

## PERMANENT RESEARCH POSITION “CHARGE DE RECHERCHE” OPEN (M/F) in Artificial Intelligence for Robotics and Autonomous Vehicles

**Institution:** MINES ParisTech (Ecole Nationale Supérieure des Mines de Paris)

**Research Center:** Center for Robotics

In the frame of the development of research and teaching activities in the area of Artificial Intelligence and Machine-Learning, MINES ParisTech, member of PSL Research University, is opening a permanent position “chargé de recherche” in *Artificial Intelligence for Robotics and Autonomous Vehicle*. At MINES ParisTech, a “chargé de recherche” is a junior member of staff with a permanent position having research as main duty, with some teaching. Equivalent positions outside France would be lecturer or assistant professor.

The targeted profile is a young (mainly 3 – 10 years after PhD) researcher (f/m) willing to develop multidisciplinary research combining fundamental and applied sciences in Artificial Intelligence with application to Autonomous Vehicles and Robotics.

### 1. THE RESEARCH AT MINES ParisTech

In line with its training activity, MINES ParisTech develops a research activity that covers a wide range of scientific disciplines. The 18 research centers are organized in five departments: Earth and Environmental Sciences, Energy and Processes, Mechanics and Materials, Mathematics and Systems, and finally, Economics, Management and Society.

MINES ParisTech research aims at both academic excellence and socio-economic impact. This research model is developed in close interaction with the socio-economic world: private or public sector companies, and also institutions and public administrations. MINES ParisTech is the first school in France by its volume of research on contracts, carried by Armines, the Mines ParisTech Foundation or MINES ParisTech. This special positioning allows the School expanding its staff and maintains unique experimental and digital platforms highly appreciated by its partners.

This ability of MINES ParisTech and companies to work together on ambitious scientific and industrial issues is recognized nationally and internationally. For example, the CNRS silver medal awarded to Madeleine Akrich, two French Research Agency industrial chairs and the renewal of the Carnot label in 2016. MINES ParisTech is positioned at the 23<sup>rd</sup> place in the QS World University Rankings by subject and in the top 100, 150 and 300 of the Shanghai engineering thematic rankings.

### 2. THE CENTRE FOR ROBOTICS

With around 20 permanent staff members and 20 PhD students, the Center for Robotics (<http://caor.mines-paristech.fr/>) is one of the main research centers of the "Mathématiques & Systèmes" (≈ applied maths) department of MINES ParisTech. Located in downtown Paris (boulevard Saint-Michel, on the historic site of MINES ParisTech), the Center conducts researches mainly applied to the sectors of Intelligent Vehicles and Transports, as well as Collaborative Robotics for industry and services. Its research is largely partner-oriented, with roughly 2M€/year of public and private research contracts (European H2020 projects, industrial direct contracts, CIFRE PhDs, etc...) and donations (research chairs). A common point of most research works in the Center for Robotics is to deal with systems with retroaction, therefore more or less real-time and often embedded, and to rely on algorithmic researches in one or several of the complementary domains below:

- Intelligent Perception, Machine-Learning & interactions (in particular real-time pattern or gesture recognition) ;
- Cooperative planning of movements and actions, and advanced control ;
- Mobile 3D cartography using 3D point clouds captured with LIDARs ;
- Virtual and Augmented Reality (including semantization of 3D scenes and adaptive HMI) ;
- Intelligent Industrial and Logistic systems based on Machine-Learning and data science.

Artificial Intelligence (AI) and Deep Machine-Learning is becoming a more and more essential component of all the above domains. ***The positioning of the Center for Robotics on AI and Machine-Learning is to conduct algorithmic and experimental research works focused on adaptation of cutting-edge models and methods from AI domains for the needs of our key applicative sectors: Autonomous Vehicles & Intelligent Transports; Collaborative or/and mobile Robotics for Industry 4.0, and for logistics and services.***

Finally the Center for Robotics is also strongly involved in teaching for engineers, both in core courses and specialized courses, as well as in engineering majors. The center is also significantly involved in teaching at ParisTech\_Shanghai (<http://speit.sjtu.edu.cn/indexen.html>). Furthermore, the Center has created and launched in 2018 a new "Mastère Spécialisé" (a post-Master one-year degree) called Almove (<http://aimove.eu/>) and focused on AI and movement for Human-Robot/Machine interactions.

The Center for Robotics has acquired a large international visibility and renown: for instance, Peugeot, Valeo and Safran companies have donated 4 M€ to the Centre (Prof. Arnaud de La Fortelle) for setting-up and managing the International Chair *Drive for All* in collaboration with UC Berkeley (USA), Shanghai Jiao Tong University (China) and EPFL (Swiss); the Center organizes the prestigious [IEEE Intelligent Vehicles Symposium](#) in June 2019 in Paris. The candidate shall contribute to this excellence.

### 3. POSITION DESCRIPTION

The candidate is expected to be able to perform fundamental and applied research in the area of *Artificial Intelligence for Autonomous Vehicles and Robotics*. He/she should be autonomous and develop and build research projects in collaboration with academic and industrial partners.

#### Research

The successful candidate is expected to develop his/her own research direction in the area of AI and Deep Machine-Learning, while targeting at least one of the key application sectors of the Center for Robotics. He/she shall participate to the supervision of PhD students, post-doctoral researchers and trainees. He/she will be expected to:

- publish in the best scientific journals;
- perform research with a high scientific visibility and being also attractive for industrial applications;
- propose new topics in coherence with the Center’s strategy and in coordination with its other permanent researchers;
- apply for research projects on the national and international level, and build projects in collaboration with industry keeping, at the same time, high scientific standards.

#### Teaching

The successful candidate is expected to contribute, through courses, practical sessions and projects *related to his research domain*, to various teaching activities of MINES ParisTech: initial formation of engineers, post-master specialized diplomas (Mastère Spécialisé, MS), lifelong training programs, and potentially also engineering courses at ParisTech\_Shanghai. Envisioned are participation to at least one or two of the current courses managed by the Center for Robotics:

- post-master (Mastère Spécialisé, MS) Almove (<http://aimove.eu/>);
- Specialized courses in Machine-Learning within initial formation of engineers;
- MAREVA (Mathématiques Appliquées : Robotique, Vision, Automatique) major within initial formation of engineers;
- Possibly also courses in Deep-Learning or/and Intelligent Vehicles at ParisTech\_Shanghai.

He/she will also be encouraged to suggest new courses which would enrich the spectrum of courses offered by MINES ParisTech.

#### Candidate qualifications

- PhD ideally in the field of Deep-Learning for Robotics and Autonomous Vehicles (otherwise: either PhD in Deep-Learning *applied* to another domain; or PhD in perception or planning for robotics or autonomous vehicles)
- Ideally at least one post-doctoral experience in the same domains
- Solid background in applied mathematics (in particular statistics, probabilities and optimization)
- Good capacities in algorithm and programming (in particular in Python)
- Interest and motivation for Deep Machine-Learning AND for Robotics or Autonomous Vehicles
- Demonstrated experience in students’ supervision.
- Ability to develop high-level research attracting international recognition, in collaboration with other researchers of the Center for Robotics
- Capacity to generate a strong activity in publishing and in research visibility.
- Potential in building research projects.
- Demonstrated experience in working in the international context.
- Demonstrated capacity to communicate in English.
- Will to learn French for foreign candidates.

### 4. APPLICATION FILE

The application should consist of the following documents:

- A cover letter
- A detailed CV
- Copies of official transcripts for all degrees at all institutions attended
- List of publications and of oral communications at scientific conferences
- Three recommendation letters to be sent by the reference person directly to the Center for Robotics. Optionally, to provide contact details of three researches to be contacted for recommendation.
- Research project (5 pages limit)

**Please send the documents before May 6<sup>th</sup> 2019, to the following address:**

Mme Christine Vignaud, Secrétariat du Centre de Robotique  
MINES ParisTech, 60 boulevard Saint-Michel, 75006 PARIS  
Mel: [Christine.Vignaud@mines-paristech.fr](mailto:Christine.Vignaud@mines-paristech.fr)

**Same contact for any prior information request.**