



ALLA MAGNIFICA RETTRICE
DELL'UNIVERSITA' DEGLI STUDI DI MILANO

COD. ID: 7060

Il sottoscritto chiede di essere ammesso a partecipare alla selezione pubblica, per titoli ed esami, per il conferimento di un assegno di ricerca presso il Dipartimento di Bioscienze

Responsabile scientifico: Lucio Conti

[Nome e cognome]

CURRICULUM VITAE

INFORMAZIONI PERSONALI

Cognome	Cubillas Martínez
Nome	Iván Alejandro

OCCUPAZIONE ATTUALE

Incarico	Struttura
Nessun incarico attuale	Non applicabile

ISTRUZIONE E FORMAZIONE

Titolo	Corso di studi	Università	anno conseguimento titolo
Laurea Magistrale o equivalente	x	Université Grenoble Alpes	2024
Specializzazione			
Dottorato Di Ricerca			
Master			
Diploma Di Specializzazione Medica			
Diploma Di Specializzazione Europea			
Altro			

ISCRIZIONE AD ORDINI PROFESSIONALI

Data iscrizione	Ordine	Città



LINGUE STRANIERE CONOSCIUTE

lingue	livello di conoscenza
Inglese	C1
Spagnolo	Lingua materna

PREMI, RICONOSCIMENTI E BORSE DI STUDIO

anno	Descrizione premio
2022	Graduate School program Soft-Nano
2023	Graduate School program Nanobiotechnology

ATTIVITÀ DI FORMAZIONE O DI RICERCA

Laboratory technician

Finalizing my bachelor's degree, I participated in a research project for 3 months on shrimp colonies at a laboratory named CIBNOR in Sonora, Mexico. Here, I did DNA extraction and purifications from samples using DNA extraction tool kits from Qiagen. PCR testing was performed on specific sequences in reference to bacterial resistance. In parallel, I grew bacterial cultures from water samples at different depths of a reservoir feeding these shrimp colonies. I characterized several bacteria from these samples by selective and differential media growth as well as performing gram testing, antibiotic resistance, amongst others. During this time, I performed hundreds of extractions and purification tests using NanoDrop spectrophotometer with full 96 plate wells at a time. Additionally, over 5 bacteria strands were properly differentiated in direct contact with the shrimp samples. Thanks to my specialization in biotechnology during my bachelor's degree in chemical engineering I was able to easily accommodate and learn the necessary skills to perform an outstanding work in this laboratory.

Internship in Rheology

In my first year of masters in Soft Matter and Biophysics I conducted a yearlong research investigation on colloidal materials in rheological fluids at Laboratoire de Rheologie et Procédés (LRP) in Grenoble, France under the tutelage of Clement de Loubens and in co-operation of Nishant Nassir as a post-doc. Long-range attraction between colloidal vesicles was encountered in this lab during rheological studies and further intrigues lead to this project with two main priorities, measuring the nano-scale forces being presented and unveiling the root of this attraction. At the beginning, I was able to refine the protocol to create polyelectrolytic vesicles with fatty acids and a polymer surfactant first through an inhouse microfluidic channel setup and later with a more manual protocol that yielded upwards of 80% size homogeneity. Later, micropipettes were modified to act as nano-Newton force scales as a cantilever by measuring the deflection (once calibrated) presented by the attraction of two fixed vesicles on each micropipette. This was done with the help of a high-resolution camera, coupled with 1.25x to 100x objectives on a moving platform of a microscope all guided and synchronized in Matlab. The micropipette setup was changed to an electric current setup over time due to technical reasons where adaptability was a key component and recalibration took place. Data analysis and image processing were refined as well to measure forces accounting for viscosity, lubrication forces while analyzing frames by millisecond with a Matlab image tracking script. Finally, characterization of these forces was done with different electrical currents and frequencies. The work done was written in a report and presented as a poster during the 2023 summer European School of Nanoscience and Nanotechnology as part of the stipulations in the Graduate School Program scholarship.



Internship in Plant Biology

For the second year of master's in Nanobiotechnology, my internship took place at CEA (Commissariat à l'Énergie Atomique et aux Énergies Alternatives) in Grenoble, France. This was done at LPCV (Laboratoire Physiologie Cellulaire & Végétale) under the tutelage of Robert Blanvillain for the course of 5 months. The research project involved unveiling functions of PAP8 (PEP associated protein) during photomorphogenesis, clock entrainment alongside CRY2 photobodies and its relationship with nuclear complexes. This protein is dually localized, once in the plastids and again in the nucleus. Research done at this lab has greatly helped discover how these proteins aid different processes in plant development and how they are crucial during chloroplast biogenesis. The absence of a single one of these proteins in knockout mutants produce albino phenotype in *Arabidopsis thaliana* later leading to an arrest in flowering altogether and are sporophytic lethal. Following this logic phenotyping was done on a PAP8 K.O. mutant grown in low UV light showing significant hypocotyl length difference, 1.5x longer than in wild type. I did extensive work with plasmids to place a reporter assay in a PAP8 mutant by floral dip with hygromycin in a binary vector to track clock gene expression with Firefly Luciferase. Some of this work included the creation of oligonucleotides, gene sequencing, plasmid transformation, ligation, Phusion PCR, cloning and topology. Parallel work to this goal included genotyping by enzymatic reaction and PCR, RT-PCR, DNA extraction, seed sterilization and plating, phenotypic screening and selection, spectrophotometry, bibliographic work, microscopy, gel electrophoresis and image analysis. Additionally, previous protocols for nuclei and chloroplast extraction were refined and combined to obtain both intact organelles separately to be used for structural biology with the use of Cryo-EM. This protocol was used in several plants including one *A. thaliana* containing a tagged version of a PAP8 mutant with Strep tag to study nuclear complexes after affinity purification. In conclusion, a phenotype with hypocotyl elongation was found in low UV, nuclei and chloroplast extractions were performed and sent for further studies, and initial tests were done tracking clock gene expression in *A. thaliana* such as EF1 alpha, TOC1 and CCA1 in comparison to PAP8 and proper controls such as cDNA and genomic DNA. The work done here was extensive and thorough, making it a very enjoyable and learning experience for me due to my passion for genetics and molecular biology. All of this was written in a comprehensive forty-page master thesis report and presented.

Post-graduate experience

After graduation, I had the opportunity to continue the clock entrainment experiments for two additional months under the guidance of Robert Blanvillain at LPCV in Grenoble, France. Our focus was on investigating the relationship between PAP8 and CRY2 during the regulation of the internal clock. PAP8, known for its dual localization in plastids and nuclei, had been identified in CRY2 photobodies, suggesting a potential interaction during the early stages of seedling growth. To explore this, I conducted reverse transcription PCR using samples from both albino and green phenotypes to synthesize complementary DNA. The expression of several morning and evening genes was compared to that of PAP8 through PCR analysis. Gel electrophoresis, image analysis, and data processing provided qualitative insights with reproducible results under varying conditions. These findings were presented into a written report, including graphics and supporting evidence.

Additional work

Some other relevant experiences obtained during my master's degree are in the form of practical lab work. These practicals include technical skills and theoretical knowledge for lab works such as surface functionalization, protein staining followed by epifluorescence microscopy, ELISA test, Western Blot, PCR, cell-on-a-chip adhesion, atomic force microscopy (AFM), micropatterning, glucose and electric nose biosensors.

ATTIVITÀ PROGETTUALE

Anno	Progetto



2024	Investigating the role of protein modulating plant growth responses to light and its relation to internal biological clock.
2022/2023	Rheological studies of in-house vesicles responding to induced electrical current

TITOLARITÀ DI BREVETTI

Brevetto

CONGRESSI, CONVEGNI E SEMINARI

Data	Titolo	Sede
2023	European School of Nanoscience and Nanotechnologies (ESONN summer school) - Long-range attraction between polyelectrolyte microcapsules	Presentatore di poster

PUBBLICAZIONI

Libri
[titolo, città, editore, anno...]
[titolo, città, editore, anno...]
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Articoli su riviste
[titolo articolo, rivista, città, editore, anno...]
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Atti di convegni
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ALTRE INFORMAZIONI

Le dichiarazioni rese nel presente curriculum sono da ritenersi rilasciate ai sensi degli artt. 46 e 47 del DPR n. 445/2000.

Il presente curriculum, non contiene dati sensibili e dati giudiziari di cui all'art. 4, comma 1, lettere d) ed e) del D.Lgs. 30.6.2003 n. 196.

RICORDIAMO che i curricula **SARANNO RESI PUBBLICI sul sito di Ateneo** e pertanto si prega di non inserire dati sensibili e personali. Il presente modello è già precostruito per soddisfare la necessità di pubblicazione senza dati sensibili.

Si prega pertanto di **NON FIRMARE** il presente modello.

Luogo e data: _Grenoble, France_, ___17/12/2024_____