Master 2 Research Fellow at LRCS, Amiens, FRANCE https://www.lrcs.u-picardie.fr/	
Topic Title	*"Ensuring water stability of hybrid perovskite solar cells"*
Principal Advisor	GOTTIS Sébastien, sebastien.gottis@u-picardie.fr, (+33) 3 22 82 57 95
Web Site of Advisor	https://www.lrcs.u-picardie.fr/equipe/permanents/detail/sebastien-gottis/
Date of publication of the offer	October 28th, 2020
Deadline for application	December 15th, 2020
Date of start of the Project	February 1st, 2020
Description of the Topic	Perovskite structures have allowed the emergence of a whole new photovoltaic technology which achieved conversion efficiency up to 25%. However, among many stability problems encountered by this type of cell, we wish to contribute to two important issues: (i) the lack of temperature and humidity stability of the absorber (ii) the lead content which leads to under humidity to degradation products. Within this context, our focus is niche in the development of new organic composition including macromolecules and hydrophobic cation in the A-site which showed stability against light exposure and moisture. On the one hand, the objective of the master thesis will be to synthesize new hydrophobic ammonium salt and incorporate them into the Cesium-Formamidinium Perovskite layer. On the other hand, the Master student will modify polymers in order to create hydrophobic barrier. Both ammonium and polymers obtained would be incorporate into complete devices to rise efficiency greater than 21% and maintain perfectly stable materials under humidity thanks to the association of a simpler FAPbI3 system as an absorber and the use of polymers.
Techniques to be used	The new materials will be characterized in-depth by x-ray diffraction, transmission electron microscopy and UV-Visible absorption spectroscopy. The power conversion efficiency and spectral response of the devices will be measured from the (J-V) characteristics under illumination using class 3A solar simulator and by external quantum efficiency (EQE), respectively. The successful student will have access to all the laboratory instruments that will allow him to carry out the complete the study of the new materials. In addition, all of our students have access to microscopy platforms as well as a full panel of instruments to perform X-ray diffraction experiments under humidity and under illumination ex situ and in situ.
Skills of the Applicant	The student has to be in Master II in chemistry, organic chemistry or materials chemistry and should show a strong motivation for solar cells technology.
Contact (s)	GOTTIS Sébastien, sebastien.gottis@u-picardie.fr, (+33) 3 22 82 57 95
List of documents to provide	CV + motivation letter + list of references + 2 recommendation letters