Indiana University – International Summer Undergraduate Research Program

(IU-ISURP)

2026

Position Description

Professor's Name	**David Daleke**
Department	Medical Sciences / Biochemistry and Molecular Biology
Lab website	http://mypages.iu.edu/~dldlab
Position Description	This project is a study of novel proteins ("flippases") that transport lipids across membrane bilayers. These proteins regulate the organization of lipids in biological membranes. The student will express, using the bacculovirus expression system, candidate aminophospholipid transporters and purify the proteins by affinity chromatography. Purified proteins will be reconstituted and lipid transport activity will be measured. A related, alternative project is to synthesize, using enzymatic methods, phospholipid analogs to test the substrate specificity of the purified flippases.
Desired Skills & Background	A good knowledge of basic biochemistry. Some experience in protein purification, enzymology, or membrane biology will be helpful.

Position Description

Professor's Name	**Bogdan Dragnea**
Department	Chemistry
Lab website	https://dragnea.lab.indiana.edu/
Position Description	Professor Dragnea's lab is interested in the physics and chemistry of mesoscale materials which have properties that are often very different from both bulk and single molecules, due to the dominance of interfacial effects (e.g. changes in the bulk melting temperature in confinement conditions) and/or coordinated collective behavior (e.g. virus-like particles). The group develops optical characterization methods and experimental models aimed at understanding phenomena in thermoplasmonics, room-temperature super-radiance, and virus mechanics and self-assembly. Our students will do wet-lab experiments, some single particle microscopy, data analysis, and some programming.
Desired Skills & Background	Looking for students that are willing to get out of their comfort zone and be self-motivated.

Position Description

Professor's Name	**Alexandru B. Georgescu**
Department	Chemistry
Lab website	https://alexbgeorgescu.com/about
Position Description	Lab/research description (a paragraph or two): Materials define our day-to-day existence, and are even part of how we named historical ages (stone age, iron age and so on). Now, they form the basis of all technology around us, from our computer screens, to materials protecting spaceships from the harshness of space. We're a highly collaborative and interdisciplinary computational group that builds models to understand how materials behave from the atomic level upwards. One can think of our work as performing theoretical experiments, without a lab, to understand and design new materials. More can be learned from our website: https://alexbgeorgescu.com/
Desired Skills & Background	Generally, our group thrives on values curiosity and kindness; previous theoretical experience is not required, as most of our group members switched to theory from experiment and this has provided us with a variety of views and creativity. At the same time, good understanding of math is important in this type of work.

Position Description

Professor's Name	**Heather Hundley**
Department	Biology
Lab website	www.hundleylab.org
Position Description	ADARs are a family of enzymes that catalyze a hydrolytic deamination of adenosine (A) to yield inosine (I) in double stranded regions of mRNA. Current estimates predict hundreds of millions of editing sites in the human transcriptome and decreased editing has been observed in a number of neurological diseases and many types of cancer. The project will be to determine A-I RNA editing levels in human glioblastoma (brain tumor) cell lines and/or the model organism *Caenorhabditis elegans*. The student will learn to grow human cell lines/*C. elegans*, isolate RNA and perform editing assays. In addition, depending on the student interest, there is the possibility to learn how to perform immunoprecipitation and RNA expression analysis as well as CRISPR genome engineering.
Desired Skills & Background	A good knowledge of basic molecular biology is needed.

Position Description

Professor's Name	**Youngchan Park**
Department	Chemistry
Lab website	https://scholar.google.com/citations?user=WV1SQcoAAAAJ&hl=en&oi=ao
Position Description	Our research focuses on elucidating the spatiotemporal dynamics of proteins involved in extracellular electron transfer (EET) mechanisms in electroactive bacteria using single-molecule/single-cell fluorescence imaging techniques. This research aims to gain fundamental insights both in vitro and in living bacteria, and to enhance electron transfer efficiency through the integration of nanomaterials, advancing bioenergy applications (e.g., bacterial fuel cells). Projects in our lab provide research students with opportunities to build quantitative skills and gain knowledge in optics and microscopy, imaging analysis through computer coding, molecular biology, and biochemical techniques.
Desired Skills & Background	Self-motivated students. A good knowledge of general chemistry and general biology will be great.

Position Description

Professor's Name	**Jia Shen**
Department	Medical Sciences
Lab website	https://sites.google.com/view/shen-laboratory/welcome
Position Description	Research synopsis: Cancer stem cells, referred to as tumor-initiating cells, constitute a distinct group of cells within a tumor and are thought to share traits with stem cells, such as the ability to self-renew and transform into diverse cell varieties. These cells have a significant impact on tumor progression, recurrence, metastasis, and resistance to therapies. Unless cancer stem cells are eliminated, a cure of cancer is unlikely. Our research focuses on interrogating the biology of cancer stem cells in adult and childhood brain tumors. More importantly, we are dedicated to developing innovative cancer immunotherapies designed to target and eliminate cancer stem cells, with the ultimate goal of improving outcomes for brain cancer patients. Research strategies: (1) Computational and functional genomics to pinpoint pivotal targets (eg. epigenetic regulators, transcription factors, E3 ubiquitin ligases) in brain cancer stem cell maintenance and immune evasion; (2) Harnessing NK and T cells to target cancer stem cells in brain tumors affecting adults and children.
Desired Skills & Background	Background in computational biology, cancer biology, or cancer immunology. Strong interest in pursuing a PhD in the near future.

Position Description

Professor's Name	**Sara Skrabalak**
Department	Chemistry
Lab website	Skrabalak Research Group: Department of Chemistry: Indiana University Bloomington
Position Description	Researchers will collaborate with a graduate student or postdoctoral mentor to synthesize and characterize nanoparticles with potential applications in catalysis, chemical sensing, or security applications. The specific nature of the project will depend on current project needs and the student's interest and prior research experience.
Desired Skills & Background	Familiarity with materials chemistry or materials science/inorganic chemistry. Ability to calculate molarity and prepare solutions. Good notetaking and observation skills. Enthusiasm to learn something new and interest in collaboration.

Position Description

Professor's Name	**Ricardo Javier Vázquez**
Department	Chemistry
Lab website	https://vazquez.lab.indiana.edu/index.html
Position Description	We integrate the synthesis of organic materials and measurement science to address problems regarding 1) Quantum Addressability, 2) Biosensing, and 3) Energy Transduction/Bioelectronics. Triplet-state production and management through molecular design are essential yet minimally understood aspects in organic photophysics. We are working on this challenge by developing water-soluble twisted intramolecular charge transfer (TICT) chromophores with a partiall break in its π-conjugation, yielding a near-isoenergetic singlet-triplet energy gap (ΔEST ~ 0 eV). By combining design, synthesis, and time-resolved spectroscopy, and non-linear optics, novel organic materials are tailored and optimized for their use in biological imaging and sensing, quantum information science (QIS), organic light-emitting diodes (OLEDs), photovoltaics (PVs), energy transfer, and catalysis, and other emerging applications. Efficient ion-electron conduction and its management are essential yet poorly understood properties in one-dimensional (1D) and two-dimensional (2D) conjugated polyelectrolytes (CPEs). CPEs possess the backbone of traditional conjugated polymers with ionic functionalities as sidechains. We are working on developing such materials with open-shell character (stable unpair electrons) for energy transduction and magnetic applications in the aqueous phase. By combining design, synthesis, and electrochemical methods, novel CPEs are tailored and optimized for their use in green energy storage, bioelectrosynthesis, quantum information sciences (QIS), and other emerging applications.
Desired Skills & Background	We are primarily interested in a physical/analytical chemist who is willing to perform measurements. Students with good synthetic skills will also be considered.

Position Description

Professor's Name	**Xingchen Ye**
Department	Chemistry
Lab website	https://www.chem.indiana.edu/faculty/xingchen-ye/
Position Description	(1) Design and synthesis of complex colloidal nanocrystals for electro- and thermo-catalysis. (2) In-situ liquid phase electron microscopy imaging of nanomaterials. (3) Self-assembly of nanocrystals into functional mesoscale superstructures
Desired Skills & Background	Major in Chemistry, Materials Science and Engineering, Chemical Engineering, Physics, or Mechanical Engineering.