

## Polytech network form for PhD Research Grants from the China Scholarship Council

This document describes the PhD subject and supervisor proposed by the French Polytech network of 14 university engineering schools. Please contact the PhD supervisor by email or Skype for further information regarding your application.

Supervisor information	
Family name	HONG
First name	Dunpin
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Web reference	<a href="http://www.univ-orleans.fr/gremi/dunpin-hong">http://www.univ-orleans.fr/gremi/dunpin-hong</a>
Lab name	GREMI
Lab web site	<a href="http://www.univ-orleans.fr/gremi/">http://www.univ-orleans.fr/gremi/</a>
Polytech name	Polytech Orleans
University name	University of Orleans
Country	France

PhD information	
Title	Study of non-thermal plasmas dedicated to water pollution control
Main topics regards to CSC list (3 topics at maximum)	V-12, VI-3
Required skills in science and engineering	Applied Physics, Electrical engineering

## Subject description (two pages maximum)

Plasma is the fourth State of matter. Even if it is not widely known by the public, it has many applications in industrial areas, for instance, the semiconductor industry which cannot manufacture any microchip without plasma. The use of plasma to the air pollution control is a maturing technology, while its use for pollution control of the waters still requires many investigations.

In our laboratory, we conduct studies on pollution control of water containing pharmaceutical molecules by using non-thermal plasmas (NTP) created by electrical discharges. Preliminary results [1, 2] are encouraging and we must continue the effort to improve the effectiveness of the treatment. Optimization requires a thorough study of electrical discharges in the used reactor with and without catalyst.

If the PhD thesis proposed here is motivated by the need mentioned above, the study is not limited to this particular case. Indeed, during this thesis, the candidate will study the electrical discharges in the presence of water, which are far from being mastered. This work includes:

- Electrical measurement
- Optical measurement
- Gas analysis
- Water analysis
- Design of non-thermal plasmas reactors

The proposed work will be carried out in GREMI laboratory which is hosted by Polytech Orleans. The GREMI laboratory belongs to the French research institution CNRS (Centre National de la Recherche Scientifique) and the University of Orleans. It specializes in laser and plasma processes. The student will work under supervision of the Professor Dunpin HONG and his colleagues, namely Dr. Hervé RABAT and Dr. Olivier AUBRY, three researchers involved in topic concerning the removal of drug from water (<https://trememap.wordpress.com/>, <https://www.plateformes-pivots.eu/>). Dr. Hong, professor at Polytech Orleans, works in electrical discharges and their investigations since about 30 years and is co-author of 72 journal papers while 26 recent papers concerning NTP, mainly for airflow control. This group run recently an international conference on gas discharges and their applications (<http://gd2014.sciencesconf.org/>).

- 1 Y. Baloul, H. Rabat, D. Hong, S. Chuon, and O. Aubry, *Preliminary Study of a Non-thermal Plasma for the Degradation of the Paracetamol Residue in Water*, *IJPEST*, 10 (2), pp. 102-107 (2016)
2. Y. Baloul, O. Aubry, H. Rabat, C. Colas, B. Maunit, and D. Hong, *Paracetamol degradation in aqueous solution by non-thermal plasma*, *Eur. Phys. J. Appl. Phys.* (2017) 79: 30802, doi: 10.1051/epjap/2017160472