Instructions

Below, click on the link of the department to which you would like to apply for a COSURP award. From the list of faculty in that department, determine which faculty you would be interested in working with. On the submission form, you will be allowed to rank, your top two (maximum) choices. You may find that you have less than two preferences, and that is ok.

I. College of Sciences
   A. Advanced Materials Research Center
   B. Department of Biological Sciences
   C. Department of Chemistry
   D. Department of Computer Science
   E. Department of Earth & Environmental Sciences
   F. Department of Mathematics
   G. Department of Physics
   H. Department of Psychology

College of Sciences

   A. Advanced Materials Research Center

Name: Weilie Zhou
Interests: Nanomaterials Synthesis; Structure and Properties Characterization, and Nanodevice Fabrication
Student Projects: Growth II-VI Nanowire Arrays; Fabrication of Photovoltaics, Sensors, and Photodetectors
Web page: http://www.uno.edu/amri/faculty-staff/zhou.aspx
**Department of Biological Sciences**

**Name:** Nicola “Nicky” Anthony  
**Interests:** Molecular ecology, evolutionary genomics  
**Student projects:** Adaptive variation in tropical forest vertebrates; relatedness and inbreeding in wild mandrills; field herpetology; ecological niche modeling  
**Web page:** [http://www.anthonylab.org](http://www.anthonylab.org) and [www.caballiance.org](http://www.caballiance.org)

**Name:** Joel Atallah  
**Interests:** Comparative developmental biology, Drosophila genomics, bioinformatics, and the computational analysis of biological datasets  
**Student projects:** A comparison of the maternal-zygotic transition in embryos of closely related insect species; Deciphering gene regulation at the transcriptional and post-transcriptional levels; Analyzing the role of transposable elements in evolution.  
**Web page:** [https://sites.google.com/view/atallahlab](https://sites.google.com/view/atallahlab)

**Name:** Charles (Chuck) Bell  
**Interests:** molecular systematics and evolution of plant, phylogenetics and biogeography.  
**Student projects:** Molecular systematics of plants including Valerianaceae, Symphoricarpos, Linathus, Leptosiphon, and others; Determining the wild relatives of the sweet potato; Divergence time estimation; computer simulation studies; RADseq and GBS methods.  
**Web page:** [http://phylodiversity.net/cbell](http://phylodiversity.net/cbell)

**Name:** Mary Clancy  
**Interests:** Eukaryotic genetic regulatory mechanisms using the yeast, Saccharomyces cerevisiae as a model organism.  
**Student Projects:** Current work in the laboratory is focused on identifying and analyzing proteins necessary for RNA-mediated pathways governing meiotic cell differentiation in this organism. In one pathway, production of an RNA-modifying enzyme promotes entry into the meiotic cycle. The production of the modifying enzyme is itself regulated by an “antisense” RNA that inhibits production of the sense RNA. Together, these processes ensure that meiosis will occur only in the correct cells (diploids) and under the correct environmental conditions.

**Name:** Erin Cox  
**Interests:** benthic ecology in seagrass beds and artificial reefs, eco-physiology of aquatic plants, bottom-up processes in coastal habitats, multi-stressors such as ocean warming, acidification, eutrophication on coastal aquatic organisms and ecosystems  
**Student projects:** Student projects could include examining aspects of ocean acidification impacts on seagrass seedling development and seagrass ecology, composition of benthic organisms on artificial reefs in the Northern Gulf of Mexico, contribution of epiphytic diatoms to seagrass bed production

**Name:** Jerry Howard  
**Interests:** Evolutionary ecology, Biology of invasive species, conservation biology.  
**Student projects:** Effects of diet on behavior, physiology, and life history of insects, insect communities of southeast Louisiana, insect-plant interactions, resource allocation and ecological effects of Chinese tallow tree, conservation of the Mississippi sandhill crane.
Name: Simon Lailvaux  
**Interests:** Evolution, functional ecology, physiology  
**Student Projects:** Exercise response in lizards; predicting locomotor performance in extinct animals; neurochemistry, performance, and mate choice in crickets; mechanical trade-offs among locomotor performance traits; cricket sexual conflict; aging and longevity in animals  
**Web page:** [http://fs.uno.edu/slailvau/index.html](http://fs.uno.edu/slailvau/index.html)

Name: Zhengchang Liu  
**Interests:** Signal Transduction Pathways in Yeast. My laboratory is interested in understanding the mechanisms by which cells sense their internal and external environments by focusing on three signal transduction pathways, mitochondria-to-nucleus signaling, the TOR (target of rapamycin) signal transduction pathway, and the SPS (Ssy1-Ptr3-Ssy5) amino acid sensing pathway. We are addressing these questions by using genetic, molecular, and biochemical approaches in the model organism Saccharomyces cerevisiae.  
**Web page:** [http://fs.uno.edu/zliu5/](http://fs.uno.edu/zliu5/)

Name: Carla Penz  
**Interests:** evolution, comparative morphology, and general biology of butterflies.  
**Student projects:** Using collection specimens, students can study butterfly color patterns and/or morphology. Examples would be: the study of wing shape as associated with flight behavior, or how color patterns differ between various butterfly species.  
**Web page:** [http://fs.uno.edu/cpenz](http://fs.uno.edu/cpenz)

Name: Bernard (Barney) Rees  
**Interests:** Fish physiology, biochemistry, and molecular biology; biochemical adaptation to environmental changes, especially changes in dissolved oxygen.  
**Student projects:** Students are involved with routine characterization of responses of fish to environmental stress, in particular decreased oxygen concentration. Former students have measured changes at the organismal level (behavior, oxygen consumption), tissue level (blood oxygen-carrying capacity, tissue enzyme activities), and molecular level (specific proteins and mRNAs). Live animal handling and husbandry might be involved depending upon the student and the project.

Name: Wendy Schluchter  
**Interests:** Microbial physiology; cyanobacterial photosynthesis; biosynthesis of light-harvesting proteins and environmental influences on gene expression. Cyanobacteria alter the composition of their light-harvesting proteins for photosynthesis (phycobilisomes) in response to light intensity, light quality, and nutrient availability. Their phycobilisomes (PBS) are composed primarily of phycobiliproteins (PBP). Phycobiliproteins range in color from yellow to red to purple to blue, depending upon which of a combination of four possible chromophores called bilins are covalently attached to these proteins.  
**Student projects:** Students would be involved in cloning and expressing cyanobacterial proteins inside E. coli to recreate the entire biosynthetic pathway for each phycobiliprotein.
C. Department of Chemistry

Name: David Podgorski
Project title:
- Analytical Chemistry
- Environmental Chemistry
- Organic Geochemistry
- Biogeochemistry

Project description:
- Photodegradation of hydrocarbon metabolites in groundwater
- Fluorescence profiling of marine dissolved organic matter


Name: Viktor Poltavets
Interests: Poltavets group research program is focused on the rational design of novel solid-state phases and establishing how crystal structure, spin and oxidation state correlates with the magnetic, electronic, catalytic, and electrochemical properties of materials. While focusing on fundamental scientific problems, we are attempting to address critical needs of current technologies in novel energy storage (cathodes with multiple electrons transfer) and energy conversion (new catalysts for ammonia decomposition) materials.

Student Projects:
Rechargeable batteries: synthesis of new cathodes with multiple electron transfer
Heterogeneous catalysis: ammonia for renewable energy storage (new catalysts for ammonia decomposition)

Name: Steve Rick
Project title: Computational studies of aqueous, ionic, biological and polymeric systems.
Project description: Recent advances in algorithm development and computer architecture have greatly increased the ability of computational methods to play a major role in chemistry, enabling computer simulations to provide valuable insight into the structure and dynamics of materials. Our lab is interested in a range of systems, from both aqueous and non-aqueous liquids to biological systems. These studies include biological ion channels, stimuli responsive polymers, and ionic liquids.


Name: Matthew Tarr
Interests:
- Environmental photochemistry
- Nanomaterials for photocatalysis
- Nanomaterials for biomedical applications

Student Projects:
- Measure effects of photochemistry on oil spilled in aquatic systems
- Make and test nanomaterials for photocatalysis
- Make and test nanomaterials for biomedical applications

Name: Mark L. Trudell  
Interests: Medication Development for Psychostimulant Abuse, Iridium catalyzed reaction for Carbon-Nitrogen bond formation, Natural Product Total Synthesis  
Student Projects: Synthesis and structure-activity relationships of synthetic cannabinoid metabolites; Total synthesis of amphibian alkaloids; Iridium catalyzed polymerization  

Name: John B. Wiley  
Interests: Synthesis and Characterization of Nanoscrolls  
Student projects: The student will utilize low temperature reaction strategies to modify various layered compounds so as to create nanoscroled materials. High temperature synthesis, followed by exfoliation, will be used in the formation of the nanoscrolls. Various oxide and non-oxide compounds will be investigated and in some cases, nanoparticles will be captured so as to make nanopeapod structures. The student will learn about the methods used in synthesis, simple crystallography, and electron microscopy.  
Web page: http://fs.uno.edu/jwiley/

Name: Phoebe Zito  
Interests: Analytical Chemistry, Environmental Chemistry  
Student Projects:  
- Assessment on how the thickness of petroleum films can affect photochemistry and the production of petrogenic dissolved organic matter in aquatic systems.  
- Photochemical production of hydroxyl radical in petrogenic dissolved organic carbon

D. Department of Computer Science

Name: Shaikh Arifuzzaman  
Interests: Big Data, Graph (Network) Mining, Parallel Algorithms, High Performance Computing (HPC), Social Network Analysis, Data Science  
Student projects:  
- Network Data Visualization  
- Designing MapReduce-based Parallel Algorithms for Big Data  
- Designing GPU-based Algorithms for Big Data  
- Analyzing Large-scale Biological Data  
- Mining and Analysis of Large Social Networks (e.g., Facebook, Twitter)  
- (Or, any similar Topics Involving scalable computing and big data)  
Web page: www.cs.uno.edu/~arif/

Name: Md Tamjidul Hoque  
Interests: Bioinformatics, Machine Learning and Artificial Intelligence, Algorithm Development  
Student projects:  
- Semi-disordered Prediction, Energy function optimization, Fold-recognition, Binding region prediction, Support vector machine (SVM) optimized by Genetic algorithms, Neural Network optimized by Genetic
algorithms, Gene-Regulatory-Network (GRN) for Algal genome, Sampling algorithm development, Anomaly detection in drug usage.

Web page: [http://cs.uno.edu/~tamjid/](http://cs.uno.edu/~tamjid/)

**Name:** Ben Samuel  
**Interests:** Interactive Narrative, AI-Driven Game Design, Social Simulation, Computationally Assisted Performance  
**Student projects:** Potential student projects include using an existing, novel artificial intelligence system to produce believable, empathetic virtual characters (for video games and other contexts), assisting in the development of a mixed-initiative game that encourages players to craft their own stories, and helping to increase the accessibility and distribution of an award winning game that combines social simulation, world generation, and live improvised performance.

Web page: [http://www.ben-samuel.com](http://www.ben-samuel.com)

**Name:** Christopher Summa  
**Interests:** Protein structure refinement, simulation of macromolecules, statistical analysis of protein structures, computational design of water-soluble membrane proteins, and optimization and analysis of molecular energy functions.  
**Student projects:** Students would work on a problem involving refinement of protein structure, simulating macromolecules, performing statistical analysis of protein structures, computational design of water-soluble membrane proteins, or optimization and analysis of molecular energy functions.


**Name:** Shengru Tu  
**Interests:** Service-oriented architecture (SOA), Web services for GIS, testing for Web services, enterprise software integration, and semantic framework supporting computer science education.  
**Student projects:**  
- Web Application Development for Education on Computational Thinking  
- Web Mash-up Frameworks  
- Web Enable the Louisiana Oyster Growth Model Database  


**Name:** Phani Vadrevu  
**Interests:** Web and network security (developing defenses, attacks, forensic tools and making measurements), malware research. I am interested in the usage of machine learning techniques in the aid of solving these problems in computer security.  
**Student Projects:** Most of the projects, if successful, will lead to an academic publication at a reputed computer security conference.  
- Develop a mobile app that helps in measuring the practicality of a particular kind of phishing attack on the mobile platform  
- Enabling automatic analysis of malicious obfuscated JavaScript used on the web  
- Detecting malicious activities on the web (eg: cross-site scripting, phishing, malvertising and some newer nuisances like cryptojacking etc.) by dynamically analyzing JavaScript execution in real-time.

Website: [http://www.phanivadrevu.com](http://www.phanivadrevu.com)
**Name:** Stephen G. Ware  
**Interests:**  
- Artificial intelligence  
- Game development  
- Interactive narrative  

**Student projects:** Prof. Ware is looking for an undergraduate student with an interest in designing 3D levels for an RPG-like game. The student will use pre-made, high quality 3D assets to lay out the insides of rooms and the outsides of buildings.  
**Web page:** [http://nil.cs.uno.edu](http://nil.cs.uno.edu)

**Name:** Minhaz F. Zibran  
**Interests:** Software Engineering with particular focus on source code analysis and manipulation, empirical studies, tool support for aiding software development and maintenance. Program Comprehension  

**Student projects:** Code Clone Detection, Clone Visualization, Code obfuscation  
**Web page:** [http://www.cs.uno.edu/~zibran](http://www.cs.uno.edu/~zibran)

**Department of Earth & Environmental Sciences**

**Name:** Ioannis Y. Georgiou  
**Interests:** I am interested in various surface processes occurring in rivers, deltas and estuaries. My recent efforts have focused on fluvio-deltaic and coastal plain systems, focusing on the hydrodynamic and geomorphic response of these systems to internal and external forcings at various time-scales, frequently spanning from inter-annual to century. We do so by studying regional-to-local processes driving geomorphic change using observations in the field, numerical process-based models, and often reduced complexity models. Much of my research takes place in the Mississippi River Delta Plain, where the ongoing transgression provides unique conditions to study the effects of sea level rise, storms, and other processes on wetlands, barrier islands, and the modern delta, with transferable knowledge to other systems around the world. Recent research efforts include paleo wave climate and tidal current reproductions to better understand regressive systems and basin infilling, processes controlling the development of stratigraphy in tidal point bars, the morphodynamics of the fluvial-to-marine transition, morphodynamics of barrier islands, controls on delta distributary channel kinematics, and exchange processes between estuaries and the coastal ocean.  

**Potential Student Projects:**  
1. Fine sediment dynamics in Lake Pontchartrain  
2. Lateral accretion of tidal bars with and without fluvial input  
3. Tidal inlet and basin infilling processes  
4. Understanding marsh edge erosion in coastal wetlands  
5. Coastal morphodynamic response to tropical and extratropical storms  
6. Sedimentation in river-dominated deltaic wetlands  
7. Morphometrics of tidal channel networks  
**Web page:** [https://sites.google.com/site/ioannisgeorgiougroup/](https://sites.google.com/site/ioannisgeorgiougroup/)

**Name:** Mark Kulp  
**Interests:** The Coastal Research Laboratory has potential undergraduate research projects in stratigraphy and geomorphology of the Mississippi River delta plain.
Potential Student Projects:

- Mapping of geomorphologic change across the northern Gulf of Mexico through the use of historical and recently acquired imagery
- Correlation of stratigraphic units to better understand the framework of the Louisiana shelf
- Documentation of the shallow stratigraphy below modern barrier islands
- Investigations of the relative sea level change across the northern Gulf of Mexico

Name: Robert Mahon

Interests:

- Sediment transport in modern river and delta systems
- Quantitative models for understanding flow and sediment transport conditions from ancient sedimentary rocks

Student Projects:

- Grain size fining along river delta fronts
- Dynamics of sediment transport and construction of subaqueous delta levees
- 3-dimensional evolution of river and tidal bedforms and their stratigraphic deposits
- Analyzing advection and diffusion of sediment particles over mobile beds with bedforms

Name: Martin O’Connell

Interests: The Nekton Research Laboratory (NRL) has many potential undergraduate research projects for students. Our research interests include studying the ecology of local freshwater and marine fishes with the hopes of improving the management and conservation of these species. The NRL has a history for recruiting undergraduate researchers and volunteers, some of whom continue on as graduate students either in the NRL itself or elsewhere.

Student Projects:

- Processing and identification of larval fishes and invertebrates as related to measuring their responses to possible settlement cues;
- Assessing the interaction of non-native Rio Grande Cichlids and native fishes in Bayou St. John and City Park;
- Determining if Louisiana populations of Sheephead Minnows practice inter- and intra-species cleaning behavior or lepidophagy;
- A survey for populations of Southern Redbelly Dace in stream of Louisiana’s Florida parishes;
- Surveying for non-native island apple snails in southeastern Louisiana;
- Surveying City Park for possible species’ refugia;
- Tracking non-native water hyacinth;
- Examining fish specimens for the presence of microplastics; and
- Preliminary survey for limpkin in City Park.

Web page: [http://www.uno.edu/nekton-research-laboratory/](http://www.uno.edu/nekton-research-laboratory/)

Name: Peter Bierhorst

Interests: Statistics, Quantum Information Theory. I focus on the statistical analysis of experimental demonstrations of quantum nonlocality. I also study potential applications of these experiments to real-world problems in communication and cryptography.

Student Project:
1) Understand Bell's Theorem, which shows that "local hidden variable" explanations of quantum mechanics are impossible.

2) Re-examine various analyses of quantum nonlocality experiments that claim to have found exotic, unanticipated effects, to (probably) find the flaw in reasoning.

3) Study the limits on the type of correlations that can be established between two and/or three people if they exploit the resource of shared quantum-entangled particles.

Name: Kenneth Holladay
Interests: Combinatorics - Circle systems
Student Project: I am writing a text book for discrete math on circle systems. The student can work on several topics of research as well as the exposition of this work. This includes completing the list of 8 point systems, finding extremal systems with 9 to 12 points, geometric representations, density theorems, counting results and other topics.

Name: Linxiong Li
Interests: My research focuses on both theoretical and applied statistics with applications in various fields including biomedicine, engineering, financial industry, etc. Currently, I am working on a project funded by the USDA about cotton fiber length estimation.
Student Project: Use basic statistics and software to analyze data.

Name: Xueyan Liu
Interests: Spatial statistics. I will focus on developing new statistical methods for analyzing spatial data in terms of clustering of a single species and co-localization of multiple species. Applications can be used in geography, biology, social sciences, etc.
Student Projects: To study stochastic processes and spatial statistic theory; to develop R algorithms and packages for calculating clustering degrees and co-localization degrees; to work on simulations and real data applications of the indices.

Name: Jairo Santanilla
Interests:
- Mathematics for Data Analysis,
- Actuarial Science
- Stochastic Analysis
- Differential Equations (including stochastic)
Student Projects:
- Data analysis in actuary.
- Preparation for actuarial exams (Society of Actuaries)

Name: Ralph Saxton
Interests: Nonlinear analysis and its applications to field theories. Some problems involve harmonic mappings, nematic liquid crystals, phase transitions, fluid dynamics and elasticity. Each of these produces surprisingly interesting equations to study. Equations are to mathematics something like planets to astronomy or species to biology; new ones are as exciting to discover as their properties are to uncover.
Student Projects: We would examine the theories behind waves. Waves are everywhere, in sound, in water, underground (in earthquakes), in light - they can be produced, and behave, in very different ways. We discover how waves are propagated through their medium.
Name: Tumulesh Solanky
Interests: Statistics. In particular, deriving sampling strategies where the sampling cost is high, such as in clinical trials where the subjects are human beings. The overall goal is to achieve precise estimation of key parameters based on a smallest possible sample.
Student projects: I am looking at the data for some clinical trials for selected antipsychotic drugs, which have been approved by FDA and have gone through independent clinical trials. The goal would be to see if using the current research methodologies, one could achieve the same precision as in the published studies, based on a smaller sample.

G. Department of Physics

Name: Juliette Ioup
Research Interests: Acoustic, geophysical, and aerospace signal analysis and processing; deconvolution, mathematical digital filtering, and spectral estimation; Fourier and wavelet transforms; higher order correlations and spectra; underwater acoustics and bioacoustics; modeling and simulation; computational physics.
Student Projects:
  • Analysis of underwater fish videos.
  • Geophysical monitoring of levees.
  • Analysis of whale and dolphin clicks.
  • Acoustic analysis of musical instruments

Name: Kendal Leftwich
Research Interests:
  • Science Education
  • Signal Processing
Student Projects:
  • Introducing scientific research to high school students
  • Calculating population densities of dolphins in the northern Gulf of Mexico

Name: Leszek Malkinski
Research Interests:
Thin film technology, micro-origami techniques, magnetic materials for information technology and wireless communications, spring-magnets, magnetoelasticity, magnetoelectric and multiferroic composites for biomedical applications, spin electronics, micro-electro-mechanical systems, new generation of solar cells, liquid crystals, triboelectric effect
Student Projects:
Triboelectric effect- converting surface charges into volume charges

Name: Ashok Puri
Interests: condensed matter optics, surface optics, electronic properties of semiconductors, nonlinear problems in applied mathematics
Recent past research includes: the optical response of rough surfaces, nonlinear pulse propagation through fibers, thin films, second harmonic generation, resonant tunneling through quantum well heterostructures and quantum chaos.

**Student projects:**
- Investigating characteristics of fluid flow through a porous medium using both analytical and numerical techniques.
- Numerical investigation of Non-Fickian diffusion with generalized source.
- Investigation of dynamics of biological films using numerical methods.

**Name:** Leonard Spinu  
**Research Interests:**  
Dr. Spinu is an experimental condensed matter physicist who is interested in the magnetic and electronic properties of nanostructured materials, high frequency characterization of magnetic and dielectric materials, spin-dependent transport, and tunneling magnetoresistance. He also performs mathematical modeling and computer simulations on magnetization processes in fine particle systems micromagnetics.  
**Student Projects:**
- Magnetization Switching in Magnetic Nanostructured Materials

**H. Department of Psychology**

**Name:** Elliott Beaton  
**Interests:** At the Stress, Cognition, and Affective Neuroscience (SCAN) Laboratory, we study how the physiological effects of stress shape development in children at high risk for mental illness in adulthood. To this end, we use a variety of methods to study children including interviews and questionnaires, computer-based cognitive games, brain imaging, hormone and immunological analyses, and reactive physiological measures such as heart rate and blood pressure.  
**Student Projects:**
- Spatial sound detection study.
- MRI diffusion tensor image processing and analyses.
- Portable EEG system and mindfulness training validation study.

**Web Page:** [www.SCANLaboratory.org](http://www.SCANLaboratory.org)

**Name:** Christopher Harshaw  
**Interests:** I am interested broadly in how homeostatic mechanisms/bodily signals influence cognition and behavior. My current focus is on deficits in thermal homeostasis and microbiome dysfunction in mouse models of autism and how these may provide translational leverage for understanding Autism Spectrum Disorders (ASDs). ASDs often co-occur with gastrointestinal issues, thermoregulatory and immune disorders, as well as mitochondrial dysfunction. I take a translational approach to investigating potential links between such somatic variables and social behavior/cognition, employing several mouse models of autism (e.g., oxytocin knockout, BALB/c, and BALB/cByJ mice). My lab brings a range of techniques to bear on such questions, including behavioral and blood assays, pharmacological
manipulations, perfusion, immunohistochemistry, infrared thermography, small animal surgery, and radiotelemetry tracking of core body temperature and other physiological parameters.

**Potential Student Projects:** There are a number of ongoing projects available for students to assist on, including (1) an experiment aimed at elucidating the effects of oxytocin on brown adipose tissue thermogenesis and behavior, (2) experiments investigating thermoregulatory dysfunction in mouse models of autism, and (3) a study of thermoregulation and social cognition in humans using facial thermography.