CALL FOR STUDENTS NOMINATIONS

Research Abroad Program at UIC University, Illinois, USA

With the aim of offering high-performing students at Tec de Monterrey a multicultural environment that contributes to their global perspective, academic and personal development in institutions of recognized international prestige, the Vice-Rector's Office for Internationalization in collaboration with EIC and the research laboratories of **UIC University** invite pre-graduate students to carry out research abroad starting Fall 2023 term.

- This call is addressed to Students of Tec 21 and plans prior 2019.
- Period of the Research Stay: August - December 2023
- Completed at least 5 semesters at TEC by the time of the application.
- **The deadline for the submission of the documentation will be March 30, 2023**

PROJECTS

Op--	Major	Project/Professor	Description
2	IIS, LEC	Covid 19 impact on Supply Chain: Maritime industry and nearshoring (Dr. Anthony Pagano)	During the year of 2020, previous to the pandemic crises, the top textile industry exporters were China, Bangladesh, Pakistan in Asia with a combined value of $ 343 B USD, while the United States remained a main importer bringing in values of goods estimated to be $ 122 B USD according to OED (2022). In Latin America, the top countries for the production and export of textile goods are Mexic and Honduras with a total value of $ 1.05 B USD, and current foreign investments in this sector of $ 11 B USD. Given the importance of this industry, this research analyzes the normalized comparative advantage of Latin America, Asia, and USA in an aggregate and disaggregated form for the NAFTA, AP and Mexico-AELC treaties in the textile industry sector, as well as the role of maritime industry in this nearshoring process
1	Nanotecnologia	Surface modification of nano-particle cathodes for rechargeable batteries. (Dr. Robert Klie)	Rechargeable battery cathodes often consist of transition metal oxide host materials that allow for facile diffusion of Li (or multivalent ions, such a Mg or Ca). The most promising materials are based on the spinel structure, where the redox-active transition metal sites are distinct form the intercalation sites. While the overall capacity of the cathode materials to host Li (or multivalent) ions determines the power density of a battery, which is important for the development of carbon-free energy sources for transportation and grid-scale energy storage, capacity fade, the long-term loss of storage capacity after repeated charge-discharge cycles, limits the useful lifetimes of many high- energy-density cathodes. In this project, we will explore the effects of surface corrosion, including structural changes to the spinel structure of the battery cathodes and correlate the observed changes to the loss in storage capacity. Atomic-resolution scanning transmission electron microscopy imaging and spectroscopy will be performed on various cathode materials in their pristine, charged and discharged states. Surface modifications will be explored that will limit the modification/dissolution of the cathode surfaces, while maintaining the high mobility of Li (or multivalent) ion from the electrolyte into the cathode (and vice versa). The outcome of this study will have significant impact on the lifetime of future battery powered devices and ensure that the clear energy revolution will be successful.
1	Nanotecnologia	Graphene liquid cells to study anti-bacterial nanoparticles. (Dr. Robert Klie)	The progression of dental caries and odontogenic infection is attributed to robust biofilm formation by Streptococcal strains. Nanoceria prepared from Ce (IV) salt hydrolysis were previously shown to limit Streptococcus mutans biofilm adherence in complex growth media via non bactericidal mechanism(s). However, their preparation requires highly acidic conditions (pH < 2.5) that readily form non-tractable agglomerates at physiological pH and in the presence of sodium fluoride – a common occurrence with pristine metal oxides. In this project, we study cerium oxide nanoparticle aggregates formulated with chondroitin sulfate A (CSA) resulting in superior chemical stability under physiological conditions - while maintaining biofilm reduction efficacy and minimal toxicity toward human cells populations. CSA formulated aggregates of CeO_2-NP demonstrates dose-dependent aggregation of S. mutans while having minimal effect on bacterial growth. Using a combination of atomic-resolution scanning transmission electron microscopy (STEM) imaging and spectroscopy, we will develop novel graphene liquid cells that will enable us to characterize the effects of CSA on the ceria aggregation, the valence state and nano-particle structures. The outcome of this study is anticipated to have implications for future daily administration of anti-caries products.
1	Mecatronica	Development of an assistive SEWHO for ALS patients controlled by bio-signals. (Dr. Myunghee Kim)	Amyotrophic Lateral Sclerosis (ALS) is a neurodegenerative disease characterized by the progressive loss of motor neurons responsible for controlling voluntary muscle movement. As the disease progresses, people with ALS find their mobility severely impaired and require assistance with everyday activities such as eating, dressing, bathing, getting to the toilet, and moving around. In advanced stages, patients may lose speech entirely and experience problems in breathing. Due to the difficulties faced by people with ALS, assistive technology constitutes a critical health care intervention and can restore the patient's independence and quality of life.

GUIDELINES

All students with a minimum general average of 90 at the time of the call and who present a copy of the card that endorses it and who satisfy the following points may participate as per the following guidelines:

1) It is the candidate's responsibility to carefully read the information on possible research projects as well as additional information on the center or laboratory and scientist associated with the research project of interest.
2) Present a letter explaining the reasons with a maximum of 1 page in English, addressed to the leading research professor at UIC.
3) A copy of your CV (free format). The document must be submitted in English.
4) Proof of English language proficiency as follows: TOEFL iBT 80, TOEFL 550 or IELTS 6.5 (current).
5) Letters of recommendation in English from 2 teachers.
6) Evidence of teamwork skills, leadership, and proactivity (participation in student groups, social activities, representative teams, outstanding work done as a team leading the respective team, etc.) Photos with a brief description and/or a portfolio is accepted as evidence.
7) Have a VALID national passport at the time of submitting your application to this call and with sufficient validity to remain in the United States if selected (minimum 6 months after coming back from USA).
8) Students must have sufficient funds and appropriate Medical and Liability insurance as per hosting university guidelines to support themselves in UIC for the duration of the respective research stay.
9) The following fees apply: University visa DS-2019: 650 USD

HOW TO APPLY

1) The student must update his/her profile at:

   Mi Tec -> Mi Experiencia Internacional -> Estudiante Interesado -> Actualiza tu Perfil

2) The student must send his/her application by **March 30, 2023**, including the program key **EUA-5EI-359C** at:

   Mi Tec -> Mi Experiencia Internacional -> Estudiante Solicitante -> Realiza tu solicitud

3) Shortly after the application is sent, the application status will be updated, and the student must accept the preselection. It is particularly important to keep in mind that this is NOT the result. The candidate selection depends on the decision of a selection committee, and it will be communicated by the International Programs Office.

4) Next, the student will have access to the Document Submission and must upload the required documents by **March 30, 2023**.

DOCUMENTS SUBMISSION

• Documents must be digitized in 1 single PDF file named with the prospective student ID # and last name of UIC Research Professor of the project to be applied for. Applications will not be received if the documents come in multiple files.

• Pre-grad Students

Enter info and requested documentation in the following link: UIC-Research Abroad

Without exception, applications will not be accepted after the date indicated, so it is suggested to complete the application as soon as possible. Candidates with incomplete documentation will be automatically disqualified. There is the possibility that they will not be selected for the laboratory to which they applied, but they could be selected for another, so if it is of interest to you, it is recommended to indicate a second, or even a third option.

Deadline: March 30, 2023

SELECTION PROCESS

The selection process is divided into two parts.

1) At Tec de Monterrey.

An analysis and evaluation of the candidacy will be carried out by Tec de Monterrey

a) Analysis and review of documentation.
b) Selection of candidates according to the program.
c) Sending the file directly to the research project leading professor at UIC.

2) At UIC

a) Analysis of the candidates sent and, where appropriate, selection of them for an interview.
b) If selected for the interview, an appointment will be arranged with the UIC researchers via video link. It is important to consider that the language of the communication appointment with the researchers is in English.
c) Report from UIC's leading researchers to the professor in charge of the Tec de Monterrey program on students selected to participate in the respective research projects.

Once the process is completed, the selected student will receive the response to the application by email by early mid-April 2023. The committee's decision is always final.

TO THE SELECTED STUDENTS

• Be fully aware that, as selected student, you are the image of the institution, so that in addition to complying with the norms and standards of the respective research center or laboratory, you will be obliged, without exception, to always comply with the institutional values and the General Regulation of Students of the Tec de Monterrey, which applies when the students of our institution are abroad.

• The commitment of the selected student to participate in the research project in an active and committed way, with an attitude of learning and contribution always.

• Under no circumstances the selected student will be able to seek additional work to support themselves during the stay. It is important to take this point into account since it is a very serious matter for the immigration authorities of the United States.

• The work schedule will be defined by the mentors of the project in which they will participate and must be fully complied with.

• Due to the nature of the projects and the intellectual property involved, the student must sign a confidentiality agreement.

• The time will be determined by the UIC researcher together with the Tec student, as well as any change in dates.

• Students must have sufficient funds to support themselves in UIC Illinois for the duration of their stay. This call does not include funds for accommodation, food or any other type of expense derived from your research stay in the selected laboratory or center.

- Accepted students are expected to complete and pay for the corresponding visa process including any related fee of 650 USD that UIC dictates for reimbursement.

REGISTRATION AND ACCREDITATION OF COURSES

The program has a minimum duration of 18 weeks, students will be enrolled at Tec de Monterrey in the academic period August - December 2023.

Students of academic plan: Prior to 2019

The number of units to be accredited will be defined by the Academic Coordinator prior to the studenť s participation. The number of units to be enrolled and credited in each semester is:

Minimum: 8 units
Maximum: 32 units

Students of academic plan: Tec 21
The student will enroll 18 credits per semester and validate the accreditation in the study plan with the Academic Coordinator.

The courses to be revalidated from the student's study plan will be defined by the Academic Coordinator and informed to the International Programs Office of the student´s campus.

Once accepted, students must complete their course registration for each period in the International Programs platform.

It is student's responsibility to validate with the Academic Coordinator the availability of the subjects to be revalidated by a project in which they participate. Otherwise, the subjects could be left as off-plan subjects.

Students will have assigned a Tec professor who will evaluate and define the student final scores of the research abroad experience, considering the following policy.

TUITION

The tuition to be paid will be directly at the corresponding Tec de Monterrey campus. Payment will be made according to the number of units registered in each period.

There is a fee of $650 USD related to the corresponding Visa process, in addition to visa fees paid to the US Embassy.

ADDITIONAL INFORMATION

Any point not covered in this call will be resolved by the selection committee in conjunction with the competent authority of Tec de Monterrey as the case may be. Any problem or doubt regarding the application stage should be communicated in a timely manner by sending an email or attending to the International Programs Office at the corresponding campus.