

## EDITORIAL

We are happy to deliver the 2<sup>nd</sup> newsletter of the EXPOSOGAS project. This is a Horizon 2020 Twinning project that will promote the training and career development of researchers in the field of occupational and environmental health sciences. Special focus is paid on workers directly involved with oil and gas activities, and the general population in surrounding communities, using human exposome tools. We hope you will find this newsletter informative. If you have any questions or comments, please get in touch with us!

**Konstantinos C. Makris, PhD**  
*EXPOSOGAS project coordinator*

### What is EXPOSOGAS about?

EXPOSOGAS is a 3-year project funded by the European Union, which aims to develop the research capacity of the Cyprus International Institute for Environmental and Public Health (CII) in using the human exposome platform and tools. EXPOSOGAS will use the exposome framework for assessing, managing and communicating information about the overall health risk of hydrocarbons operations to workers and the general population.

### What is the human exposome?

The human exposome is a relatively new framework for conducting research. The exposome concept was first coined by the cancer epidemiologist Dr. Christopher Wild in 2005, who defined it as the cumulative set of all non-genetic (i.e. environmental) exposures which an individual experiences from the moment of conception throughout their life. Thus, exposome studies focus on the effects of multiple environmental exposure and consequent health-related outcomes.

### What is EXPOSOGAS interested in?

EXPOSOGAS is interested in oil/gas operations that often involve exposures to multiple chemicals, shift work, noise, high temperatures, and ergonomic and psychological factors and the collective impact on health that these multiple exposures have. Important operation stages of hydrocarbons occur throughout the industry lifecycle and include the preparation and installation, production, transport, storage, distribution, use and end of life activities and each of these will affect health differently, thus increased training is necessary in order to be able to establish how health is affected across the stages.

### Why focus on the oil and gas industry in Cyprus?

The oil and gas industry in Cyprus is growing fast, especially with the recent discovery of the natural gas reserves in the Cypriot exclusive economic zone (EEZ). In order to increase the autonomy and energy independence of the Southern European region, the EEZ region is of primary importance. However, given the expansion of the oil and gas sector in Cyprus, there is also a need to similarly increase the capacity of the occupational and environmental health sciences in maintaining active surveillance of affected communities.

### How will we do this?

Primarily by promoting the training and career development of CII researchers in the field of occupational and environmental health sciences through training that teaches them how to apply the exposome concept and related technologies on workers directly involved with oil/gas activities. EXPOSOGAS is actively trying to engage stakeholders and the general public to express their views as a means of furthering the exposomic framework.

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## EXPOSOGAS project

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- Participation in annual conferences
- Publication: Scoping review analysis

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For more info, please visit  
our [website](#)  
and our [Facebook Page](#)

# PROJECT ACTIVITIES

## Stakeholder engagement

Our EXPOSOGAS stakeholder workshops are held bi-annually and are open for all interested stakeholders. Their purpose is to discuss the project with the project team and gain valued stakeholder insights on the workshop topics of discussion.



*2<sup>nd</sup> Stakeholder Workshop in action*

The **2<sup>nd</sup> Stakeholder Workshop** was hosted on the 6<sup>th</sup> November 2019, at the Audit Office in Nicosia and 7 stakeholder organizations from the government and industry were present. A round table discussion took place with a set of 3 questions, that were pre-identified based on the preliminary responses we received from the so far interviewed organizations:

- A. Is there a need for considering non-emergency hazards in relation to gas stations for general population?
  - ▶ Participants agreed on the need to perform a project on this issue, considering the proximity of residence from gas stations by taking measurements and taking into account the local conditions (i.e. climate, season, microclimate, loading/unloading).
- B. Is there a need for considering non-emergency hazards in relation to Vasilikos activities for general population?
  - ▶ Participants agreed that periodic and systematic surveillance, with multiple exposures, spatially and temporally, is needed at baseline before development in the area begins
- C. Needs and feasibility of designing education programs for existing governmental and other professionals dealing with non-emergency risks associated with hydrocarbons operations

## Mapping stakeholders

In an effort to engage more stakeholders to participate in the EXPOSOGAS project, the EXPOSOGAS team members identified stakeholders across multiple domains (governmental, academic, business, and non-governmental) which may be affect or play a role in the hydrocarbon industry.

**The EXPOSOGAS research project is keen to engage with all interested stakeholders. If you are interested on this topic, please get in touch with us and introduce yourself via [our website contact form](#) or over a message through [our Facebook page](#)!**

- ❖ The next stakeholder workshop will take place on March 2020.

## Stakeholders' interviews

Targeted 45 organisations (government, industry and research)

- ▶ 23 interviews have been completed.
- ▶ 18 organisations not interested/ not possible to contact them/ re-direction to another organisation.
- ▶ Rest organisations need to be followed up.

## Training sessions at CII



**Top:** CII students engaging during the training presentation from TNO and IOM

**Bottom:** CII students and staff along with the trainers, following the end of the training sessions



One of the major objectives of the EXPOSOGAS project is to train young and early researchers and scientists on the human exposome concept. The project collaborators from the Institute of Occupational Medicine (UK) and the TNO National Research Institute (NL) delivered their training class content.



Teaming up with the EXPOSOGAS Project Members, Master's and PhD students, as well as staff of the CII were trained on the human exposome followed by field work with personal sensors and the statistical analysis of the generated sensor datasets.

By applying their new skills to existing health-related problems in Cyprus due to the hydrocarbon industry, students were able to have breakthroughs and develop critical thinking skills, which relate to designing exposome research studies.

The feedback from the students was very positive and some of the comments were: "Very informative", "I think that is a wonderful experience and I would love to do it more often" and "I would like to repeat it in the future because it is the best way to apply the knowledge of lectures in practice."

## We want to hear your views!



The EXPOSOGAS research project is keen to engage with stakeholders who have an interest in the activities of the oil and gas industry. If you are a member of the government, the public, industry or an academic, please get in touch with us and introduce yourself via [our website contact form](#) or over a message through [our Facebook page!](#)

## Webinars

Webinars are an integral part of the EXPOSOGAS project. During this period, three webinars took place and copies of the presentations can be found in the project's website.



*Dr. Sabina Bijlsma's Webinar on July 16, 2019*

### WEBINAR on "A Metabolomics Data Processing and Validation Workflow, Valuable Lessons Learned From the Past"

Dr. Sabina Bijlsma, an expert in metabolomics and bioinformatics from The Netherlands Organisation for Applied Scientific Research (TNO), presented a webinar on July 16 to lecture about "A Metabolomics Data Processing and Validation Workflow, Valuable Lessons Learned From the Past". Students had the unique opportunity to engage with Metabolomics Data Processing.



*Dr. Rob Stierum's Webinar on September 27, 2019*

### WEBINAR on "The internal human exposome"

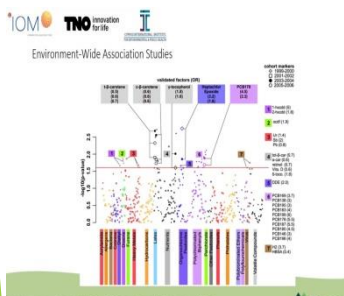
Dr. Rob Stierum, PhD, ERT, TNO, The Netherlands presented a webinar on September 27 to the CII's students and researchers on the topic "The internal human exposome".

The internal exposome will provide insights in whether a person will actually develop a health effect from one or multiple exposures and why. Moreover, new technologies are emerging, e.g.: smart phone based urine bio analyte detection, band-aids combined with lab on a chip approaches to continuously monitor blood biomarkers present in the interstitial fluid and exhaled breath constituents sensors.

### WEBINAR on "What is the external exposome? Definition and assessment methods"

Dr. Miranda Loh, Institute of Occupational Medicine, UK presented a webinar on October 4 to the CII's students and researchers on the topic "What is the external exposome? Definition and assessment methods".

This webinar presented the concept of the external exposome, and will discuss approaches and methods that may be used in assessing the external exposome. These methods include sensors, combination of data sets, and chemical analytics. The webinar also explored challenges in assessing the external exposome.



*Dr. Miranda Loh's Webinar on October 4, 2019*

## Presentations, courses, conferences



*Families visiting our kiosk during the Researchers' Night 2019*

### Public Presentation: Researcher's Night

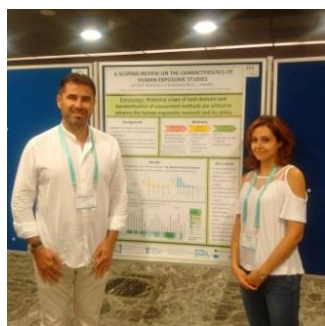
On September 27, we participated at the Researchers' Night, which is organized by the Research & Innovation Foundation in Nicosia. Hundreds of people passed by our exhibition kiosk, and we provided information about biomarkers and indicators of health status, such as BMI measurements, urinary pesticides, and skin temperature sensor control.

### EMBO practical course: Metabolomics, bioinformatics in Human Health

Our Post-doctoral researcher, Thibaut Delplancke, attended the EMBO practical course on metabolomics in human health at the premises of the International Agency for Research on Cancer (IARC) at Lyon, France. This interactive course entailed a series of lectures on: setup of metabolomics studies, from experimental design to data analysis, difference between targeted/untargeted analysis, processing of GC-MS and LC-MS data, lipidomics, exposome applications.



*Dr. Thibaut Delplancke at the EMBO practical course*



*Exposogas team at the annual ISEE conference*

### Annual conference of the International Society of Environmental Epidemiology

The Exposogas team participated at the annual conference of the International Society of Environmental Epidemiology (ISEE) in Utrecht, the Netherlands. Three research works focused on the human exposome and its applications, including a work on the urban exposome, were presented.

### Annual conference of the International Society for Exposure Science

The Exposogas team participated at the annual conference of the International Society for Exposure Science at Kaunas, Lithuania with 2 poster presentations. The titles of the presentations were: "Review on technologies and their applicability in an exposome-based assessment of hazards and risk in the petrochemical industry" and "Review of environmental and occupational cohort studies related to the up- and mid-stream oil and gas industry"



## Publication

### Scoping review analysis

Our team published a scoping review analysis of all human exposome studies and their characteristics, globally.

- The work was published in the journal "Current Pollution Reports" (<https://doi.org/10.1007/s40726-019-00130-7>).
- A comprehensive mapping analysis of relevant human exposome studies was conducted, underlining the exposome domains included and the metrics of exposure(s)/outcome(s) used.
- This work highlighted the dynamic nature of the exposome and its timely momentum in driving fundamental changes in the field of health sciences.
- The publication called for improved consideration of as many as possible environmental components from all exposome domains, as well as the standardization of the exposure and outcome assessment methods in exposome-based study designs.



## CONTACT US

