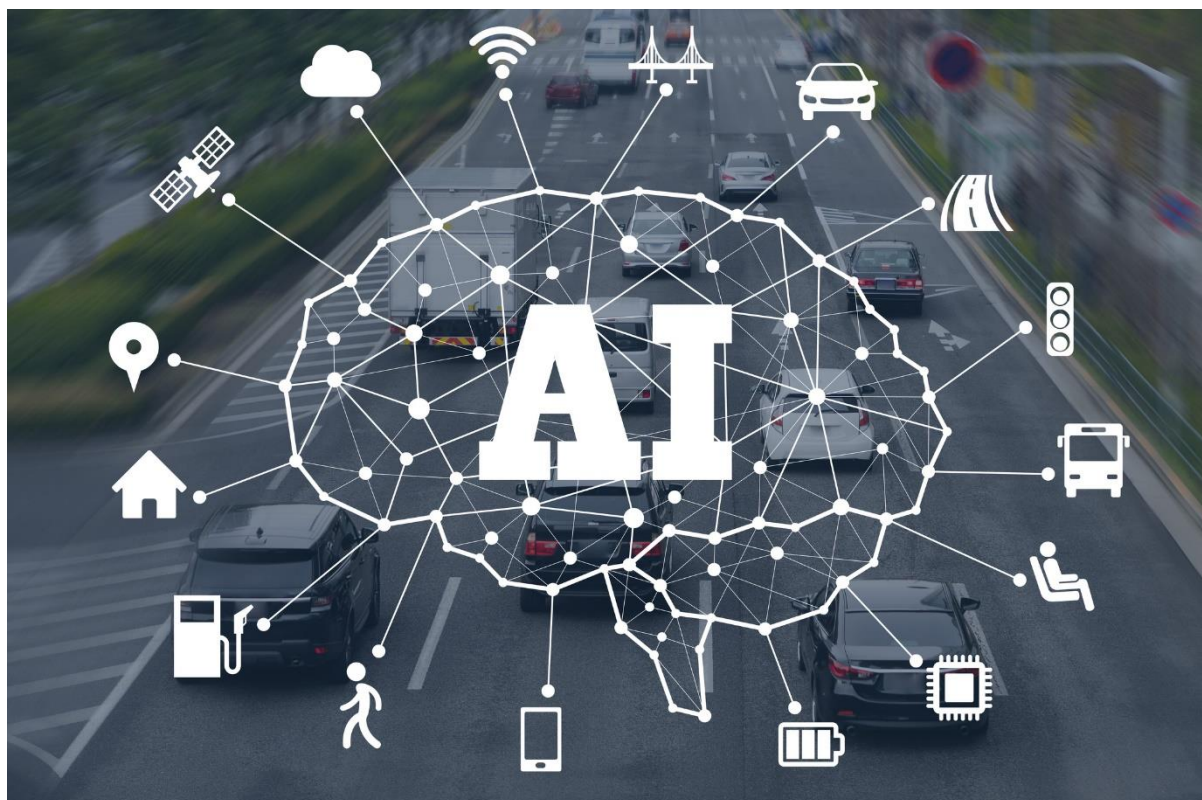


IVORY - Artificial Intelligence for Vision Zero in Road Safety

PhD Candidate Vacancy Description



Within the framework of the Horizon Marie Skłodowska-Curie Actions ([MSCA](#)) Industrial Doctoral Network [IVORY - Artificial Intelligence for Vision Zero in Road Safety](#), a call for applications for the following Industrial PhD candidate has been launched, to be hosted by National Technical University of Athens ([NTUA](#)), a Centre of Road Safety Research Excellence with global recognition.

PhD #14

Road safety prediction on the basis of ethically sound physiological measurements

Vacancy description

Within the IVORY doctoral network, this PhD position aims to understand and predict how the psychophysiological state of the driver contributes to overall road safety, particularly by using measurements of physiological data, such as the electrocardiogram (ECG), photoplethysmogram (PPG), blood pressure, among others. The goal is to create machine learning models that relate individual physiological dynamics with road safety indicators, with the ultimate objective of accurately and reliably detecting and warning, in real-time, when the driver is unfit for the driving task, regardless of automation level. Deep learning methodologies, such as convolutional neural networks, should be considered, as well as privacy-by-design frameworks.

The position contributes to road safety research by compiling a taxonomy of driver monitoring technologies, creating innovative algorithms for

	physiological-based, real-time prediction of driver capability and its impact on safety, in several real-world scenarios, and to explore and create frameworks to assess the ethical and privacy dimensions of the use of driver monitoring technologies.
Project description	IVORY (ivory-network.eu) is a Horizon Europe MARIE SKŁODOWSKA-CURIE ACTION Industrial Doctoral Network consisting of 22 partners (universities, industry, and non-governmental organizations). The project aims to develop a new framework for the integration of AI in road safety and train a new generation of leading researchers in the field, in order to address the UN Sustainable Development Goals target 3.6 (halving the number of traffic fatalities by 2030) and EC 'Vision Zero' strategy (eliminating traffic fatalities by 2050). PhD students will obtain their PhD degree from the relevant academic partner, and spend at least 50% of their PhD time at the relevant non-academic partner.
Academic host	National Technical University of Athens (NTUA), Athens, Greece School of Civil Engineering Department of Transportation Planning and Engineering Months 19-36 of PhD
Industry host	CardioID Technologies Lda, Lisbon, Portugal Months 1-18 of PhD
Secondment(s)	Delft University of Technology (TU Delft), Delft, The Netherlands Duration: 4 months
Research field(s)	Transport engineering; Data science; Physiological computing; AI ethics
Application deadline	16 February 2024
Type of contract	Fixed-term
Employment status	Full time (1.0 fte)
Eligibility criteria	<ul style="list-style-type: none"> • A Master's degree (or equivalent); • Not in possession of a doctoral degree at the date of the recruitment; • Recruited applicants can be of any nationality and must undertake trans-national mobility (i.e., move from one country to another) when taking up the appointment. In particular, at the time of selection, the recruited applicant for this position must not have resided or carried out their main activity (work, studies, etc.) in Portugal for more than 12 months in the 3 years immediately prior to their recruitment. Short stays, such as holidays, are not taken into account.
Required skills	<ul style="list-style-type: none"> • A Master's degree (or equivalent) in biomedical engineering, transport engineering, computer science, or relevant fields; other Master's degrees will also be considered if you have demonstrable expertise, for instance, in data science, signal processing, multi-variate analysis, modeling, or machine learning. • Familiarity with signal processing techniques (filtering, linear systems, transforms, discrete signals). • Strong conceptual and analytical skills. • Strong capacity to undertake research. • Excellent academic writing and presentation skills. • The ability to work both independently and as part of a team.

	<ul style="list-style-type: none"> • High level of proficiency in English. • Willingness to work in a multi-national, diverse environment.
Optional skills (preferred but not required)	<ul style="list-style-type: none"> • Familiarity and hands-on experience with handling physiological signals (e.g., electrocardiogram, photoplethysmogram, electroencephalogram, electrodermal activity). • Capacity to conceptualize and conduct experiments to collect physiological data. • Familiarity with concepts related to human factors engineering. • Familiarity with machine learning algorithms, deep learning, and dynamic modeling. • Familiarity with advanced statistics (statistical tests and regression) and probability theory (probability distributions, Bayesian statistics). • Familiarity with concepts related to ethical and fair use of machine learning systems. • Familiarity with concepts related to data protection and privacy (e.g., GDPR). • Coding skills in Python. • Familiarity with Python libraries and frameworks for signal processing and machine learning (e.g., numpy, pandas, scikit-learn, tensorflow, keras, pytorch). • Familiarity with Git version control.
English requirement	Proof of English language proficiency at a Common European Framework of Reference (CEFR) level of C1, or an MSc degree in English, or IELTS: minimum 8.0 / TOEFL: minimum 110
Salary	The successful candidate will receive an attractive salary following the MSCA regulations for doctoral candidates. The exact salary will vary depending on the country of the host partner and will be confirmed upon appointment. The salary includes a living allowance, a mobility allowance, and a family allowance (if the recruited doctoral candidate has or acquires family obligations during the duration of the fellowship), and is very competitive overall.
Other benefits	In addition, the doctoral candidate will benefit from extensive training within the IVORY network, which includes internships/secondments in other laboratories, a variety of training courses (including transferable skills), and active participation in workshops and conferences.
Application process	<ul style="list-style-type: none"> • Candidates should apply electronically using the link indicated in the PhD position(s) of their interest; • Candidates should provide the following documents: <ul style="list-style-type: none"> ○ Detailed CV, including information on the candidate's proficiency in English ○ Motivation letter (1 page), describing why the position fits the applicant ○ Contact information of 2 references
Academic host	The National Technical University of Athens (NTUA) is the oldest engineering school in Greece and it plays a paragon role in the scientific, technical and economic development of Greece but also in Europe and worldwide, consistently ranking as the best Greek technical university. Lately, it is ranked among the top engineering and technology universities (3rd in Europe and 7th worldwide) by Shanghai World University Rankings. NTUA has been involved

	<p>in more than 160 road safety research projects since the early 1990s, comprising 70 European Commission projects, 14 International Organisation projects (UN-ECE, WHO, EIB, World Bank, ITF, CEDR) and 76 Greek projects. NTUA has well established communication channels to promote research findings: more than 800 road safety scientific publications highly cited globally, including more than 220 in scientific journals and 550 in scientific conferences. The NTUA Road Safety Observatory (NRSO) (www.nrso.ntua.gr) has a widespread recognition at the global road safety community as a center of research and innovation excellence on road safety, having received during the last 10 years more than 150.000 road safety visitors and more than 2,800,000 visits (today steadily more than 3.000 visits per month).</p>
Industry host	<p>CardioID was born out of research on Physiological Computing, studying ECG signals for biometrics, health, and wellbeing purposes, on the premise that each cardiac signal is unique. CardioID has developed several collaborative projects aimed at integrating its technology in the most diverse environments, such as in the automotive industry, critical facilities, and hospitals.</p>
Additional information	<p>For more information about this vacancy, please contact:</p> <p>For NTUA: Professor George Yannis – geyannis@central.ntua.gr</p> <p>For CardioID: Dr. André Lourenço – arl@cardio-id.com</p>