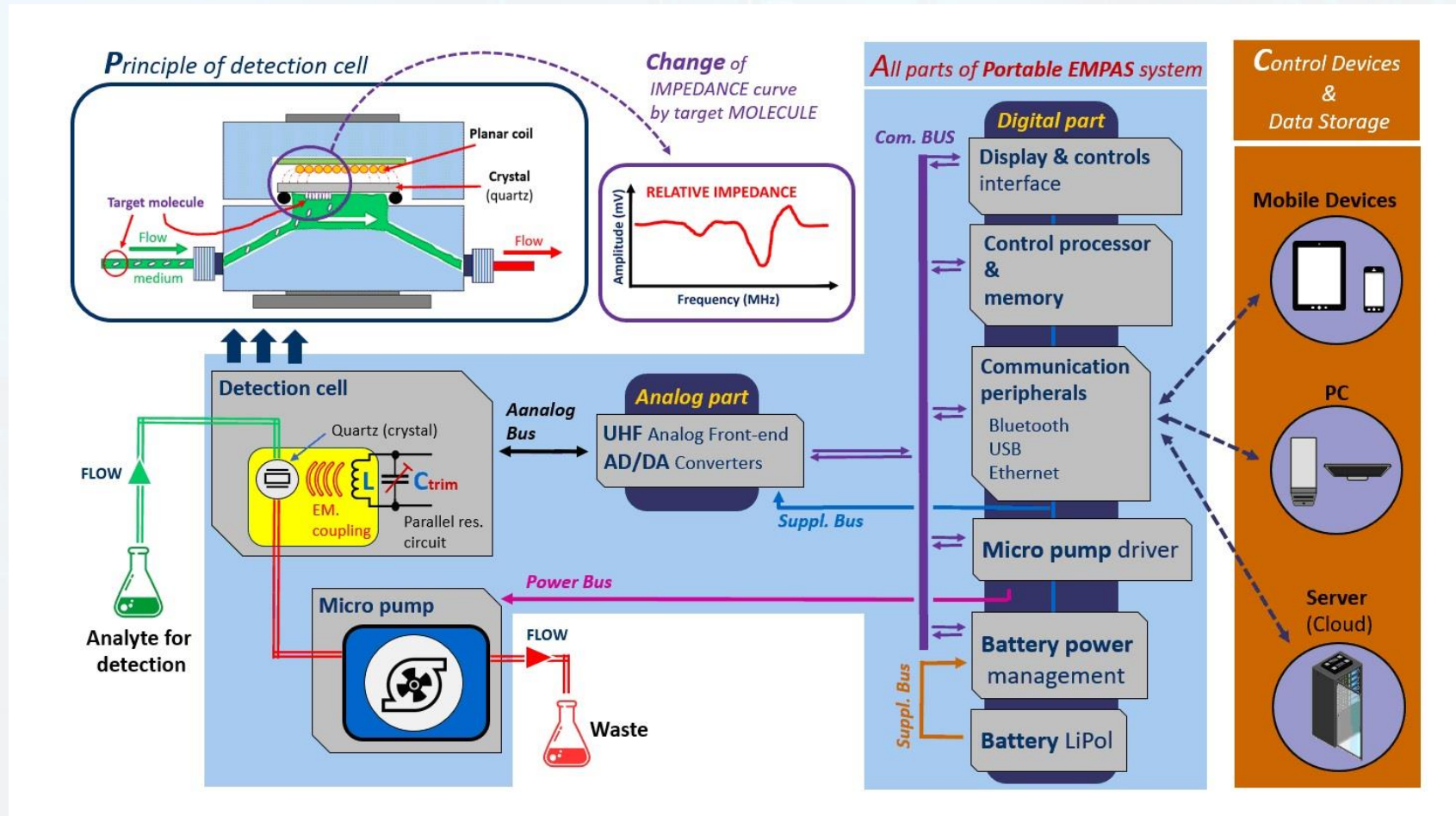
## Deliverables

- D4.1 (M44) Demonstration of EMPAS and miniature potentiostat based aptasensors for detection of bacteria and antibiotics to the end-users in dairy industry (PTEC, CUB, RCNS, HDRI).
- D4.2 (M48) Construction of EMPAS, software and flow cell (PTEC)

## Planned activity for the next 6 months

- Modification of potentiostat parameters with focus on differential pulse voltammetry.
- Debugging of potentiostat parameters and subsequent verification of measurements with commercially available laboratory methods in cooperation with project partners.
- Analysis of EMPAS system and electroacoustic measurement methods.
- Market research focusing on State of the art available commercial solutions for electroacoustic measuring systems.
- Analysis of the acquired theoretical knowledge about the EMPAS system and their subsequent transformation into the prototype of the EMPAS portable system.

# The principle of the proposed EMPAS device



## Work Package - 5 (WP-5) / Workshops and summer schools

### Lead Beneficiary

RCNS

### Participating organisation

PTEC, CUB, RCNS, HDRI, NKUA, DEM, IMD

### Objectives

- Organization of summer schools and workshops.
- Focus on training and transfer of knowledge.
- Information about results of the project in public media.

### Tasks

- **Task 5.1. Organization of workshops and summer schools.** 4 workshops and 3 summer schools will be organized within the project. The workshops will coincide with the project meetings. CUB, PTEC, NKUA, DEM, IMD, HDRI, UTR, UCSD, CNMS, SKOL – collaborate on scientific and organizational issues
- **Task 5.2 - Coordination in the organization and content of open-door days (ODD) in universities and European Researchers Night Events (ERNE).** The participation in at least in one ODD and in one ERNE per year will be organized in MC countries (5 PMs, RCNS (leader) - coordination. CUB, PTEC, NKUA, DEM, IMD, HDRI - contribution).
- **Task 5.3. Information about results of SAFEMILK project in public media,** such as press release, TV, radio, newspapers, Twitter and Facebook. At least 2 contributions per year.



## Risks

- **Global pandemic situation**

Solution: on-line platforms

## Deliverables

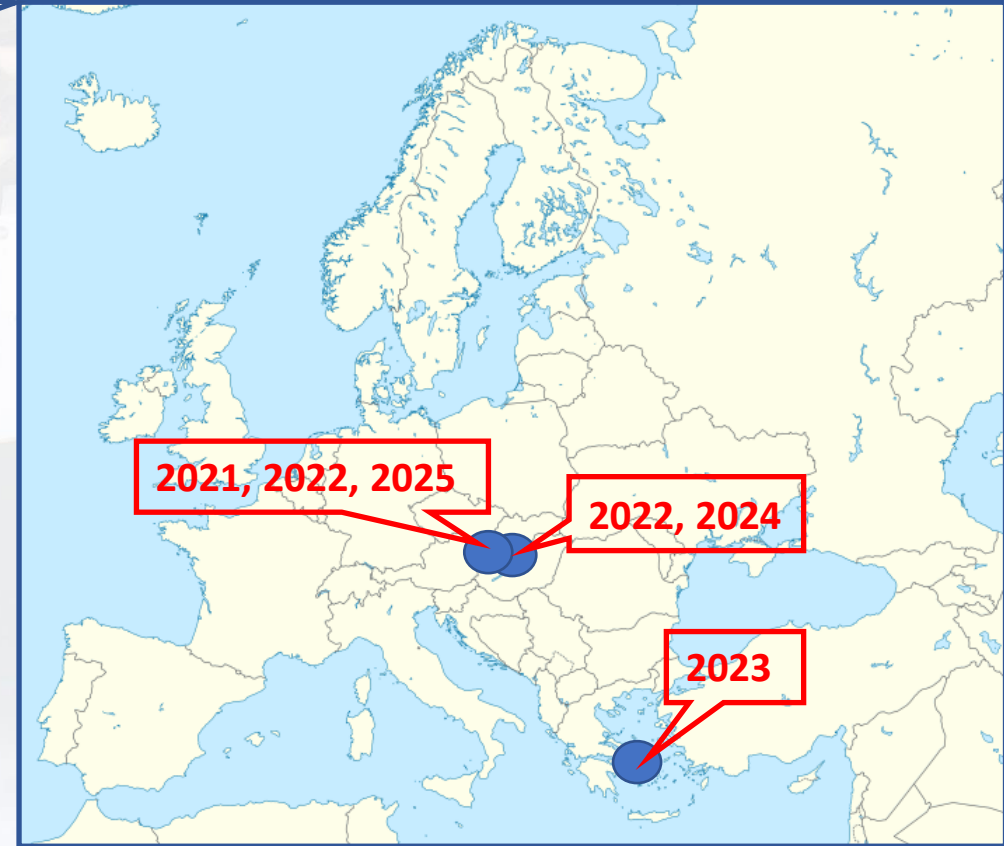
- **D5.1 : Workshop No. 1 "Acoustic methods in the study of affinity interaction at surfaces"**. Invited lectures, short oral and poster presentation of the participants (**Bratislava, September 2021**, CUB, PTEC).
- **D5.2 : Summer school No. 1 "Surface modification and application of electrochemical and acoustic techniques for detection affinity interaction using DNA aptamers as receptors"**. Tutorial lectures, practical tasks and presentation of the results of ESR (**Bratislava, May 2022**, CUB, PTEC). – MS7
- **D5.3 : Workshop No. 2 "Advanced analytical methods in milk industry"**. Invited lectures, short oral and poster presentation of the participants (**Budapest, June 2-3, 2022, RCNS**) – Midterm meeting!
- **D5.4 : Workshop No. 3 "Optical methods in biosensing"**. Invited lectures, short oral and poster presentation of the participants (**Athens, October 2023**, NKUA, DEM).
- **D5.5 : Summer school No. 2 "IPR and patenting, transfer of knowledge from academia to industry"** Tutorial lectures, practical tasks (**Athens, October 2023**, IMD).
- **D5.6 : Summer school No. 3 "Analytical methods and sensor technology for milk safety"**. Tutorial lectures, practical tasks and presentation of the results of ESR (**Budapest, Mosonmagyaróvár, May 2024**, RCNS, HDRI) – MS9
- **D5.7 : Workshop No. 4 "Transfer of the novel analytical methods to milk industry"**. Invited lectures, short oral and poster presentation of the participants. Demonstration of EMPAS, miniature potentiostat and biosensors (**Bratislava, March 2025**, PTEC, CUB, RCNS, HDRI).

## Planned activity for the next 6 months

- Press release on the launch of the project.
- Workshop No. 1



## Workshops and summer schools



## Work Package - 6 (WP-6) / Management

### Lead Beneficiary

PTEC

### Participating organisation

PTEC, CUB, RCNS, HDRI, NKUA, DEM, IMD, UCSD, UTR, CNMS, SKOL

### Objectives

- Management and monitoring of the overall performance of the projects
- Ensure the progress of the work in respect of fulfillment the contract
- Coordination of the collaboration within the project
- Coordination of the production of deliverables, meetings, workshops;
- Financial and administrative management of the project resources.

### Description of Work and Role of Specific Beneficiaries / Partner organisations:

- The project coordinator (PC) will be **Dr. Martin Donoval** (PTEC). He will co-ordinate works in close collaboration with WP leaders.
- **Dr. Z. Keresztes** (RCNS) will serve as deputy coordinator responsible for management of workshops and summer schools.
- **Dr. Michal Micjan** (PTEC) will manage and control of the plan and realization of secondments.
- **MSc. Michal Hanic** (PTEC) will be administrative and web manager.
- **Dr. L. Bousiakou** (IMD) will be responsible for management of exploitation of intellectual properties such as patenting, (IPR management)
- A **steering committee** consisting of all PIs of the project will control the execution of the work plan and will meet virtually (video conference through Skype) or by real meetings biannually.

## Tasks

- **Task 6.1 - Establishment of a project web page**  
Project web page will be established at the beginning of the project. It will contain information about the project announcements and information about workshops and summer schools, publications raised from the project. Web page will be regularly updated.
- **Task 6.2 - Monitoring of the fulfillment of the plan of secondments**  
At the beginning of each year all PI have to update plan of secondment for respective year and submit this to the coordinator. Each PI will be obliged to inform project coordinator and secondments manager on **the date and duration** of the secondment at least **two weeks prior it's starting**. Corresponding PI have to sign **secondment agreement** with corresponding host PI not later than 1 month prior starting of the **secondment**. **The secondment notebook and report of secondments** must be sent to project coordinator and secondments manager not later than **10 calendar days** after finishing of the secondment.
- **Task 6.3 - Periodic and final reports**  
Each PI must submit requested information about periodic report to the project coordinator upon request without any delay. The coordinator will prepare periodic and final report and submit this through participant portal.

## Risks

- **Delay in planned secondments**  
Secondments will be monitored continuously. The problems in delay will be solved with respective PI. Redistribution of secondments to those with sufficient operational capacity.
- **Problems with proper management of the project**  
The steering committee will evaluate project management at least biannually. The problems will be promptly resolved.

## Deliverables

- D6.1 (M6) SAFEMILK web page (PTEC)
- D6.2 (M24) Mid-term project report (PTEC)
- D6.3 (M48) Final project report (PTEC)
- D6.4 (M48) Report on secondments (PTEC)

## Questions & Answers

If you have a question, you can also send it to an email and it will be answered later.

[miso.hanic@gmail.com](mailto:miso.hanic@gmail.com)



# Coffee break 3

19:00 - 19:05 (5 min)



# SESSION IV.

19:05 - 19:15 (10 min)

## Conclusion and short summary

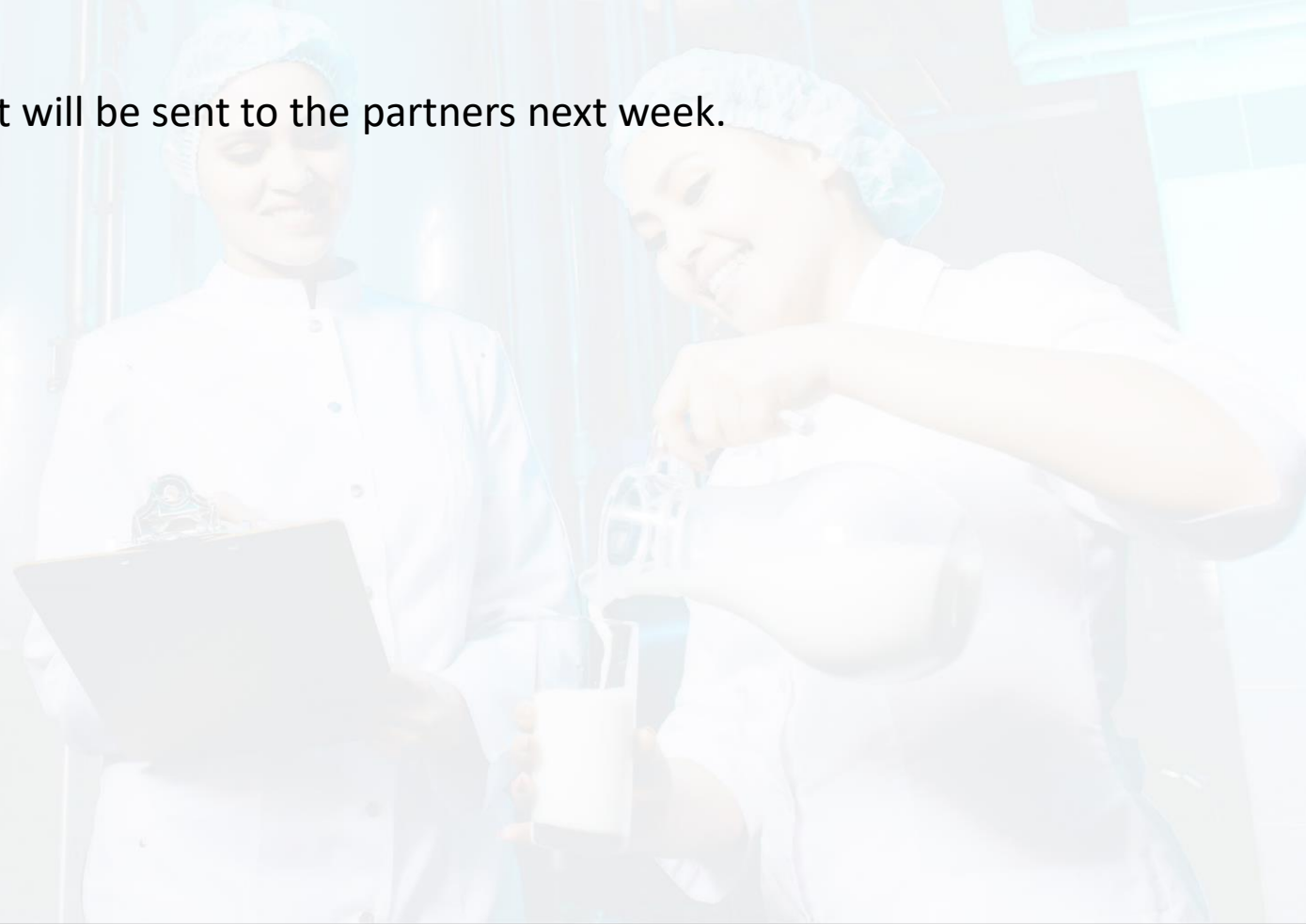


## Upcoming events

**Start project:** May 1

**Financial:** Financial Identification

**Documents:** All documents needed for the secondment will be sent to the partners next week.





## Questions & Answers

If you have a question, you can also send it to an email and it will be answered later.

[miso.hanic@gmail.com](mailto:miso.hanic@gmail.com)





# SAFEMILK

*project*

Thank you for  
your attention!

