2025 SARRA Mentors and Projects Book

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Project Number: 1

Project Title: "Exploring the impact of GMD events with PandaPower and PowerModelsGMD.jl"

Mentor: Barnes, Arthur; **Co-Mentor:** Tabarez, Jose

Group Name: Information Systems & Modeling; **Group Acronym:** A-1

Project Description: PandaPower has emerged as the most popular open-source package for power systems analysis, and has recently implemented an interface to make use of the PowerModels.jl solvers. This is a user-friendly package with built-in geospatial visualization tools. This project investigates the feasibility of integrating PandaPower with PowerModelsGMD.jl, a package built on top of PowerModels.jl for performing analysis and mitigation of geomagnetic disturbance (GMD) events in power systems. Finally, the visualization capabilities of PandaPower will be explored in order to gain insight into the impact of GMD events on power systems.

Project Number: 2

Project Title: "Accelerator Reliability Modeling"

Mentor: Baxter, Stephen; **Co-Mentor:** Newton, Destry

Group Name: Nuclear Systems; **Group Acronym:** NEN-5

Project Description: The Los Alamos Neutron Science Center of Excellent (LANSCE) particle accelerator is a critical scientific facility for the nation. This accelerator is comprised of numerous sub-systems, the failure of any of which can drive shutdowns for the system as a whole. Through this internship, students will apply statistical methods and numerical modeling techniques (using Python, MATLAB, or equivalent) to project accelerator reliability in support of LANSCE operations.

Project Number: 3

Project Title: "Radiation Measurements of High Fidelity Surrogates"

Mentor: Borgwardt, Tyler; **Co-Mentor:** Meierbachtol, Krista

Group Name: Advanced Nuclear Technology; **Group Acronym:** NEN-2

Project Description: The student will conduct radiation measurements of high fidelity surrogates of nuclear weapons. The measurements will include gamma ray spectroscopy, neutron spectroscopy, and neutron multiplicity measurements. Common detector types, data acquisition, and analysis software and methods will be taught to and used by the student.

Project Number: 4

Project Title: "Using Legacy Data to Improve Energy Equivalence Relationships Between Nuclear and Chemical Explosions"

Mentor: Bourret, Michelle; **Co-Mentor:** Euler, Garrett

Group Name: National Security Earth Science; **Group Acronym:** EES-17

Project Description: There are gaps in the equivalence relationship between underground chemical and nuclear explosions with increasing explosive yield. Improving our understanding could improve nuclear test detection and relevant post-detonatin cavity phenomology. This work would require a background in physics, chemistry, and geology. Someone interested in reading historical documents and finding legacy datasets would be the ideal fit for this opportunity.

Project Number: 5

Project Title: "Modeling of Fire Spread in Fuel and Structures"

Mentor: Brambilla, Sara; **Co-Mentor:** nelsonm@lanl.gov, Matthew

Group Name: Information Systems & Modeling; **Group Acronym:** A-1

Project Description: Modeling of fire in wildland fuels and confined environments supports several national security efforts. The team is looking at someone with coding experience (e.g., Matlab, Python, C++, Fortran) to help develop next generation fast-running operational models. Pursuing STEM or computer science degree required. You'll work with in a team environment with other students and staff.

Project Number: 6

Project Title: "Metric Quantification for Pure Actinide Materials"

Mentor: Bratton, Ryan; **Co-Mentor:** Chamberlin, Rebecca

Group Name: Nuclear Systems; **Group Acronym:** NEN-5

Project Description: The Material Attractiveness (MA) program utilizes several metrics to assess the attractiveness of any nuclear material to an adversary. A new metric will be quantified using MCNP and the latest available nuclear data for materials that are central to the MA program's mission, such as pure actinide materials. Interested SARRA students must have some experience using MCNP or high-performance computing systems.

Project Number: 7

Project Title: "Acetylcholinesterase, The Movie: Probing Dealkylation by Time-Resolved X-ray Crystallography"

Mentor: Chen, Julian; **Co-Mentor:** Williams, Robert

Group Name: Biochemistry & Biotechnology; **Group Acronym:** Bioscience, B-IOME

Project Description: The enzyme acetylcholinesterase is a key component of neurotransmission, by splitting the neurotransmitter acetylcholine after a signal has been passed from one cell to another at a synapse, thus allowing the cells to return to their so-called resting state after the signal is transmitted. A number of organophosphorus compounds act as acetylcholinesterase inhibitors, interrupt this process, and as such, are highly toxic. This project aims to create a molecular movie of the "aging" process in acetylcholinesterase, by which organophosphorus compounds inhibit and eventually inactivate acetylcholinesterase. A key part of this project involves the expression, purification, and crystallization of acetylcholinesterase in complex with different inhibitors, in order to determine its structure using X-ray crystallography.

Project Number: 8

Project Title: "Machine Learning Algorithm Training with High Quality Data"

Mentor: Clendenin, Tiffany; **Co-Mentor:** Roos, Jennifer

Group Name: NSRC Mission Support; **Group Acronym:** WRS NSRCMS

Project Description: Quality control process of data representation, evaluation and optimization for model training. Annotation to create ground truth datasets and setting standards used to measure model performance and the quality of other datasets.

Project Number: 9

Project Title: "Systems Engineering for Nuclear Equipment Manufacturing"

Mentor: Contreras, Dax; **Co-Mentor:** Eng, Arnold

Group Name: Systems Engineering; **Group Acronym:** PIE-3

Project Description: Building a systems engineering program in support of the pit production mission. We are responsible for the V&V and associated SE deliverables to show how our projects are meeting all applicable project requirements and end user needs. Project scopes vary from traditional infrastructure projects to installation of nuclear equipment.

Project Number: 10

Project Title: "Radio Wave Propagation in a Vertical Magnetic Field with Plasma Density Inhomogeneities"

Mentor: Derr, Jason; **Co-Mentor:** Light, Max

Group Name: Electromagnetic Sciences & Cognitive Space Applications; **Group Acronym:** ISR-2

Project Description: We have a radio frequency remote sensing program at LANL which utilizes a multiple phase screen (MPS) code that relies on model of the ionosphere permeated by horizontal magnetic field lines (parallel to the Earth's surface), which results in the so-called parabolic equation for high frequency radio wave propagation. This model is valid at low-latitudes, but its validity diminishes at mid-latitudes and becomes invalid at high-latitudes owing to the predominantly vertical magnetic field lines. The SAARA students would work on the project of examining an MPS model (alternative to parabolic equation) with purely vertical field lines, as a first step towards a more general MPS model that interpolates between the low- and high-latitude regions of the Earth. The ideal background for those interested in pursuing this project would be some basic familiarity with differential equations and electromagnetic theory; however, a broader array of physics, electrical engineering, mathematics or other STEM backgrounds may be suitable to the project.

Project Number: 11

Project Title: "Analytical Chemistry Applications to High Explosives"

Mentor: Freye, Christopher; **Co-Mentor:** Corbally, Michelle

Group Name: High Explosives Science & Technology; **Group Acronym:** Q-5

Project Description: Analytical chemistry of trace chemical changes to high explosives and inerts in support of the W93, the newest warhead being designed by Los Alamos National Laboratory. The student(s) will learn sample preparation techniques along with hands-on experience running advanced analytical instrumentation.

Project Number: 12

Project Title: "Historical Stockpile Planning Analysis"

Mentor: Gerts, Dax; **Co-Mentor:** Bratton, Ryan

Group Name: Nuclear Systems; **Group Acronym:** NEN-5

Project Description: The annual stockpile planning process requires extensive iteration and analysis, with each change having significant downstream implications for the Nuclear Enterprise. While this process is inherently forward-looking, in-depth analysis of historical planning can provide insight into biases and limitations to help guide future decisions and analytical approaches. Through this internship, students will be introduced to the Nuclear Weapons Council requirements and planning process and have opportunities to apply data analysis skills (Python, Excel, R, general statistics) to historical and current stockpile planning data.

Project Number: 13

Project Title: "Analysis of Nuclear Enterprise Production Schedules"

Mentor: Gerts, Dax; **Co-Mentor:** Baxter, Stephen

Group Name: Nuclear Systems; **Group Acronym:** NEN-5

Project Description: Coordinating production schedules across the nuclear enterprise is an immense task, with even minor changes having potentially significant second and third-order effects. Further complicating matters, production activities span both the National Nuclear Security Administration (NNSA, warhead production) and the Department of Defense (DOD, delivery system production). Developing capabilities to rapidly model the implications of changing schedules, defensibly quantify their impacts, and then

communicate results to decision-makers is a vital and evolving challenge. Through this internship, students will develop a working knowledge of the nuclear stockpile, be introduced to the Nuclear Weapons Council planning process, and develop data analysis and process modeling skills (projects in Python, Excel, or R).

Project Number: 14

Project Title: "Engineering Support to Weapons Production"

Mentor: Gerving, Corey; **Co-Mentor:** Komar, Travis

Group Name: W4 W88; **Group Acronym:** W-4

Project Description: W-Division is actively involved in the current operations of sustaining and maintaining the nation's nuclear deterrent. Prospective students will participate in active investigations of stockpile anomalies and in the development of solutions for immediate implementation into the weapons design and fabrication operations.

Project Number: 15

Project Title: "Nuclear Weapons Environments and Effects"

Mentor: Goorley, John (Tim); **Co-Mentor:** Spencer, Josh

Group Name: X Theoretical Design; **Group Acronym:** XTD-DO

Project Description: As the Chief Scientist for Nuclear Weapons Effects at LANL, I can offer a wide variety of different topical areas for a summer project about nuclear detonations and the impacts they produce, depending on student interest and background. Examples include interests in nuclear radiation, air and ground shock, thermal radiation & heat, looking at historic nuclear tests in Nevada and the Pacific, and space detonations and the prompt and delayed impacts they produce.

Project Number: 16

Project Title: "Geological Hydrogen Storage for the Energy Transition"

Mentor: Gross, Michael; **Co-Mentor:** Coblentz, David

Group Name: Energy & Natural Resources Security; **Group Acronym:** EES-16 (Earth and Environmental Sciences)

Project Description: This project will investigate the feasibility of storing hydrogen underground in geologic formations. It involves integrating results from laboratory experiments and computational models to evaluate the appropriate rock types and physical properties for potential hydrogen storage reservoirs. Background in geology, petroleum engineering or computer science is helpful but not a requirement.

Project Number: 17

Project Title: "Generating an Automated Nuclear Material Storage Container Surveillance Tool"

Mentor: Hafen, Joseph; **Co-Mentor:** Jonathan, Gigax

Group Name: Operational Safety & Compliance Programs; **Group Acronym:** PSS-2

Project Description: The Production Support Services group at The Los Alamos National Laboratory (LANL) is investing in the development of automated surveillance technology to help storage container engineers accurately assess the health of damaged storage containers and ensure worker safety at LANL's plutonium facility. This is accomplished by training machine learning models to correlate deformation to residual stress on storage containers with data extracted from experimentally validated finite element models. This project heavily involves the use of machine learning packages in Python or related languages and experimental and simulated mechanical testing.

Project Number: 18

Project Title: "AI for Material Model Development"

Mentor: Hamilton, Brenden; **Co-Mentor:** Germann, Tim

Group Name: Physics & Chemistry of Materials ; **Group Acronym:** T-1

Project Description: Artificial Intelligence is advancing modern science in many ways (see Nobel prizes, 2024). Using AI to optimize the models that scientists and engineers use to run simulations has provided exponential increase in capability. This project will introduce students to an existing software package to rapidly develop AI-driven models for metal alloys and compare to existing models. Little to no programming experience is needed, but would be helpful.

Project Number: 19

Project Title: "Using ChatGPT to Annotate Mathematical Models for Complex Biological Systems"

Mentor: Hlavacek, William ("Bill"); **Co-Mentor:** Mallela, Abhishek

Group Name: Theoretical Biology & Biophysics; **Group Acronym:** Theoretical Biology & Biophysics Group (T-6), Theoretical Division

Project Description: In this project, we will use OpenAI's ChatGPT tool to create a custom GPT that has the purpose of providing enhanced annotation for a mechanistic mathematical model for a cell signaling system involved in adaptive immunity.

Project Number: 20

Project Title: "Rapid Heating Assessment in Nuclear Environment"

Mentor: Kim, S. Jun; **Co-Mentor:** Byerly, James

Group Name: Weapons Engineering Analysis; **Group Acronym:** W-13

Project Description: This project focuses on developing a rapid heating assessment under nuclear environment using scientific tools like Python or MATLAB. It begins with a literature review on reactivity insertion accidents (RIA) in nuclear fuel research along with relevant classified documents, followed by collaboration with mentors to produce an analytic solution for heat transfer involving a dynamic heat source. Additionally, a 1D heat transfer simulation tool using Python or MATLAB will be developed to compare with the analytic solution, enabling a deeper understanding of thermal behaviors in a weapon system.

Project Number: 21

Project Title: "Nex-Gen Approach to Rapidly Dissect Complex Host-Microbes Interactions"

Mentor: Kumar, Anand; **Co-Mentor:** Wardhani, Kartika

Group Name: Biochemistry & Biotechnology; **Group Acronym:** B-TEK

Project Description: We currently have three ongoing projects that can be used to train interested students. The first project focuses on developing a novel method to study host-virus and microbe interactions, aimed at understanding the role of microbes in viral infections. The second project involves engineering probiotic bacteria to sense and

respond to inflammation markers in the gut in real time, mimicking a living diagnostic and therapeutic system. In the third project, we are utilizing acoustic waves to revive previously unculturable bacterial species from complex microbial communities.

Project Number: 22

Project Title: "Developing a Living Diagnostic-Therapeutic System"

Mentor: Kumar, Anand; **Co-Mentor:** Wardhani, Kartika

Group Name: Biochemistry & Biotechnology; **Group Acronym:** BTEK

Project Description: We currently have three ongoing projects that can be used to train interested students. The second project involves engineering probiotic bacteria to sense and respond to inflammation markers in the gut in real time, mimicking a living diagnostic and therapeutic system.

Project Number: 23

Project Title: "Using Acoustic Stimulation to Culture Unculturables"

Mentor: Kumar, Anand; **Co-Mentor:** Wardhani, Kartika

Group Name: Biochemistry & Biotechnology; **Group Acronym:** BTEK

Project Description: We currently have three ongoing projects that can be used to train interested students. In the third project, we are utilizing acoustic waves to revive previously unculturable bacterial species from complex microbial communities.

Project Number: 24

Project Title: "Optimizing Over AI Algorithms"

Mentor: Lemons, Nathan; **Co-Mentor:** Parker, Robert

Group Name: Applied Mathemitcs & Plasma Physics; **Group Acronym:** T-5

Project Description: The goal of this project is to incorporate machine learning algorithms into optimization routines. The student will help write code that turns one or more learning algorithms into algebraic formulae which will then be included in a larger optimization

program. A final goal of the project will be to enable the discovery of materials with optimized properties.

Project Number: 25

Project Title: "Nuclear Forensics - Characterization of U.S. Plutonium"

Mentor: Luksic, Andy; **Co-Mentor:** Olivas, David

Group Name: ALDWP Technology Applications Office; **Group Acronym:** ALDWP-TAO

Project Description: Develop a basic understanding of the characteristics of plutonium produced and utilized in the U.S.. During the course of the project, the student will learn how plutonium was produced in nuclear reactors by the U.S., and the impact of how those reactors were operated on its isotopic content. The student will also learn how plutonium was recovered from spent nuclear fuel, then subsequently processed and utilized, and the impact of those activities on the chemical and metallurgical properties imparted on the plutonium.

Project Number: 26

Project Title: "Multiomics Mass Spectrometry"

Mentor: Mach, Phillip; **Co-Mentor:** McBride, Ethan

Group Name: Biochemistry & Biotechnology; **Group Acronym:** B-TEK

Project Description: Mass spectrometry is a crucial analytical tool in multiomics research, enabling the simultaneous analysis of diverse biological molecules such as proteins, metabolites, and lipids. By ionizing and measuring the mass-to-charge ratios of these molecules, mass spectrometry provides highly sensitive and accurate data on their identities and quantities. In proteomics, it allows for the comprehensive profiling of protein expression and post-translational modifications. In metabolomics and lipidomics, it facilitates the detection and quantification of a wide array of small molecules and lipids involved in metabolic pathways. Integrating mass spectrometry data across multiple omics layers enhances our understanding of complex biological systems, revealing intricate molecular interactions and pathways that contribute to health and disease.

Project Number: 27

Project Title: "Intelligence and Space Research Data Stack Project"

Mentor: Maher, Josh; **Co-Mentor:** Schmidt, Karl

Group Name: Data & Software Systems Group; **Group Acronym:** ISR-3

Project Description: This data engineering focused project will build features and improvements to the software orchestration platform, data lakehouse, APIs, and visualization tools used by the space research division at the lab. Familiarity with batch and streaming data processing, NoSQL and SQL databases, GraphQL, and Grafana will be helpful, but are not required to successfully complete projects. However, Students with strong computer science skills are recommended.

Project Number: 28

Project Title: "Site Evaluation and Remediation at a Former Nuclear Test Site"

Mentor: Meijer, Sam; **Co-Mentor:** Miller, Liz

Group Name: Advanced Nuclear Technology; **Group Acronym:** NEN-2

Project Description: The Semipalatinsk Test Site was the primary home to the former Soviet Union's nuclear weapons testing program. To this day, there are continued efforts by the US Government to identify any remaining proliferation risks there through a combination of historical data analysis and present-day field measurements, and to eliminate or mitigate any such risks. Students on this project would learn about nuclear weapons testing, data analysis, GIS, and imagery analysis, and could directly contribute to this nonproliferation mission.

Project Number: 29

Project Title: "Engineering Enzymes for Efficient Plastic Degradation"

Mentor: Nguyen, Hau; **Co-Mentor:** Groseclose, Thomas

Group Name: Biochemistry & Biotechnology; **Group Acronym:** B-TEK

Project Description: Our goals are to engineer new enzymes that digest polyethylene terephthalate (PET) with improved catalytic activity, thermostability and production level. We have developed a high-throughput screening platform for engineering such enzymes at LANL and have successfully engineered a new set of PET hydrolyses. Further engineering

goals include engineering new enzymes that work at lower pH, lower buffer concentrations and towards high-crystalline PET substrates.

Project Number: 30

Project Title: "Post-Detonation Nuclear Forensics"

Mentor: Ryan, Courtney; **Co-Mentor:** Keith, Corey

Group Name: Nuclear & Radiochemistry; **Group Acronym:** C-NR

Project Description: The student will work on the Debris Diagnostics team in the Nuclear and Radiochemistry Group and help support the operational post-detonation nuclear forensics program. Using archival radiochemical data from debris samples, the student will model and assess the performance of a historic nuclear event. This project will involve learning about the radiochemical signatures of nuclear events and the post-detonation nuclear forensics process, from debris collection through device assessment.

Project Number: 31

Project Title: "Numerical Study of ICF Implosions with Fuel Dopants "

Mentor: Sagert, Irina; **Co-Mentor:** Haack, Jeffrey

Group Name: Computational Physics & Methods; **Group Acronym:** CCS-2

Project Description: On August 8th 2021, inertial confinement fusion (ICF) research entered the era of ignition as the National Ignition Facility (NIF) achieved the first implosion with net energy gain. Even higher yields were obtained in subsequent experiments. In the coming years, large efforts will be dedicated to understanding which physical setups allow capsules on the ignition cliff to reach thermonuclear (TN) burn or cause them to fail. The student work will be part of a larger project to provide the first comprehensive picture of the effects of impurities on TN fuel reactivity which will also benefit other TN research efforts at the LANL. In collaboration with other computational scientists, the student will use LANL's ICF codes to study implosions with varying amounts and types of fuel impurities.

Project Number: 32

Project Title: "Introduction to Implicit and Explicit Finite-Element Analysis with Ansys Workbench"

Mentor: Sant, Thomas; **Co-Mentor:** Spawn, Casey

Group Name: Advanced Systems Development; **Group Acronym:** Q-18

Project Description: The project will introduce the student to implicit and explicit finite-element analysis (FEA) with the Ansys Workbench suite. The student will be responsible for creating solid models, finite-element models, performing simulations, and reporting key results. A series of progressively more difficult simulation environments will be used to develop the student's applied FEA skillset and may include static and transient thermal or structural loads, shock and vibration, and drop tests.

Project Number: 33

Project Title: "Wide-field Imaging of Space Objects"

Mentor: Sechrest, Yancey; **Co-Mentor:** Vance, Marion

Group Name: Space Remote Sensing and Date Science ; **Group Acronym:** ISR-6

Project Description: Our team is developing new electro-optical instruments for autonomous space surveillance. Student will gain hands-on experience working with fast CMOS imaging sensors, Nvidia Jetson embedded GPUs, and application of realtime objected detection algorithms. Student will have the opportunity to support night observing campaigns at Fenton Hill Observatory in the Jemez Mountains. Important skills include: Python programming, Linux OS, Optics, Physics, and/or Engineering.

Project Number: 34

Project Title: "Applied Machine Learning to Simulate, Analyze, and Optimize HPC Job Scheduling"

Mentor: Senator, Steven; **Co-Mentor:** Easterday, Hunter

Group Name: HPC Environments; **Group Acronym:** HPC-ENV

Project Description: This project utilizes high performance computing (HPC) scheduling data from two large clusters (>2000 nodes and >6000 nodes) to train a machine learning model and predict power and resource (cpu, gpu, etc) utilization of the cluster for various time horizons. This has direct production goal and mission execution relevance. Some familiarity with HPC, Linux, Slurm scheduling, operations research, queueing would be ideal.

Project Number: 35

Project Title: "Safeguard Historic Nuclear Weapons Research "

Mentor: Templeton, Patty; **Co-Mentor:** Alcazar, Danny

Group Name: NSRC Mission Support; **Group Acronym:** WRS NSRC MS

Project Description: Help support the nation's nuclear deterrent by assisting the National Security Research Center, LANL's classified library, in inventorying, researching, and preserving unique materials from underground and atmospheric testing eras. You will make mission critical, irreproducible research accessible to modern researchers. (No previous archival or library experience required.)

Project Number: 36

Project Title: "Preserve Early LANL Motion Picture Films and Video"

Mentor: Templeton, Patty; **Co-Mentor:** Kilidjian, Megan

Group Name: NSRC Mission Support; **Group Acronym:** WRS NSRC MS

Project Description: Support mission critical, high-impact Laboratory research at the National Security Research Center, LANL's classified library, by preparing, cataloging, and digitizing classified motion picture films and video. Your work will make accessible unique resources about historic LANL processes and weapons testing that would otherwise be lost to LANL researchers due to format obsolescence. (No previous archival or library experience required.)

Project Number: 37

Project Title: "Nanofiber-Nanobody Chimera for Medical Countermeasures (NNM)"

Mentor: Velappan, Nileena; **Co-Mentor:** Solomon, Emilia

Group Name: Biochemistry & Biotechnology; **Group Acronym:** B-TEK

Project Description: In this project we are developing a novel medical counter measure material and techniques based on self assembling peptide based nanofibers and a specialized antibody fragment known as nanobodies. Students on the project will get exposure to cell biology, molecular biology, microbiology, and basic biochemistry

techniques. Some the assays we will be using include ELISA, immunohistochemisty, flow cytometry, viral neutralization assay, immune cell activation assay etc.

Project Number: 38

Project Title: "Scientific Machine Learning for Dynamic Radiographic Imaging"

Mentor: Wang, Jeph; **Co-Mentor:** Wolfe, Bradley

Group Name: Termonuclear Plasma Physics; **Group Acronym:** P-4

Project Description: This project will train students on using machine learning algorithms for scientific image analysis. Different existing images will be used first to familiarize the student for existing machine learning algorithms. Then the student will learn how to extend the work to new image sets, including generation of synthetic image data.

Project Number: 39

Project Title: "MDM Migration with ICE-DCS"

Mentor: Weber, Kelley-Ann; **Co-Mentor:** Martinez, Savannah

Group Name: Device Configuration Services; **Group Acronym:** ICE-DCS

Project Description: ICE-DCS is seeking a SARRA student to assist in the Mobile Device Management (MDM) migration project from Blackberry UEM to Microsoft Intune at Los Alamos National Laboratory. This project involves migrating over 10,000 active employees to the new system, which is a manual and labor-intensive process. The selected student will assist with customer support, help develop migration instructions, and provide hands-on assistance. This is an excellent opportunity for a student to gain practical experience in IT while contributing to a critical operational project.

Project Number: 40

Project Title: "Turbulence at The Sea Floor and Implications for Sedimentation in The Arctic"

Mentor: Weijer, Wilbert; **Co-Mentor:** Comeau, Darin

Group Name: Computational Physics & Methods; **Group Acronym:** CCS-2

Project Description: Particulate matter, including biogenic detritus, microplastics, and fluvial and aeolian sediments, is ubiquitous in the ocean. Most of these particulates end up on the sea floor, where they feed or pollute benthic ecosystems, and form sedimentary deposits. The process of sedimentation is complex, but depends largely on the degree of turbulence in the bottom boundary layer. In this project we will use matlab or python to analyze the turbulence in the ocean's bottom boundary layer, in observations and numerical models.

Project Number: 41

Project Title: "Catalytic Conversion of Bio-Derived Chemicals to Bioproducts"

Mentor: Yang, Xiaokun; **Co-Mentor:** Jones, Margaret

Group Name: Inorganic Isotope & Actinide Chemistry; **Group Acronym:** C-IIAC

Project Description: In our renewable energy and chemical team, we are synthesizing organic products from biomass or renewable carbon feedstocks over heterogeneous catalysts. This project will be focus on operating a continuous flow reactor in the lab to produce bio-based monomer chemical for polymer end products. On the side, there will be reactive extraction to purity its starting materials from fermentation broth.