PhD Topic at LRCS, Amiens, FRANCE https://www.lrcs.u-picardie.fr/	
Topic Title	*Determination of electrolyte transport properties for Li-ion batteries*
Principal Advisor	LRCS: Dr. C. Delacourt, charles.delacourt (at) u-picardie.fr LAMFA : Pr. J. P. Chehab, jean-paul.chehab (at) u-picardie.fr
Co-advisor	LRCS: Dr. B. Fleutot, benoit.fleutot (at) u-picardie.fr
Collaborations	MeCS: Computation center of UPJV
Funding Source, Name of project	EP4B; Project funded by Region Hauts-de-France
Web Site of Advisor (if applicable)	https://www.lrcs.u-picardie.fr/equipe/permanents/detail/charles-delacourt/ http://www.lamfa.u-picardie.fr/chehab/
Date of publication of the offer	May 2, 2017
Deadline for application	June 30, 2017
Date of start of the Project	October 1st, 2017
Description of the Topic	**The development of the electric vehicle is tied to that of Li-ion cells from which the battery pack is made. The driving range of the vehicle directly relates to the energy stored in the battery pack. In order to forecast how a cell design will translate to the vehicle performance, as well as how a vehicle usage will affect the battery life, it is important to set forth reliable battery models. Physics-based models, which are based on mathematical equations that describe the various underlying phenomena (reaction kinetics, transport, etc.), are probably the most predictive in this regard. However, they rely on a number of input parameters which must be determined as accurately and independently as possible. Among these, the electrolyte properties are crucial, because electrolyte transport is known to have a strong impact on limitations across the porous electrodes. Looking at the literature, there are only a few reports on battery electrolytes. In the PhD thesis work, experiments will be carried out with a novel cell that has specifically been developed in order to study how the transport properties depend upon salt concentration and temperature, for some selected electrolytes. The concentration dependence will be included in the model analysis, which should help decreasing the number of initial salt concentrations to be studied without compromising on accuracy. Optimization methods will be developed in this regard to analyze data in an effective and automatized way. This work will pave the way toward the development of a methodology to set forth a**

	database for electrolyte properties, which is extremely relevant to the physics-based modeling community; both from academia and industry.
Techniques to be used	• Electrochemical techniques with an innovative multi-electrode cell. • Modeling techniques, including optimization routines to analyze experimental data
Skills of the Applicant	The candidate must preferably hold a master degree in electrochemistry or (electro)chemical engineering, or at least in chemistry. Ideally, he/she is knowledgeable in Li-ion batteries and in mathematical modeling and programming. He/she must be handy with experimental work.
Contact (s)	See above
List of documents to provide	CANDIDATE APPLICATIONS SHOULD COMPRISE A CV AND A COVER LETTER SPECIFICALLY HIGHLIGHTING HOW CANDIDATE'S SKILLSET IS APPROPRIATE TO THE PROPOSED RESEARCH DETAILED ABOVE.