

Recruitment of Postdocs and PhD Candidates official announcement



Effects on air quality of semi-volatile engine
emissions

Project no. 101095457

Project starting date: 1 February 2023

Project end date: 31 January 2027

Project duration: 48 months



EASVOLEE has received funding from the European Union's Horizon Europe (2021-2027) research and innovation programme under grant agreement No 101095457.

List of Participating Organisations

	Consortium member	Legal Entity Short Name	Academic	Non-academic	Country	Number of postdoc positions	Number of PhD candidates	Dept/ Division/ Laboratory	Scientists in Charge
	FOUNDATION FOR RESEARCH AND TECHNOLOGY-HELLAS	FORTH	√		EL	2	1	Institute of Chemical Engineering Sciences (ICE-HT)/FORTH, Center of Studies on Air quality and Climate Change (C-STACC), Patras	Prof. S. Pandis Prof. A. Nenes Prof. M. Kanakidou
	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	CNRS	√		FR	1	-	Institut de Recherches sur la Catalyse et l'Environnement de Lyon (IRCELYON)	C. George M. Riva P. Vernoux
	NEDERLANDSE ORGANISATIE VOOR TOEGEPAST WETENSCHAPPELIJK ONDERZOEK	TNO	√		NL	-	-	Netherlands Organisation for Applied Scientific Research, Petten	M. Schaap J. Kuenen
	WEIZMANN INSTITUTE OF SCIENCE	WEIZMANN	√		IL	2	2	Department of Earth and Planetary Sciences Faculty of Chemistry Weizmann Institute of Science, Rehovot Israel	Prof. Yinon Rudich
	METEOROLOGISKE INSTITUTT	Met Norway	√		NO	-	-	Norwegian Meteorological Institute, Oslo	Prof. David Simson
	CRMT SAS	CRMT		√	FR	-	-	CRMT SAS Dardilly, Lyon	Bernard Guiot
	PAUL SCHERRER INSTITUT	PSI	√		CH	-	-	Laboratory of Atmospheric Chemistry, Gasphase Chemistry group, Villigen	Prof. Dr. Andre Prevot
	BERNER FACHHOCHSCHULE	BFH	√		CH	-	-	Laboratory for vehicle emissions and powertrain of, Bern University of Applied Sciences	Prof. Danilo Engelmann

1 Introduction

Applications are invited for 5 Postdocs and 3 PhD Candidates, funded by the European Union's Horizon Europe research and innovation programme EASVOLEE (Effects on air quality of semi-volatile engine emissions; project 101095457). EASVOLEE is an international consortium of high-profile universities, research institutions and companies located in France, Greece, Israel, Netherlands, Norway, and Switzerland. The positions have a duration of 1-4 years.

1.1 Benefits

The EASVOLEE programme offers a highly competitive and attractive salary and working conditions. Exact gross salary will be confirmed upon appointment (employer costs and other deductions depend on recruiting host). In addition to their individual scientific projects, all Postdocs and PhD candidates will benefit from further continuing education, which may include secondments (internships), a variety of training modules as well as transferable skills courses and active participation in workshops and conferences.

The host institutions of EASVOLEE consortium (8 partners from 6 countries) mobilize the diverse interdisciplinary knowledge needed to match the projects' objectives; complementary expertise is brought in within each discipline. The consortium is using state-of-the-art infrastructure, performs ground-breaking research adopting open science practices and has strong experience in transforming scientific results in support of technology development and policy relevant information for societal and economic benefit.

1.2 Eligibility Criteria

Strong motivation to conduct research under a work or an employment contract in the framework of the aforementioned project "EASVOLEE". Postdoc candidates are required to hold a PhD in Engineering or Science relevant to air pollution research. PhD candidates are required to hold a BS or MS in Engineering or Science.

2 Objective of the EASVOLEE

The primary objectives of EASVOLEE are to:

- i) Quantify the contributions of secondary aerosol formation from transport engines to air quality problems in Europe.

ii) Develop and identify health-related metrics, mitigation strategies, and policies to improve air quality, limiting the concentrations of aerosol (organic, inorganic, nanoparticles).

The project combines state-of-the art measurement of the complete suite of emissions of transport engines under real driving conditions, investigations of the formation of secondary particulate matter (PM) during their atmospheric processing, and studies of the toxicity of both the fresh and aged PM and of the mechanisms that affect health. These results will be used to improve chemical transport models that in turn will allow us to quantify the effects of engine emissions on air quality and health - both now and for a series of future scenarios.

EASVOLEE will improve our understanding of organic emissions from vehicle exhaust including low-volatility (LVOCs), semi-volatile (SVOCs), intermediate volatility (IVOCs) and volatile organic compounds (VOCs). It will elucidate the corresponding secondary aerosol formation (both organic and inorganic) and characterize the health effects of these primary and secondary particles.

The contribution of engine exhaust emissions to PM_{2.5} and size-resolved particle number concentrations in Europe will be quantified during all seasons. The above scientific evidence will be used to investigate the effectiveness of policies to reduce secondary organic and inorganic PM levels in urban areas – with a focus on components impacting health.

Finally, EASVOLEE will develop new approaches to improve the quantification of transport impacts on air quality and health effects supporting future emissions and climate legislation.

3 Overview of the host institutions



**Institute of Chemical Engineering Sciences (ICE-HT),
Foundation for Research and Technology Hellas (FORTH),
Stadiou Str., Platani, P.O.Box 1414, GR-26504 Patras, Greece**

The Institute of Chemical Engineering Sciences (ICE-HT) was established and began operating at Rio-Patras in 1984 as an independent academic institute. In 1987 ICE-HT was incorporated into the structure of the Foundation of Research and Technology-Hellas (FORTH). This comprises of a network of eight institutes that report directly to the General Secretariat of Research and Technology of the Ministry of Development and Investments. In addition to fundamental research, the ICE-HT/FORTH currently conducts applied and technological research in a great variety of fields and provides specialized services to industry.

The Center of Studies on Air quality and Climate Change (C-STACC) is part of ICE-HT/FORTH. It aims to understand how atmospheric processes impact climate, health and ecosystems through a combination of theory, measurements and simulations. A central focus in our research program is atmospheric particulate matter (aerosols) which are responsible for most of the health problems caused by air pollution. Aerosol interactions with clouds, and their description in models represents one of the major sources of uncertainty in climate projections. Aerosol can also supply limiting nutrients to ecosystems, and have a profound impact on primary productivity, biogeochemical cycles and climate.

The C-STACC team (Profs. Pandis, Nenes, Kanakidou) is involved in the development of instrumentation for the measurement of gas and particulate-phase pollutants, oxidative potential and measurement techniques required to study atmospheric processes and their health impacts. The atmospheric simulation chambers of the C-STACC are state-of-the-art facilities which allows studies of how atmospheric constituents evolve after they are released in the atmosphere. The C-STACC team members participate in field studies around the world (Pittsburgh, Mexico City, Paris, Po Valley, Finland, Greece, Africa, Greenland, Arctic, Antarctic, and many other regions) to study air pollution and atmospheric processes, natural and anthropogenic aerosol (sources, atmospheric evolution and impacts), and propose solutions to air pollution problems.

The C-STACC team has more than 30 years of experience in the development of chemical transport models on urban, regional, and global scales. They have contributed to the development of the Volatility Basis Set for the simulation of atmospheric organic aerosol and the ISORROPIA thermodynamic codes (used in the majority of regional and global models worldwide) for the simulation of inorganic aerosol and water content. The publicly available version of FORTH's PMCAMx (called CAMx) is used for regulatory purposes in the US, Europe, Asia, Australia, and South America.



CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE (CNRS)



Ircelyon

Institut de Recherches sur la Catalyse et l'Environnement de
Lyon - IRCELYON UMR5256, CNRS-UCBL, 2 av Albert
Einstein 69626 VILLEURBANNE Cedex, France

The Institut de Recherche sur la Catalyse et l'Environnement de Lyon (CNRS-IRCELYON) is one the largest catalysis laboratory in France and Europe, centralizing competences in the field of heterogeneous catalysis in the Lyon area. It comprises ca. 100 permanent research staff members both from CNRS and the University of Lyon, plus an equivalent number of PhD students, post-doctoral fellows, and invited scientists from all over the

world. IRCELYON research efforts target sustainable development issues and focus on societal demands for sustainable energy production and protection of the environment.

EASVOLEE will involve the CARE team at IRCELYON, which is positioned at the intersection of many major social issues related to water resources, waste recovery, air quality, and climate change. Its research is based on the association of strong expertise and efficient analytical parc in order to characterize, eliminate and promote pollutants. By being at the interface between environmental sciences, heterogeneous catalysis – dedicated to car exhaust treatment, analytical chemistry, and electrochemistry, the CARE team develops innovative remediation methods (photocatalysis, electrochemical promotion of catalysis, ...), process coupling (catalysis-photocatalysis, catalysis-electrochemistry, etc.), chemical analysis (real-time high-resolution mass spectrometry) and studies in order to characterize atmospheric processes. As such, CNRS-IRCELYON has a unique position at the interface between traffic emission abatements technologies and atmospheric impacts, themes at the core of this proposal.

The recruited person will perform emission measurements under real-driving conditions of VOCs and aerosols. These experimental activities will involve various advanced high-resolution mass spectrometers (PTR-MS, Vocus, ...), and aerosol specific instrumentations (SMPS, EEPS,...).

The candidate should be fluent in English, enthusiastic and have excellent communication, organization, planning and interpersonal skills, along with a strong scientific spirit.

Applicants should have a technical background and in experimental atmospheric-, physical-chemistry or physics. Postdoctoral researchers with experience in either mass spectrometry, or aerosol physical chemistry are encouraged to apply.

TNO innovation **NEDERLANDSE ORGANISATIE VOOR TOEGEPAST**
for life **WETENSCHAPPELIJK ONDERZOEK (TNO)**

TNO is a European and globally leading institute for emission inventories from local to global scales, especially on making these suitable for air quality modelling activities. This experience goes back almost 50 years, since the start of the Dutch emission inventory in 1974. Since then, TNO also contributed to many EU projects for developing emissions (e.g., EUCAARI, TRANSPHORM, MACC, EnerGEO, RI-URBANS). Currently TNO leads the emission project in the Copernicus Atmospheric Monitoring Service (CAMS), where its CAMS-REG emission database is widely used for air quality modelling at European scale. TNO is a leading institute in the ongoing discussions about how to account for condensables in emission inventories at European scale and has produced its own science-based inventories for residential combustion. TNO is also a member of the Scientific

Steering Committee of the Global Emission Initiative (GEIA). Related to SOA, TNO has recently published a review report on SOA formation from transport activities. TNO has many years of experience in the development and application of its own air quality model LOTOS-EUROS which is applied in studies for Netherlands, Europe but also in other parts of the world. The model includes a specific labelling approach for source attribution. The LOTOS-EUROS model is applied in numerous EU projects (e.g., MACC, EnerGEO, RI-URBANS, AQwatch) and is one of the members of the CAMS regional ensemble. With the LOTOS-EUROS model, TNO participates actively in international modelling and intercomparison programs such as EURODELTA, FAIRMODE and AQMEII.



WEIZMANN INSTITUTE OF SCIENCE (WEIZMANN)

Department of Earth and Planetary Sciences, Sussman Family Building for Environmental Sciences, Weizmann Institute of Science, Rehovot 7610001 Israel

The Weizmann Institute of Science is one of the world's leading multidisciplinary basic research institutions in the natural and exact sciences. It is located in Rehovot, Israel, just south of Tel Aviv. The Weizmann Institute has a long history of investigation and discovery rooted in a mission of advancing science for the benefit of humanity. In parallel, it educates a substantial proportion of Israel's scientific leadership and advances science literacy in schools and among the public.

The research in the Department of Earth and planetary sciences (EPS) includes both experimental/field, and theoretical studies focused on understanding the complex inter-relationships among the major Earth systems and other planets. Scientists in the department have expertise in various Earth science and planetary science disciplines, including climate dynamics, atmospheric chemistry, cloud dynamics, earth system dynamics, geochemistry, and geophysics. These disciplines and topics studied in each of them are ultimately integrated to understand and predict local, regional, and global changes.

Atmospheric aerosols play a key role in the Earth's atmosphere, affecting clouds' formation and lifetime, the distribution and amount of trace gases, and the radiative balance. Aerosols also affect human health, air quality, and visibility conditions. Prof. Yinon Rudich's group contains chemists, geophysicists, and biologists who focus on the chemical and physical properties of different types of aerosols and how they affect atmospheric processes, climate, and human health. Combining field and laboratory work, we aim to address main open questions, such as the health effects of aerosols and other types of particulate matter, environmental microbiome transport by dust and pollution, characterization of aerosol's optical and chemical properties, and formation of atmospheric ice particles.



The Norwegian Meteorological Institute (Met. Norway) forecasts weather, monitors the climate and conducts research. Since the institute was established in 1866, Norwegian meteorologists have figured prominently in the development of the discipline. The Norwegian Meteorological Institute is today a leading international centre of expertise. Met. Norway has close and extensive contact with the main organisations in Europe developing emission inventories for policy-related modelling, including national EMEP reporting bodies, TNO and IIASA. The EMEP and uEMEP models (MET Norway) underpin air quality and emission impact simulations for both the UN-ECE and the European Commission (e.g. AAQD Ambient Air Quality Directives), providing model calculations of PM_{2.5} in current and future scenarios for assessment of health impacts. Results from the EMEP models also underpin the GAINS integrated assessment model, which is also central to these UN-ECE and EC assessments of the health impact of emission control measures. The EMEP and uEMEP models have proved valuable tools for evaluating the above emission inventories and have been used to flag errors or suspicious data in submitted datasets, which typically results in discussions with the data-originators and corrections as appropriate. Met. Norway has also supported TNO work regarding condensable organics in PM inventories, coordinating two Norwegian Council of Ministers projects on this issue and will bring this experience in EASVOLEE.



Created in 1977, CRMT is the national market leader in HD pollutant emissions measurements with Portable Emission Measurement Systems (PEMS). The company is a recognized expert on alternative fuel engines and vehicles R&D (CNG, hydrogen), and was the first company in France to test PEMS for on-road campaigns in 2005. Ten years later, in 2015, CRMT developed its own measuring technology called CEMS (Continuous Emissions Measurement System). Today, an average of 50 HD and off-road vehicles are tested yearly, for regulatory or R&D purposes for private companies (OEMs) and for public institutions (ADEME, UGE, IFPEN), who regularly request CRMT's skills and rely on the company's independence and impartiality to carry out measurement campaigns from recognized references. CRMT will provide the EASVOLEE consortium with its expertise and its technical resources and facilities, in the fields of internal combustion engines, as well as in the measurement of emissions and its good knowledge and understanding of regulations. CRMT will lead the RDE measurements and also contribute to the efforts to exploit commercially the project results. The RDE measurements will be carried out in partnership with CNRS-IRCELyon.



PSI is one of the leading European teams in atmospheric aerosols and one of the cornerstones of EASVOLEE. It is needed to provide state-of-the-art instrumentation and techniques for both the emission measurements and the atmospheric processing studies. PSI is one of the world leading research institutes studying SOA in lab and field studies using smog chambers and oxidation flow reactors for various emissions sources during the last 20 years. PSI was among the first groups revealing important differences between diesel and gasoline fuel vehicles regarding SOA formation potential and performed pioneering work on the very high SOA formation of scooters. The PSI team recently published a ground-breaking manuscript in Nature showing that vehicular wear, but also anthropogenic SOA is more toxic (with oxidation potential as a metric) than all other particulate components in Europe. PSI has been using smog chamber experiments to constrain the organic chemistry representation in chemical transport models. Significantly improved model measurements agreement could be achieved for European air quality. Chemical transport modelling was used to compare the contribution of different emissions.



BERNER FACHHOCHSCHULE (BFH)

Laboratory for vehicle emissions and powertrain of Bern University of Applied Sciences (BFH) is specialized in powertrain and emission measurements. They provide these services and carry out certifications. Their activities also include research and development (R&D). The measurements are performed in a controlled environment (on engine test benches or chassis dynamometers) and under real in-use conditions (real driving emissions, in-use emission testing), using specific instrumentation. Its infrastructure includes 2-wheels und 4-wheels chassis dynamometer for light duty vehicles, motorcycle or electric vehicle; Powertrain/engine test bench (diesel, gasoline, gas fuel, alternative fuels); Mechanical workshop for test set-up preparation and welding work; Instrument for gaseous emission measurement, solid particle counting and energy flow; Portable Emission Measurement System (PEMS) for the measurement of limited and non-limited exhaust components; Precision scale datalogger; Hardware-in-the-Loop installation (HiL); Buildings (e.g. vehicle hall, classroom, auditorium)

BFH brings its unique expertise in EASVOLEE consortium by combining dynamometer tests with atmospheric simulation chamber studies.

4 Recruitment and selection process

We look for Postdocs and PhD Candidates in a relevant discipline (engineering/ technical sciences) interested in combining academic and industrial research experience.

The recruitment process is composed of following consecutive steps and time allowed for them:

1. Submission of applications by the candidates directly to chosen host institutions. Compile your application in one pdf file, following the order: (i) maximum two-page motivation letter, (ii) CV, (iii) copies of transcripts of obtained degrees. The application must be written in English. Submit all the above documents via email as a single pdf file to chosen host institutions:

- FORTH - spyros@chemeng.upatras.gr
- CNRS - christian.george@ircelyon.univ-lyon1.fr or matthieu.riva@ircelyon.univ-lyon1.fr or philippe.vernoux@ircelyon.univ-lyon1.fr
- WEIZMANN- Yinon.rudich@weizmann.ac.il

As the subject of your email, please use EASVOLEE application - your name. **The candidate may apply to different host institutions.**

2. Pre-selection of candidates by the main supervisors based on the CV and the motivation letter
3. Interview of short-listed candidates by the main supervisors of the host institute
4. Notification to successful candidates
5. Issuing work contract of Postdoc and PhD Candidate by relevant HR departments - as soon as possible, based on each Party's internal processes.