

Open PhD/Master thesis positions on Vehicular Networks at LAAS, Toulouse

Funded by a contract with Continental, Toulouse (France) there are opportunities to carry out the Master and PhD theses at LAAS, Toulouse, on mathematical modeling of vehicular networks.

Title: Delivering Guaranteed Quality-of-Service in Connected Vehicles

Description of project: Connected vehicles will provide services and applications ranging from safety-critical services such as monitoring of the motor and enhanced visibility to less critical applications like infotainment. These services will be sharing common communication resources and will have to be accessible in a wide variety of environments in which a vehicle can find itself in – at high speeds, inside tunnels, or sparsely covered area. These environments can have a severe impact on the quality of the communication channel between the vehicle and the Infrastructure leading to fluctuations in the data rates of the link. It is important that irrespective of the environment, safety-critical applications that have to ensure timely and accurate delivery of data to the Infrastructure node be able to communicate whereas the quality of infotainment applications can be adapted to suit the environment. Our aim is to design communication architectures that adapt to the environment of the vehicle and satisfy the quality-of-services constraints of each type of applications at all times. The consequences of this thesis shall be two fold: (i) priority based algorithms for sharing communication resources; and (ii) rules for dimensioning the systems resources in order to achieve targeted performance guarantees. To achieve these goals, **in this thesis we will draw on the latest developments on medium access control and scheduling theory, in order to develop mathematical models that capture accurately the essential features of connected vehicles.** The ultimate goal of the thesis will be propose simple yet efficient rules-of-thumb that can be easily implemented by the system designer.

Key words: stochastic modeling, vehicular networks, resource allocation.

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Host institution: LAAS is a CNRS research unit located in Toulouse. The research activities fall within the domain of Information Sciences and Technologies and develop theories, methodologies and tools in order to design and control complex heterogeneous systems.

Requirements: Candidates should have a background in (applied) mathematics, operations research, computer science or electrical engineering. Experience in stochastic modeling, stochastic optimization, queueing theory or game theory will be appreciated. In the course of the project the candidate is expected to perform some numerical experiments (Matlab, C++, ...) Candidates are expected to be fluent in English, both oral and in writing.

Starting date: The target starting date is October 2017 (flexible). For the Master thesis anytime before summer 2017.

Terms of employment. The salaries and terms at CNRS are in accordance with French state regulations, with full salary being given during illness and paid holidays. The PhD contract is for three years, and the candidate is expected to defend the thesis within this period.

For the Master thesis, a monthly allowance will be provided according to the rules set by CNRS.

Application: Please send a detailed curriculum vitae, along with a brief cover letter motivating your interest, through the links: [Link to apply for PhD](#), and [Link to apply for a Master thesis](#).