

PHD STUDENT POSITION AT DELFT UNIVERSITY OF TECHNOLOGY IN THE FIELD OF SAFER MOTORIZED TWO-WHEELERS

MOTORIST (Motorcycle Rider Integrated Safety) is an **Initial Training Network (ITN)** Nr. 608092, funded under the FP7 Marie Curie programme of the Commission. **Duration:** Feb. 1, 2014 - Jan. 31, 2018. <http://www.motorist-ptw.eu>

BACKGROUND: The aim of the research activities within the project MOTORIST is to make the use of Powered Two Wheelers (PTWs) safer such that fewer accidents occur and if an accident is unavoidable the consequences for the rider to sustain injuries are minimal. The project is divided in three work packages (WPs) with three separate but related goals. The first work package aims to improve the rider's skills with training strategies that are derived from in-depth accident data and from a quantification of rider behaviour in critical situations. The second work package aims at developing advanced safety systems that improve the interaction between the rider and the PTW by modelling the rider, also based on the in WP1 quantified rider behaviour. The third work package considers the cases where the crash is unavoidable and will develop personal protective equipment to protect the riders, given the input conditions from WP2 at the moment right before impact. The end result of this project will be a set of rider training guidelines that are proven to be effective, safety system concepts implemented on PTWs and improved personal protective equipment and accompanying standards. These can be used by PTW industry partners in product development processes and by stakeholders to educate riders. This will ultimately improve the safety of PTWs and moreover the perceived safety, which will make more people decide to use a PTW as a good alternative to other means of transport.

CONSORTIUM: MOTORIST is formed by a group of participating hosts, combining leading education and research institutions as well as industrial enterprises in 6 countries of the EC. Thus the researchers will participate in both the scientific research work and the practical application of new methods for testing and simulation. They will profit

from extended international knowledge after their academic education when starting to work in the industry.

COORDINATOR: The project is coordinated by **UNIFI** (Università degli Studi di Firenze), Firenze (I). The MOTORIST Project Coordinator is **Prof. Marco Pierini**, marco.pierini@unifi.it

OBJECTIVES: The research of MOTORIST ITN will focus on making PTW use safer, through a clear strategy that will be pursued according to the following specific objectives:

- Firstly an improvement of PTW safety will be achieved by improving methods for rider training, with special attention to young riders (the most exposed to be involved into an accident) and elderly riders (because of the increasing mean age in Europe). In fact a fundamental actor of the road safety improvement is the rider who significantly influences the probability of accidents to happen with their risk assessment, decision making and control skills.
- Secondly safety improvement will be achieved by developing active safety systems that improve the interaction between the rider and the PTW, with particular attention to the urban environment (where PTW use is expected to increase and where traffic scenarios are complex)
- Thirdly, for cases where crashes are unavoidable, personal protective equipment will be developed that protects the rider, helped by information from the event prior to the impact.

MOTORIST will use a multidisciplinary approach of rider behaviour, training, active safety and passive safety. The resulting expertise, training methods, and PTW innovations will be of high interest to stakeholders, some important also involved as MOTORIST Associated Partners, on rider training and for fundamental links to the EU Motorcycle Industry and moreover to the PTW or components industry since design improvements to PTW related products are foreseen.

Motorcycle Rider Integrated Safety



MARIE CURIE ELIGIBILITY CRITERIA – in short:

- **Early-Stage Researcher (ESR):** holds an MSc degree and has less than 4 years of experience and has not yet been awarded a doctoral degree¹.

TU Delft will host 3 ESR positions

- 1) **ESR1.3 will evaluate rider training programs in terms of skill acquisition and safety** which will be jointly developed with other researchers, using instrumented vehicles and rider simulators. In that context, the TU Delft contribution will include a study on Pedelecs and Speed pedelecs. Amongst other, ESR1.3 will focus on simulator fidelity, behavior observation, training protocols, skill assessment, and evaluation of training effectiveness and transfer of training to real life traffic.
- 2) **ESR2.2 & ESR 2.3 will investigate and model steering & balance behaviour of PTW riders.** Experiments and system identification methods will be developed to gain understanding in the way riders use visual, vestibular and musculoskeletal sensory information to stabilize 2-wheelers, and to follow a desired path. ESR2.2 will focus on the investigation of normal balance and steering behaviour whereas ESR2.3 will focus on safety critical events and on-line detection of deviant driver behavior.

CANDIDATE PROFILE: The research is highly multidisciplinary.

- **For ESR2.2** we are looking for candidates with an interest, and/or experience in vehicle dynamics, multibody, control theory, biomechanics & perception. Candidates should have a degree in Engineering or Physics.
- **ESR1.3 & ESR2.3 have already been recruited.**
- Candidates will enroll in the TU Delft PhD programme.
- All members of the network are equal opportunity employers, both female and male candidates are invited to apply.

The research activities will mainly be carried out at TU Delft, the Netherlands, combined with research visits and/or short-term secondments to other members of the network.

Application Deadline: As soon as possible.

Targeted Start Date: As soon as possible.

APPLICATION: please send a detailed CV, motivation letter, a list of courses and grades at master & bachelor level, a report or paper of which you are the first author and names of reference(s) to Riender Happee <R.Happee@tudelft.nl>; Arend Schwab <a.i.schwab@tudelft.nl>; Joost de Winter <jcfdewinter@gmail.com>

The remuneration will be in line with the EC rules for Marie Curie grant holders and consists of a salary augmented by a net mobility allowance. <http://cordis.europa.eu/fp7>.

¹ The research experience includes the period since gaining a university degree giving the candidate access to doctoral studies (the degree must entitle the holder to embark on doctoral studies, without having to acquire any further qualifications). Among others, following criteria apply for eligibility:

- the researcher shall not be a national of the State in which the hosting partner's research team is located
- at the time of appointment, the researcher may not have resided or carried out her/his main activity in the country of the hosting partner for more than 12 months in the 3 years immediately prior to her/his appointment
- women are especially encouraged to apply.