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The SMaRT project, “Sand Mitigation along Railway Tracks”, has received funding from the European Union’s Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 721798 for European Industrial Doctorate.

## SMaRT at a glance

In the last decade, a growing number of railways and other transportation, civil or industrial infrastructures have been designed and or built in arid regions worldwide. In arid environments, windblown sand can have undesired effects on the safety, serviceability and maintenance of railway infrastructure. Effective, durable, robust and sustainable sand mitigation measures (SMMs) are an urgent requirement to allow industrial growth in such regions.

SMaRT aims to develop standardised techniques for assessing sand hazards to railways, conceive new and effective sand mitigation measure, and assess their performances using innovative computational simulations and field tests.

The SMaRT consortium structure reflects the production chain of the railway construction industry in order to train the researchers in a proper “in vitro” replica of their future working context, and to stimulate research from the different Partner Organizations.

Further information is available on the SMaRT website ([www.smart-eid.eu](http://www.smart-eid.eu)).

**Job Vacancy:** Mathematical modelling and computational methods for Windblown Sand models and computational windblown sand simulations (SMaRT ESR 2)

A 3-year Early Stage Researcher (ESR) position is available at

Optiflow  
160, Chemin de la Madrague-Ville, 13015 Marseille, France.

Expected start date: October 2017

In parallel, the ESR will be enrolled in a 3 year PhD in Pure and Applied Mathematics at

Politecnico di Torino  
Corso Duca degli Abruzzi 24, 10129 Torino, Italy  
and  
Università degli Studi di Torino  
Via Verdi 8, 10124 Torino, Italy

## Deadline for application

Position open until filled, final deadline February 15<sup>th</sup> 2017.

## Job Description

The recruited candidate will pursue research work on the mathematical modelling and computational simulation of windblown sand. The research is expected to lead to the definition of novel first and second order conservation laws capable of catching the interaction between sand and air, sand erosion from the surface, its deposition on the ground and the sliding of the surface. The solution of such conservation laws will require the development of a proper computational framework, including wind-sand coupling strategies and the identification of optimal numerical schemes for the free-boundary problem related to the adaptation of the sand profile. Validation of the developed simulation approach with respect to experiments is also expected.

## Requirements

We seek a person with strong motivation and the ability to define his/her own research questions. The applicant must hold a master degree in Mathematics, Physics, Aeronautical Engineering or related fields and good written and oral communication skills in English.

Applicants shall, at the time of recruitment, be in the first four years (full-time equivalent research experience) of their research careers and not yet have been awarded a doctoral degree. Full-Time Equivalent Research Experience is measured from the date when a researcher obtained the degree which would formally entitle him/her to embark on a doctorate. In addition, at the time of recruitment, applicants must not have resided or carried out their main activity (work, studies, etc.) in France for more than 12 months in the 3 years immediately prior to the recruitment date. Compulsory national service and/or short stays such as holidays are not taken into account.

Important characteristics of the European Industrial Doctorate programme are:

- you will be jointly supervised by academia and industry supervisors
- you are required to spend 50% of the time in your registered university in Italy and 50% time with the industrial research organisation Optiflow, France.

## Personal Qualities

- Excellent collaborative and teamwork skills;
- Strong dedication and self-motivation;
- Full command of written and oral English. Recognized certificates of English language knowledge:
  - IELTS with a minimum score of 5.0;
  - TOEFL ibt with a minimum score of 77 - cbt with a minimum score of 210 - pbt with a minimum score of 547;
  - Cambridge ESOL examinations - General English exams: minimum level accepted is PET pass with merit;

- Otherwise, a certificate stating that students have obtained Bachelor or Master degree, in which English was used as medium of instruction, certifying that "The medium of instruction is English".

Citizens of countries, in which English is one of the official languages, are exempted from providing any certificate.

The call for admission can be submitted even if the above certificates have not yet been obtained, but applicants shall obtain one of them before the deadline for enrolment expires. In this event, the admission to selection procedures will be subject to the obtainment of one among the above certificates; the failure to submit the said certificate in phase of enrolment shall entail the loss of the right to enrol.

## We offer

- Competitive salary in a 3 year full time position of 3259 €/month at Marseille
- Mobility and family allowance (600 or 1100 €/month depending on the researcher's family situation)
- High tutoring capacity. Academic tutor: Luigi Preziosi, Ph.D. Mechanics, Ph.D. Applied Mathematics – Politecnico di Torino. Industrial tutor: Dr. Nicolas Coste, PhD Fluid Mechanics - Optiflow.
- An excellent and intersectoral training environment at the academic host Politecnico di Torino (Italy), industrial host Optiflow Company (France) and host for short secondments at all the Industrial Partner Organisations (Ansaldo STS, Astaldi, Salcef-Reco).

**POLITECNICO  
DI TORINO**

Politecnico di Torino is one of the most important Research Universities in Europe for engineering and architecture studies (2014 QS Ranking in Europe: 16). It is strongly committed to collaboration with industry. Politecnico di Torino is member of the Windblown Sand Modeling and Mitigation ([www.polito.it/wsmm](http://www.polito.it/wsmm)) joint research, development and consulting group.

**OPTIFLOW**

Optiflow is a French consulting company, with more than 15 years of experience in the field of Computational Wind Engineering. Its activities helped architects and engineers improve wind and ventilation performances on more than 100 major architectural and infrastructural projects worldwide. OPTIFLOW has a strong record in R&D activities and technology transfer relationships with a number of public and private research institutions. Optiflow is member of the Windblown Sand Modeling and Mitigation (WSMM) joint research, development and consulting group.

## Application and Evaluation

Please submit your application by email as detailed below to: [apply@smart-eid](mailto:apply@smart-eid)

Competences of applicants will be assessed by the SMaRT Governing and Educational Board.

The comparative assessment will be aimed at understanding the candidate's motivations, skills and abilities which will be inferred both from the documents attached to the application form, and from an interview as necessary. Any required interview may also be remote by Skype conference.

### The Application must include

1. A 2 page application letter detailing your reasons for applying, your research interests, research experience, academic achievements and career ambitions;
2. CV, summarizing your educational background, academic achievements, any relevant professional experience, contact details (including email and Skype addresses);
3. Copies of educational certificates and transcript of records detailing information on the individual grades received in your university-level qualifications to date;
4. Details of internationally recognized language qualifications achieved;
5. List of publications and academic work that the applicant wishes to be considered by the evaluation committee;
6. A copy of some written work (2000 wd max) that demonstrates your ability to write a good academic document. This may be an essay you have previously written, a thesis chapter etc and need not necessarily be related to the proposed area of study.
7. Names and contact details of 3 referees: name, relation to candidate, e-mail and telephone number (at least two of which should be academic). Up to 3 letters of reference may be directly included.

Applicants will be notified of the outcome of their application as soon as possible after the closing date. The results of the evaluation will be published on the SMaRT website ([www.smart-eid.eu](http://www.smart-eid.eu)).