

# Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website [www-csc.utt.fr](http://www-csc.utt.fr))

Supervisor's name : Valois Given names : Fabrice

Status (prof., assistant prof., ...) : Full professor

Laboratory : CITI - Center for Innovation for Telecommunications and Integration of Services Website address : <http://www.citi-lab.fr/>

Institution : INSA Lyon Website address : <https://www.insa-lyon.fr/>

Scientific competence of the supervisor:

Fabrice Valois is full professor in INSA Lyon. In 2000, he received a Ph.D. in computer science about Performance Evaluation of Hierarchical Cellular Networks (University of Versailles). In 2007, he received the HDR (University of Lyon, INSA Lyon) about Self-organisation of wireless multi-hop networks. He is a member of the Agora Inria research team. His research interests are in the area of dynamic, dense and autonomous wireless networks (e.g. networks for IoT, wireless sensor networks, cellular networks). His research works are focused on networking protocols design and performance evaluation. He is co-author of 3 chapter books, 95+ international publications and he holds 4 international patents.

Two major publications in the field proposed for the PhD :

1. J. Oueis, V. Conan, D. Lavaux, R. Stanica, and F. Valois. Core network function placement in self deployable mobile networks. Computer Communications, Elsevier Journal, Volume 133, January 2019, Pages 12-23.
2. A. Chakraborty, E. Chai, K. Sundaresan, A. Khojastepour, S. Rangarajan. SkyRAN: a self-organizing LTE RAN in the sky. ACM CoNEXT'18, Heraklion, Greece, December 2018.

Website address of the personal page : <http://perso.citi.insa-lyon.fr/fvalois/>

Supervisor's email : [fabrice.valois@insa-lyon.fr](mailto:fabrice.valois@insa-lyon.fr)

Description of the research work proposed for a PhD Topic # (see list) : I-11.

Title : Mobility management for self-deployable networks

Subject :

A lot of efforts was done for 5G networks, especially focused on virtualization, slicing, millimeter waves but the vision remains telecommunication operators centric. 5G, like the previous generations of cellular networks, is still a hierarchical network with a physical and logical separation between the radio access network (RAN) and the core network (CN). In this PhD thesis, we will be focused on self-deployable networks, which give the opportunity to build flexible and agile cellular networks. We talk of a kind of private cellular networks that can be rapidly deployed, easily installed, and operated on demand, anywhere, anytime. Recent evolutions in terms of communication, embedded systems and equipment miniaturization, network virtualization and autonomous vehicles allow a major evolution to redesign cellular networks with autonomous base stations, and a strong convergence between the radio access network and the core network. Here is the point: in self-deployable, the CN and the RAN are collocated to build a new class of stateless cellular networks. This convergence allows new degree of freedom, in terms of architecture, configuration and deployment, services and use-cases.

During this Ph.D. thesis, we envision the future of mobility management in self-deployable networks. After reviewing the state of the art of mobility management, we will design new mobility management mechanisms that takes benefit from the two-sided mobility in self-deployable networks (users and the network).

Keywords :

Cellular networks, beyond 5G, mobility management, drones/UAVs/autonomous vehicles.

Expected collaborations :

Several works are focused on self-deployable networks in our research group. The PhD candidate will join a group of 5 researchers which use a software cellular networks based on srsLTE. More, we have common research work with a French Company in the area of telecommunication systems for first responders, as well as with University of Waterloo (Canada).

Background required from the applicant :

The candidate must possess a Master's degree or an equivalent degree (e.g. engineering degree) in Computer Science or Telecommunications. Good mathematical background and wireless networking as well as practical skills with programming languages (e.g. C/C++, Python, Java) are required. The candidate should also have a willingness to address both theoretical and experimental aspects of the problem. Languages : Fluent English level. Knowledge of French language is not mandatory

Relational skills : Active listening, empathetic communication, the ability to tolerate and accept appropriate differences.

Existence of a PDF file detailing the proposal ("yes" or "no") : no

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