

CALL FOR STUDENTS NOMINATIONS.

Research Stays Program in Engineering and Biosciences, at Urbana-Champaign 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 the School of Engineering and Sciences and the School of Medicine of Tec de Monterrey as well as the research laboratories of **Urbana-Champaign University** invite pre-graduate students to carry out research stays starting July 2022 Fall term.

- This call is addressed to Students from the 6th. and higher semesters of Engineering and EMCS Tec 20.
- Period of the Research Stay: August-December 2022
- The deadline for the submission of the documentation will be March 30, 2022

Projects:

Lab	Opps	Profile	Project
Food & Nutrition	4	LBC	Molecular mechanisms of chemoprevention of bioactive food components, mainly proteins and flavonoids, and their safety
Mechanical Sc. Eng.	1	Mech Eng	Characterizing dominant flow and structure interaction relevant to floating offshore Wind turbines. Description: New trends point towards wind energy development with offshore floating units. However, significant fundamental and technological challenges need to be fully understood to massify the concept. This project aims to continue foundational work on the subject at a laboratory scale. The student will work with a Ph.D. student in our group to prepare setups with model wind turbines subject to oscillations, learn advanced flow diagnostic techniques, and analyze the data.
	1		Understanding the dynamics of inertial particles in stratified media. Description: The ability to characterize quantitatively and statistically the motions of particles is crucial for the environment and engineering processes. Outstanding examples include sediments and nutrients in riverine currents and microplastics in the ocean. Here, the student will work with a Ph.D. student in our group to set up various stratified media and help characterize spatiotemporal motions of a range of particles. The student will learn advanced flow diagnostic techniques and analytical tools to analyze the data.
	1		Characterizing the boundary layer flow under unsteady wall motions. Description: The modulation of wall motion in the dynamics of boundary layer processes is a complex, not well-understood problem. Parametrizations are needed to simplify modeling, e.g., flow over the sea and waves. Here, the student will perform wind tunnel experiments with a Ph.D. student in our group using specially-designed setups and advanced flow diagnostics techniques.
Chemistry and Chemical Engineering	1	Chemical Eng	Nuevas tecnologías electroquímicas para la remoción y transformación de CO ₂ atmosférico basadas en electrocatálisis y en polarización electrostática.
	1		Estudio mecanístico de la generación electroquímica in situ de reactivos oxigenados para la degradación de contaminantes
	1		Caracterización nanoelectroquímica de especies activas redox usando métodos electródicos avanzados y microfluídicos
	1		Evaluación espectroelectroquímica, caracterización, y síntesis de nuevas arquitecturas basadas en oligómeros y polímeros para baterías de flujo redox
	1		Caracterización electroquímica de procesos de degradación y regeneración química en baterías de litio y otros metales
	1		AI-guided autonomous synthesis and discovery of Quantum dots and other Inorganic nanomaterials (Project involves reaction and reactor engineering as well as data science)
	1		Electrocatalysis for sustainable chemical manufacturing: CO ₂ reduction, ammonia oxidation, glycerol oxidation. (Project involves aspects of electrochemical engineering using flow electrolysis cells, product stream product analysis, life cycle analysis, techno-economic analysis)
	1		Electrochemical Removal of Short-Chain Per- and Polyfluoroalkyl Substances (PFAS) from Water. Description: The impact of per- and polyfluoroalkyl substances (PFAS) on the environment has become more evident over the years as increasing concentrations in water threaten the well-being of humans and wildlife. PFAS broad group of persistent contaminants, present in many water matrices and ecosystems such as aquifers, surface water, groundwater drinking water, and even soil. There are many challenges in removing these contaminants from water, especially for the short chain variety of PFAS. Our project will focus on the capture of short chain PFAS using an electrochemically modulated adsorbent that will increase the selectivity towards short-chain PFAS capture. This will consist of designing and testing the material for adsorption of PFAS under environmentally relevant conditions. A second part of this project aims to develop a fully integrated electrochemical separation and destruction system for PFAS remediation. The student will design, perform, and analyze experiments, including the preparation and characterization of the adsorbents in collaboration with PhD and postdoc students in the Su group.
1	Development of flow reactor for automated synthesis of polymer. The project will involve polymer synthesis and characterization as well as reactor engineering principles		

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, addressed to the leading research professor at URBANA-CHAMPAIGN, as well as a copy of your CV (free format). Both documents must be submitted in English.
- 3) Proof of English language proficiency as follows: TOEFL: 79 or higher on the iBT TOEFL Exam or IELTS: 6.5 or higher
- 4) Letters of recommendation in English from 2 teachers.
- 5) 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.)
- 6) 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.
- 7) Students must have sufficient funds and appropriate Medical Insurance as per hosting university guidelines to support themselves in URBANA-CHAMPAIGN for the duration of the respective research stay.

The deadline for the submission of the documentation will be March 30, 2022 for Fall Term

DOCUMENTS SUBMISSION.

- Documents must be digitized in 1 single PDF file named with the prospective student ID # and last name of URBANA-CHAMPAIGN 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: <https://form.jotform.com/220597555959878>

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.

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 URBANA-CHAMPAIGN

- 2) At URBANA-CHAMPAIGN

- 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 URBANA-CHAMPAIGN researchers via video link. It is important to take into account that the language of the communication appointment with the researchers is in English.
- c) Report from URBANA-CHAMPAIGN'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 May of 2022. The committee's decision is final at all times.

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 comply at all times 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 at all times.
- 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 stay for the Fall Term 2022 will begin on August 8 with a duration of 18 weeks (ends Dec 9th)
- The time will be determined by the URBANA-CHAMPAIGN researcher together with the Tec student, as well as any change in dates.
- Students must have sufficient funds to support themselves in URBANA-CHAMPAIGN 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 fees that ND dictates for reimbursement.

REGISTRATION AND ACCREDITATION OF COURSES.

The program has a duration of 18 weeks for which, depending on the length of the research stay, students will be enrolled at the Tec de Monterrey in the following academic periods:

- August - December 2022

The number of credits to be revalidated will be defined by your program director (career director) and informed to the International Programs Office of your Campus. In the case of Medicine and Biosciences students must inform to the office of Internationalization of the School of Medicine and Health Sciences.

Once accepted, students must send the accreditation format for each period to the International Programs office at their correspondent Campus.

It is student's responsibility to validate with the career director the availability of the topics and / or subjects to be revalidated by a project in which they participate. Otherwise, the subjects could be left as off-plan subjects.

The subjects that remain outside the plan, may be credited as a subject with code "WA".

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.

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 addressed to Juan José Cabrera jcabrera@tec.mx coordinator of this program by the Vice-Rector's Office for Internationalization.

Coordinators of the Research Stay Program:

Engineering and Business: Juan José Cabrera jcabrera@tec.mx – Director of the Midwest Tec Delegation

Medicine and Biosciences: Veronica Fernandez vfernandez@tec.mx – Director of Internationalization. School of Medicine and Health Sciences. Tec de Monterrey.