College of Sciences

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 Photo-detectors
Web page: http://www.uno.edu/amri/faculty-staff/zhou.aspx

Department of Biological Sciences

Name: Nicola “Nicky” Anthony
Interests: Molecular ecology, conservation biology, tropical rainforest ecology and evolutionary biology
Student projects: Disease resistance in island reptiles; mapping adaptive variation in tropical forest animals
Web page: http://www.anthonylab.org

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

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:** Jerry Howard  
**Interests:** Plant-herbivore interactions, the ecology of invasive species, and behavioral problems in conservation biology.  
**Student projects:** Genetic structure of the Texas leafcutting ant, Atta texana, in Texas and Louisiana; Comparative genetics and behavior of the endangered Mississippi Sandhill Crane and other sandhill crane populations; Relationship between fire, primary production by plants, and animal community diversity on the Mississippi coastal plain; Comparative ecology, behavior, and morphology of the fungus-growing ants.

**Name:** Simon Lailvaux  
**Interests:** Sexual selection, physiological and evolutionary ecology, whole-organism performance. My research interests are in the broad areas of ecology and evolution, but I focus in particular on sexual selection (how animals obtain mates) and on functional ecology (understanding how animal performance capacities such as jumping, running or biting allow animals to overcome environmental challenges).  
**Student projects:** Pinching force and claw allometry in fiddler crabs; interspecific competition in Anolis lizards; Dung beetle courtship; Context-dependent male combat in house crickets; and the evolution of bite force in Anolis.  
**Web page:** [http://fs.uno.edu/slailva/index.html](http://fs.uno.edu/slailva/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:** Phylogenetic systematics, comparative morphology, and general biology of butterflies.  
**Student projects:** Using collection specimens, students can study butterfly color patterns and/or morphology. If we establish inter-lab collaborations, students might be able to learn about DNA sequencing. We have available collection material for butterfly groups that would be suitable for undergraduate research.  
**Web page:** [http://fs.uno.edu/cpenz](http://fs.uno.edu/cpenz)

**Name:** 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.

**Department of Chemistry**

**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.  
**Web Page:** [http://www.uno.edu/cos/chemistry/rick.aspx](http://www.uno.edu/cos/chemistry/rick.aspx)

**Name:** Matthew Tarr  
**Interests:** Environmental chemistry, photochemistry, nanomaterials for photocatalysis, nanomaterials for biomedical applications  
**Student Projects:** Photochemistry of crude oil in environmental systems; Preparing and testing nanomaterials for pollutant degradation; Preparing and testing nanomaterials for biomedical applications  
**Web Page:** [http://www.uno.edu/cos/chemistry/tarr.aspx](http://www.uno.edu/cos/chemistry/tarr.aspx)

**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  
**Web Page:** [http://www.uno.edu/cos/chemistry/trudell.aspx](http://www.uno.edu/cos/chemistry/trudell.aspx)

**Name:** John B. Wiley  
**Interests:** Synthesis and Characterization of Nanoscrolls; Solid state and materials chemistry; new oxides; nanomaterials  
**Student Projects:** The student will utilize low temperature reaction strategies to modify various layered compounds so as to create nanoscrolled 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/](http://fs.uno.edu/jwiley/)
Name: N. Adlai A. DePano, Ph.D.
Interests: Computational geometry, Analysis of algorithms, Computability, Computer Science pedagogy
Student projects: Finding smallest regular enclosing polygons, Finding good predictors for success
Computer Science students
Web page: http://www.cs.uno.edu/~adlai

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/

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 Project: 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.
Web page: http://www.cs.uno.edu/~csumma

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
Web page: http://www.cs.uno.edu/~shengru/

Name: Stephen G. Ware
Interests: Video Games, Artificial Intelligence, Interactive Narrative
Student projects: Intelligent Game-Based Tools for Assessment of Middle School Students
Web page: 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
Name: M. Royhan Gani

Interests: I have a broad interest in sedimentology, sequence stratigraphy, and past climate changes. I particularly study Cretaceous shallow-marine and fluvial rocks in the Book Cliffs, Utah, using an integrated field technique including GPR and Lidar.

Student projects: Petrographic analysis of fluvial sandstones of the Blackhawk Formation to understand diagenetic history; 3D mapping of channelized sandbodies of the Blackhawk Formation using virtual outcrop data to understand avulsion dynamics and sandbody (reservoir) connectivity.

Web page: http://fs.uno.edu/mgani/

Name: Ioannis Y. Georgiou

Interests: Hydrodynamic controls in river-dominated systems, Deltaic sedimentation processes, Sediment dynamics in semi enclosed systems, marsh-edge erosion due to waves, circulation and transport dynamics in coastal systems, physical transport processes on barrier islands, regional sediment transport mechanisms.

Potential Student Projects:
- Fine sediment dynamics in Lake Pontchartrain
- Lateral accretion of tidal bars with and without fluvial input
- Coupled response on tidal inlet-bay systems
- Understanding marsh edge erosion in coastal wetlands
- Use of historic discrete salinity measurements and recent CTD profiles to establish a short-term and long-term salinity gradient in the Pontchartrain estuary
- Coastal morphodynamic response to tropical and extratropical storms
- Sedimentation in river-dominated wetlands

Web page: http://labs.uno.edu/cehl/home.html

Name: Mark Kulp

Interests: The Coastal Research Laboratory has potential undergraduate research projects in stratigraphy and geomorphology of the Mississippi River delta plain.

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: Martin O'Connell

Interests: The Nekton Research Laboratory (NRL) has many potential undergraduate research projects for students in spring 2015. 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 under graduate 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 (Herichthys cyanoguttatus) and native fishes in Bayou St. John and City Park;
• Determining if Louisiana populations of sheepshead minnows (Cyprinodon variegatus) practice inter- and intra-species cleaning behavior or lepidophagy;
• A survey for populations of southern redbelly dace (Phoxinus erythrogaster) in stream of Louisiana’s Florida parishes;
• Recapture of radio tagged red drum (Sciaenops ocellatus) from Bayou St. John for growth and otolith analyses;
• A survey for juvenile tarpon (Megalops atlanticus) and assessment of potential habitats in southeastern Louisiana; and
• Surveying for non-native channeled apple snails (various species) in southeastern Louisiana.

Web page: http://www.uno.edu/nekton-research-laboratory/

Department of Mathematics

Name: Ken Holladay
Interests: (1) Eigensystems of distance matrices, (2) Decomposition properties of shapes composed of tiles of a regular tessellation, (3) Using geotechnical methods such as radar or electromagnetic induction profiling to examine the subsurface of structures such as levies.
Student Project: Develop a Mathematica program to take a description of a tessellation in terms of its symmetries and interconnections and produce a graph of a section of the tessellation. We will then use this program to illustrate all (forty some) tessellations with two symmetry orbits, one a triangle and the other a quadrilateral.

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: Jairo Santanilla
Interests: Stochastic and deterministic modeling. These topics include stochastic, fractional, and deterministic differential equations in different areas including actuarial, financial, biological, and engineering problems.
Student Projects:
• To study fractional calculus and eventually fractional differential equations.
• To study specific stochastic differential equation in connection with one of the areas mentioned above.
• To compare specific models using stochastic tools vs. deterministic ones.
• To collect and analyze data to support actuarial models.

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 Project:** 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  
**Interest:** 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 Project:** 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.

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**Department of Physics**

**Name:** George Ioup and 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.

**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.  
**Current 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  
**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:**
- Novel Architectures of High Temperature Permanent Magnet Nanocomposites with a Superior Energy Product
- Ultra-Low Temperature Properties of Strongly Correlated Materials

**Web Page:** [http://fs.uno.edu/spinu/home.html](http://fs.uno.edu/spinu/home.html)

**Name:** Kevin Stokes
**Interests:** Electronic and Thermal Transport in Nanocomposite Materials; We study the electronic and thermal transport properties of nanocomposite materials solid and assemblies of nanometer-sized particles. These materials are being investigated for applications in thermoelectric devices used for power generation from waste heat, hybrid solar/thermoelectric power conversion, energy harvesting and even large-scale power generation.

**Student Project:** Students will perform electrical/thermal transport measurements on solids at low (cryogenic) temperatures, including data collection and analysis. Students will also learn some solid-state physics - the basics of electronic and thermal transport in semiconductors and metals, how these properties are related to structure and composition of the material.

**Web page:** [http://fs.uno.edu/klstokes/](http://fs.uno.edu/klstokes/)

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**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.

**Potential Student Projects:** We are currently working on a National Institute of Health funded project examining the role of stress on development in children with chromosome 22q11.2 deletion syndrome and Down syndrome. Students are needed to assist with data collection and management and will have an opportunity to be involved in a variety of ongoing projects. COSURP students may also be able to develop their own research project questions in the context of the ongoing work.

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

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**Name:** Robert Laird
**Interests:** In the Families and Teens Lab we conduct research on the contexts in which children develop social and behavioral competencies with an emphasis on parent-child and peer relationships. Specifically, we conduct research designed to understand family and peer relationship contributions to the development of a broad range of social skills and problem behaviors

**Potential Student Projects:** We are beginning a new project focused on understanding how families adjust to have a new teen driver. We also hope to learn what families can do to make driving safer for new teen drivers. Research assistants are needed to help collect (i.e., interview parents and teens, code interviews) and manage data (e.g., maintain databases and manage on-line surveys).

**Web Page:** [http://fs.uno.edu/rlaird/](http://fs.uno.edu/rlaird/)
Name: Connie Lamm

Interests: Everyday moment-to-moment, as we navigate through our busy lives, we continuously apply various self-regulation strategies, e.g., just as we are about to back into a parking spot downtown another car slides into it. At this point, we have to inhibit our desire to yell at or hit the other driver. In the Developmental Cognitive Affective Psychophysiology (DCAP) lab, we examine the neural correlates underlying various self-regulation strategies and how these mechanisms change in the context of emotion. Furthermore, we examine both the typical and atypical developmental trajectories of these self-regulatory mechanisms. Knowledge about the typical developmental trajectories of various self-regulation strategies provides insight into why some children, adolescents, or adults with aggressive behavior problems have difficulty applying self-regulatory mechanisms.

Potential Student Project: We are beginning a new project focused on understanding why emotional contexts often interfere with our ability to pay attention to important events. Research assistants are needed to help collect EEG data. The RA(s) will be trained in EEG acquisition and data quality inspection.

Web Page: http://labs.uno.edu/dcap/