



**TAIWAN PROGRAM 2019
EXPRESSIONS OF INTEREST**

CSIC SCIENTIFIC SUPERVISOR: Muñoz Caro, Guillermo M.	
EMAIL: munozcg@cab.inta-csic.es	PHONE NUMBER: (+34) 915206354
INSTITUTE/CENTER NAME: Centro de Astrobiología (CAB, CSIC-INTA)	
ADDRESS: Ctra. de Ajalvir km 4, 28850 Torrejón de Ardoz (Madrid)	
BRIEF DESCRIPTION OF THE RESEARCH GROUP: The scientific supervisor is the coordinator of the Interstellar and Circumstellar Medium group that performs research with about 15 experts in observational, theoretical and experimental aspects of Astrochemistry. He is also coordinator of the laboratory LSAIP at CAB, where the ISAC chamber for simulation of ice processes is located. The Experimental Astrochemistry unit is composed of a senior researcher, a postdoc, a technician, and a PhD student. Since 2010, this unit has published more than 40 articles in astrophysics journals (ApJ, A&A, MNRAS) and broader scope journals (Science, PNAS, Phys. Rev. Let., Chem. Soc. Rev.); a good number of these works were joint research with the National Central University group led by Dr. Y.-J. Chen. In 2018, we co-edited the book "Laboratory Astrophysics" (Springer).	
CENTER/RESEARCH GROUP'S WEBSITE: http://www.cab.inta.es/es/inicio	
NUMBER OF STUDENTS WILLING TO WELCOME: 1	
BRIEF DESCRIPTION OF THE STUDENT ACADEMIC BACKGROUND: Graduate student with a good knowledge of atomic and molecular spectroscopy and experience in the use of ultra-high vacuum chambers for the simulation of interstellar ice processes. The student will work on the photon-induced desorption of interstellar ices, experience in this field is a benefit for this application. Our collaborator, Dr. Yu-Jung Chen from the Department of Physics, National Central University, Taiwan, shares our specific field of research and supports our application.	



BRIEF DESCRIPTION OF THE STUDENTS TASK:

The aim is to study the processes taking place in icy grain mantles in space. Dust grains were likely the first surfaces available in the Universe to allow chemical reactions leading to the formation of, e.g., water and other simple molecules, but also the synthesis of more complex molecules of prebiotic interest including carboxylic acids, amino acids, N- and O-bearing heterocycles, sugars, etc., as we found experimentally. These species are detected in comets, their impact with the early Earth likely paved the way toward prebiotic chemistry.

The student will focus on the irradiation of interstellar ice analogs covering dust grains to simulate the photodesorption during UV irradiation, a process that accounts for the ejection of ice molecules to the gas phase in very cold environments like dense interstellar clouds, thus serving to explain their observed abundances using radiotelescopes. This approach will be both experimental and theoretical, involving quantum calculations in collaboration with Dr. O Roncero to simulate exciton propagation in the ice and its effect on the measured photodesorption yield.

€1 000 FOR LIVING EXPENSES WILL BE THE FINANCIAL CONTRIBUTION FROM THE CSIC CENTER TO THE STUDENTS

Responsible Researcher: Guillermo M. Muñoz Caro Center

Director: J. Miguel Mas Hesse

ICU Manager: Sagrario Salado