DEPARTMENT OF ENVIRONMENTAL HEALTH SCIENCES

EHS 690: Research Rotations

2019 - 2020

DEPARTMENT OF ENVIRONMENTAL HEALTH SCIENCES

Information Booklet for EHS 690: Research Rotations

Table of Contents

1. General information

The selection of a rotation project is one of the first and most important decisions that a new graduate student will make. The decision may determine the direction your dissertation research project may take and ultimately send you on your career path.

Selection and completion of rotation projects is a collaborative effort between the student, the faculty project mentor and the rotation coordinator. The rotation coordinator assists the student in finding the project that best matches the student's interests and objectives. The selection of a rotation project by the student is made in agreement with a faculty mentor for the project. The mentor guides the student through the project and the preparation of a report. The coordinator checks on the student's progress through the rotation, reviews the report, and assists the mentor in establishing a final grade.

This booklet contains information to help you understand the requirements and provides a time line for completing the two Research Rotations. It contains a listing of rotation projects and mentors, and sample student-faculty mentor agreement form, mentor evaluation and student evaluation forms. The evaluation forms should be completed at the end of each rotation. You should read this information as soon as possible. Then you should meet with potential faculty mentors and decide upon your first rotation project. Complete the student-faculty mentor agreement form and submit copies to the rotation coordinator and the department office so that you can get started on your lab rotation project as soon as possible and no later than **September 3**.

The rotation coordinator is **Dr. Ilham Almahamid**. She is located in the Empire State Plaza, Corning Tower, Room 1213 and can be reached by phone: 518-402-7574or e-mail: ***ilham.almahamid@health.ny.gov***. The contact and/or location information for each faculty mentor is listed with the project descriptions.

2. Course description for EHS 690: RESEARCH ROTATIONS

The aims of the Research Rotations are:

1. To allow the student to interact with scientists of varied disciplines.
2. To introduce the student to analytical, field and laboratory techniques and principles.
3. To give both the students and the faculty an opportunity to interact intellectually.
4. To aid the student in selecting a mentor for graduate research.

All students must participate in the rotations. Students may not repeat a rotation with the same mentor. Exceptions to this plan are subject to approval of the Department Chairman. The student is expected to dedicate **at least 12 hours per week** to each rotation.

Competencies: This course teaches topics and skills that relate to competencies considered critical by the Department of Environmental Health Sciences including:

1. Acquire basic and advanced knowledge in selected concentrations.
2. Gain advanced technical experience in the use of sophisticated and state-of-the-art instrumentation in the chosen field
3. Read, critically evaluate, and present scientific literature, including justifying the choice of methods applied to problems and the interpretation of results obtained
4. Prepare a report and describe the principles and procedures for techniques involved, quality assurance for data acquisition, and statistical analysis.

Rotation Schedule: Ph.D. and M.S. students will take two rotations for a total of three credits. Each rotation in the semester will last about **7 weeks**. The grading system is S/U. An unsatisfactory grade in any rotation will result in a U for that semester. Please note that a satisfactory grade in **BOTH** rotations must be attained to fulfill the rotation requirement. A Rotations Coordinator (hereafter "Coordinator') will help match students with appropriate Faculty Research Mentors (hereafter "Mentors").

The rotation schedule is designed to obtain the maximum analytical, field, and laboratory experience within the framework of courses and additional graduate responsibilities.

Student Obligations: A student may choose to work with any faculty member within the Department of Environmental Health Sciences. The student may be working in the field, laboratory, or office environment, or some combination thereof. The student may not spend the entire rotation time exclusively in an office setting. The equivalent of one rotation's time must be spent in a field or laboratory setting, or a combination of these settings. An office-based rotation must be spent learning skills directly applicable to carrying out scientific research. Some examples of acceptable office- based rotation activities are: Statistical analysis of databases, computer modeling of data, and mapping using a geographic information system (GIS). Special permission may be given to a student who wishes to complete a lab rotation with a faculty member in one of the school's other departments.

At the end of each rotation, the students are required to write a **formal** report describing their project. This report should be graded and signed by the Mentor before submission of copies to both the Coordinator and the departmental office. Note that the final version of the report should be submitted to the Department Office no more than one week after the end of a rotation. The student is responsible for submitting this report, and failure to do so will result in an "incomplete" grade. The Mentor also should complete an evaluation form and review it with the student before submitting copies to both the Coordinator and the departmental office for assignment of a final grade.

All students need to be aware of the University at Albany's standards of conduct as described in the booklet ***Community Rights and Responsibilities*** (http://www.albany.edu/studentconduct/standards_of_academic_integrity.php). This document itemizes the standards related to academic dishonesty, provides complete definitions of each type of misconduct and summarizes the penalties for violations of academic integrity. Please familiarize yourself with the contents of this document. Should problems arise during this course, a lack of knowledge of the content of this document cannot be used as a defense in determining the outcome of possible violations of the standards. We take academic integrity and honesty very seriously; a ZERO TOLERANCE POLICY with regard to violations of academic integrity will be strictly enforced. Any 4 violation of UAlbany' s Standards of Academic Integrity, including plagiarism, cheating, multiple submission, sabotage, etc. as described in Appendix C of the ***Community Rights & Responsibilities*** (see course information for a copy) will result in a failing grade for the course with no opportunity for withdrawal, and referral to the UAlbany judicial system

<u>Research Mentor Responsibilities</u>

- Notify Rotations Coordinator about possible research opportunities;
- Supply descriptive material about the research to the student and/or Coordinator;
- Meet with students to discuss opportunities;
- Approve or disapprove cross-over projects between Centers in the Health Department (e.g. Wadsworth and Environmental Health) and recommend alternative;
- Mentor research by providing direction, space and resources;
- Work with Coordinator to determine and submit grades.

<u>Rotations Coordinator Responsibilities</u>

- Assist student in finding a Research Mentor;
- Assist student placement in cross-over rotations projects;
- Verify that the project meets with the Track Coordinator and Research Mentor's approval;
- Track student progress;
- Collect all progress reports;

- Collect and submit project grades in cooperation with Research Mentors;
- The Rotation Coordinator is also responsible for obtaining the "EHS Rotation Evaluation Form". This form may be obtained from the Department Office. It should be clear that the Coordinator will work with both mentors in a given semester to determine and submit a final grade. *In order to meet University at Albany grading deadlines, the evaluation must be submitted to the Department Office no later than one week after the rotation has been completed or by the last day of the week of Final Examinations.*

3. Time line for completion of rotations

Fall (2019)

First rotation begins:	Wednesday, August 28th
First rotation ends:	Friday, October 11
Project report due to mentor:	Tuesday, October 15
Grade due:	Friday, October 18
Second rotation begins:	Monday, October 21
Second rotation ends:	Friday, December 6
Project report due to mentor:	Wednesday, December 11
Grade due:	Friday, December 13

Spring (2020)

First rotation begins:	Wednesday, January 22
First rotation ends:	Wednesday, March 4
Project report due to mentor:	Friday, March 6
Grade due:	Tuesday, March 10
Second rotation begins:	Wednesday, March 11
Second rotation ends:	Friday, May 8
Project report due to mentor:	Tuesday, May 12
Grade due:	Friday, May 15

4. General guidelines for project report

A rotation project report should follow the format of those that are typically prepared by the mentor.

For lab based research: A report is prepared as a manuscript would be for submission to a scientific journal. This would include: an Abstract that briefly summarizes the report; an Introduction, providing background and stating the purpose or specific aims of the project; a Methods and Materials sections with enough detail that would permit reproduction by someone in an external lab; a Results section describing the results of the experiments and providing data in the form of figures, tables or graphs; a Discussion

section in which the significance of the results are explained with some attempt to relate them to public health issues; and finally a list of References cited in the text that document your sources of information. See the University guidelines for information regarding plagiarism and proper citation of references.

For office-based, service, or field testing projects: A summary report is similar to the type that might be sent to a lab chief, a regulatory agency, a city, county or state health official or to a contracting agency. This report should have enough information to be understood by someone outside the area of expertise or a layperson, if appropriate.

The length of the report is flexible. It should be of adequate length to fulfill the above criteria. Brevity is preferred over verbosity. The mentor should realize that this is a first attempt for most students. The student will need a great deal of guidance with this process. The report should be something that is developed throughout the rotation with frequent interaction between the student and mentor. However, the report should not be the primary focus of the rotation. The practical experience of engagement in a laboratory, office or field-based research project should be the primary focus. The final report should grow naturally out of the work performed during the rotation. The report should not be an afterthought ignored until the last week of the rotation.

The mentor should assign **a letter grade** to the report, sign it and submit copies to both the rotation coordinator and the department office.

The mentor and the student also should complete an evaluation form and review it together before submitting copies to both the Coordinator and the departmental office for assignment of a final grade.

5. Mentor and Project Descriptions for EHS 690: Research Rotations

The following information is provided for each mentor who submitted a project this year.
1. The mentor's name, title, and location.
2. A description of the research project a new graduate student would be able to perform during a seven-week rotation.

The descriptions of potential mentors are arranged by alphabetically.

Erin M. Bell, Ph.D., Professor, School of Public Health, One University Place, Rensselaer NY 12144 Room 149. Tel.: (518) 402-0375, e-mail: ebell@albany.edu

Students with an interest in environmental pollutants and child development may find this project of interest. I currently have one opportunity for the 2018-2019 academic year. We are analyzing data from the Upstate KIDS study, a prospective cohort study of child development. We have measured PFOS, PFOA and BPA in newborn bloodspots and this project will evaluate these exposures and their association with child

neurodevelopment through age three. Statistical analyses are ongoing. The rotation would consist of learning tasks related to manuscript development including literature review, development of manuscript ready tables, outlining manuscript text. If time, the student rotation may include developing additional hypotheses for the next round of analyses related to these exposures. The opportunity for co-authorship is available.

Michael S. Bloom, Ph.D., Associate Professor, School of Public Health, One University Place, Rensselaer NY 12144 Room 157. Tel.: (518) 473-1821, e-mail: mbloom@albany.edu

Students with an interest in environmental pollutants and human reproduction, are sought. I currently have two opportunities available for the 2018-2019 academic year. We are analyzing data from the Reproductive Development Study, a mother-child cohort considering the impact of phthalate diesters measured in urine on in utero development and birth outcomes. This project also evaluates the role of race in modifying any associations. We are also analyzing data from the Chemicals in Assisted Reproductive Technologies (ChART) study, a cohort of couples using in vitro fertilization and considering the impact of urinary phthalate diesters on embryo quality, pregnancy, and live birth. This student rotation will involve literature review, data cleaning and some statistical analysis, and possibly helping with manuscript and presentation preparation. Additional projects can be also designed on an individual basis, based on the student's interest. The opportunity for co-authorship is available.

David O. Carpenter, M.D., Professor, Director, Inst. for Health & The Environment, One University Place, B Wing, Room B242, Rensselaer NY 12144, Tel: (518) 525-2660, - 2661, Fax: (518)525-2665, e-mail: dcarpenter@albany.edu.

Students could do one of three different rotations in my lab. They are as follows:

1. Use of state and national databases (NHANES, SPARCS, vital records, birth and death registries, toxic release inventory, NYS superfund site lists, NYS air pollution monitoring stations, census, etc.) to study the incidence of disease in relation to residence near to hazardous waste sites, toxic release sites and other sources of exposure to environmental contaminants.

2. Study of health of human populations exposed to environmental contaminants. Current projects include PCB and pesticide exposure in residents of the Mohawk Nation at Akwesasne, the Siberian Yupik people from St. Lawrence Island Alaska, and residents of Anniston, Alabama who live near to the Monsanto plant that manufactured PCBs. Other projects include study of air pollution and health outcomes in Karachi,

Pakistan, health effects of living near to dry cleaning facilities in NYC that use PERC and contaminated drinking water and health in two slum communities in Uganda.

3. Risks vs. benefits of consuming fish and marine mammals from various sources. The risks derive from presence of methyl mercury and persistent organic contaminants that are fat soluble. The benefits derive from the healthy omega-3 fatty acids. Current study focuses on fish from the Great Lakes and Akwesasne and marine mammal consumption by Alaskan Native populations. Laboratory based.

Liang T. Chu, Ph.D., Associate Professor, Office: D568A, Lab: D366B, ESP. E-mail: lchu@albany.edu

Project: Uptake and heterogeneous reactions on ice surfaces
The project is aimed to understand how snow/ice and aerosols are affected by organic acids in the atmosphere. Organic acids have impact on aerosol growth rate and subsequently affect ozone distribution and climate.

The project will involve the study of hydrogen peroxide and formic acid uptake on ice surfaces and heterogeneous reaction between NH_3 and formic acid on ice surfaces. The ice surface mimics clouds and snow/ice in the atmosphere. The study will be conducted using both the wall coated flow-reactor and the specular reflection-absorption FTIR with temperature-programmed desorption apparatus in the laboratory. Students will learn both mass spectrometry and FTIR spectroscopy. Laboratory based.

Beth J. Feingold, Ph.D., Assistant Professor, School of Public Health, 1 University Place GEC, 147, Rensselaer NY, e-mail: bfeingold@albany.edu

In general, projects are designed for students on an individual basis. Some specific areas of rotations could be related to (but are not limited to):

1) using GIS (geographic information systems) related to a) the Capital Region food system or b) population exposure to concentrated animal feeding operations (CAFOs);

2) statistical analysis related to a) nutrition and body composition in adults and children,
b) assessing the association between stable isotope ratios measured in hair samples and western diet exposure, or c) comparison of hair and nail mercury concentrations in Dr. Feingold's study along the Interoceanic Highway in the Southern Peruvian Amazon. None of these are laboratory-based.

Jun Gu, Ph.D., Assistant Professor, E622, ESP, Wadsworth Center
(518) 473-0782. E-mail: Jun.Gu@health.ny.gov

Project: The overall goal of our research is to study human toxicology and environmental diseases using molecular approaches. One of emphases is on determining the role of cytochorme P450 reductase (CPR) in the pathogenesis of Alzheimer's disease (AD). CPR, a drug-metabolizing enzyme, has been known to be

involved in the production of reactive oxygen species (ROS), and numerous studies have implicated oxidative stress in the pathogenesis of AD. CPR may contribute to the amyloid beta protein-induced neuropathology in AD through its activities in ROS production. We are testing our hypothesis by developing and utilizing a novel amyloid precursor protein transgenic mouse model with defective expression of CPR. This study will provide a better understanding of the molecular basis of pathogenesis of AD. In addition, we are also studying the role of cytochrome P450 enzymes in chemical toxicity in the kidney using conditional gene knockout approach. Kidney contains a variety of drug metabolizing enzymes and transporters, and is a primary target for numerous xenobiotic toxicants including drugs and environmental chemicals. A better understanding of the molecular mechanism of chemical-induced renal toxicity will provide more effective methods for the prevention and clinical therapy of renal injury induced by xenobiotics.

Kurunthachalam Kannan, Ph.D., Professor, ESP, Biomonitoring, Wadsworth Center. E-mail: kurunthachalam.kannan@health.ny.gov

Projects are designed for students on an individual basis. Laboratory based.

Haider A. Khwaja, Ph.D., Associate Professor, E221, ESP, 474-0516. E-mail: haider.khwaja@health.ny.gov

My research interests lie in the field of environmental health sciences. Active research programs include:

1) Effects of fine particulate matter on daily morbidity due to cardiovascular and pulmonary diseases in urban areas;
2) Chemical characteristics of fine particles responsible for the observed health effects;
3) Exposure and health impacts related to outdoor and indoor air pollution including studies of volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), diesel vehicle emission, air toxins, and indoor allergens; and
4) Water and human health issues such as drinking water quality and human health risks associated with water contaminants.

Students will be involved in current literature search, developing study design, conducting data collection, analysis and interpretation of the data.

David A. Lawrence, Ph.D., Professor and Chair/Lab Chief, Immunology, Room 1155, CMS. E-mail: David.Lawrence@health.ny.gov

Four research projects are available in my laboratory of Immunology. Our focus is on immunotoxicology and neuroimmunotoxicology.

- Assessment of the placenta and the exchange of maternal and fetal cells during pregnancy and how environmental stressors alter fetal development,

which cause lifetime alterations to immunity and behavior.

- Investigation of autoantibodies to brain antigens, which induce neuropathy in diseases such as lupus and autism. We are assessing the ability of autoantibodies to alter neuronal connectivity. Modification of neural circuits affect behaviors and immune complexes modulate microglial functions which affect the neuronal connections.
- Analysis of molecular mechanisms by which metals (arsenic, cadmium, lead, and mercury) and nanoparticles inhibit biosynthesis of important type-1 immunity (e.g., interferon-gamma production) which is a major cytokine responsible for
  cell-mediated immunity against intracellular pathogens and enhance type-2 immunity, which is involved in allergies and asthma. Overall, the studies include biochemical, immunological and molecular analyses with emphasis on the molecular regulation of T-lymphocyte activation and generation of cytokines in the periphery including the gastrointestinal system affecting food allergies.
- Investigation of the genetic and environmental influences on biomarkers of stress during fetal development. This project includes investigation of inbred strains of mice and their sensitivity toward development of diseases after toxicant exposure.

Shao Lin, M.D., Ph.D., Professor, School of Public Health, 1 University Place GEC, 145, Rensselaer NY, Tel: (518) 402-1685, e-mail: slin@albany.edu,

1. Assess health impacts after Hurricane Sandy among elderly. Tasks include: a. Compile study results from different data sources; b. Assist with data collection and data

entry of the nursing home survey; c. Assist with OHEP Hospital Survey d. Literature review for developing vulnerability index, maps, and risk assessment tools.

2. Pakistan air pollution and health study. Tasks include: a. Assisting cleaning and validating air pollution datasets; b. Conduct literature review for air pollution in South Asia and impact of air pollution on CVD and respiratory diseases; c. Assist conducting descriptive analyses.

3. Romania school environmental health study. Tasks include: a. Conduct literature review; b. Assist statistical analyses and prepare result tables; c. Assist prepare manuscript

4. Measurement of PM2.5 in school-aged children and NYS schools. Tasks include: a. Assist setting up personal monitor and indoor fine particle monitor in schools; b. Go with sampling team for field trip; c. Distribute asthma diary

Patrick J. Parsons Ph.D., Professor and Lab Chief, Inorganic and Nuclear Chemistry, D144, ESP, 474-7161. E-mail: patrick.parsons@health.ny.gov

Dr. Parsons' laboratory specializes in measuring trace elements in human tissues and body fluids using techniques based on inorganic mass spectrometry. The lab is developing new analytical methods for use in human biomonitoring studies (with CDC grant funding), wherein the primary goal is to assess internal exposure (or dose) typically by analyzing blood or urine, or another tissue for trace element content. These studies are important for understanding the biochemical role of essential elements, such as Cu, Se and Zn, and monitoring human exposure to non-essential toxic elements such as Pb, Cd, Hg and As.

The laboratory is also interested in assessing the physiologic distribution of lead in bone. Recent work by the team, has focused on producing well-characterized bone reference materials certified for lead content that can be used to validate techniques based on graphite furnace atomic absorption spectrometry (GFAAS), inductively coupled plasma-mass spectrometry (ICP-MS), as well as K-shell X-ray fluorescence (XRF) instrumentation that is used for non-invasive, in vivo bone lead measurements. Although the total elemental content is useful, speciation methods can provide a much more detailed picture of how some trace elements behave. For example, the lab has been working with the US National Institute for Standards and Technology (NIST) and the CDC on a speciation method for Hg in blood that can distinguish and quantitate methylmercury, ethylmercury and inorganic Hg. The method is based on coupling GC to ICP-MS with stable isotope dilution analysis. In a similar manner, the lab can analyze human urine for up to five arsenic species by coupling LC to ICP-MS. The lab has five quadrupole ICP-MS instruments and six GFAAS dedicated to the analysis of clinical samples, and a Thermo Element 2 Sector Field ICP-MS that is currently being used to measure uranium isotope ratios in urine for a local biomonitoring study of residents and retired workers exposed to Depleted Uranium (DU).

While the research team's primary focus has been on analyzing body fluids using ICP- MS and GFAAS, the laboratory also has access to new prototype instrumentation based on monochromatic XRF as part of an on-going collaboration with X-Ray Optical Systems (XOS, East Greenbush). One project involves assessing environmental exposure to Pb, As, and Hg among ethnic Chinese living in upstate NY, and is currently supported by NIEHS. Dr. Parsons is also interested in studying the physiologic distribution of trace elements in bone, teeth and brain samples using Laser Ablation coupled to ICP-MS, with recent work focusing on developing calibration materials for quantification. Other research projects involve collaborations with investigators at the Johns Hopkins Bloomberg School of Public Health, Mt Sinai School of Medicine, NICHD, SUNY Oswego, SUNY Albany, and the University of Cincinnati. There is a long standing collaboration and student exchange program with the trace elements group at the Universidade de São Paulo – Ribeirão Preto, Brasil. In addition to externally funded research studies, the laboratory also operates the New York State proficiency testing program for blood lead and trace elements. Well-characterized blood, serum and urine reference materials are developed and certified for trace element content, and the team has also worked with NIST to produce and certify SRM 955c Toxic Metals in Caprine Blood.

Both lab and non-lab-based projects suitable for rotation students are possible. Please contact Dr. Parsons directly to discuss specific projects.

Ramune Reliene, Ph.D., Assistant Professor, Cancer Research Center, Rm. 310, University at Albany East Campus. E-mail: rreliene@albany.edu

Title: Targeting breast cancer stem cells with pomegranate polyphenols

Nanotechnology products are increasing being used in industrial, consumer and medical products. Whether in socks, toothpaste, cosmetics or household appliances, silver nanoparticles are becoming a part of everyday life. The antibacterial and antifungal properties they offer have made them the most common nanomaterial used in nanotechnology-enabled consumer products. However, very little is known about health effects of silver nanoparticle exposure. Our goal is to examine the potential genotoxic and cancer risks of nanoparticle exposure and to identify silver nanoparticles that are most harmful to humans and the environment. Mouse models will be utilized to determine whether silver nanoparticles are genotoxic when exposed by oral route. Several biomarkers of genotoxicity will be determined in exposed mice and compared with the same biomarkers in unexposed controls. In addition, we will determine the expression of relevant genes that would explain the mechanisms of silver nanoparticle toxicity. The proposed procedures will involve whole animal experimentation and the application of microscopic and other laboratory techniques.

Thomas M. Semkow, Associate Professor, Biggs Laboratory, Room D486, Phone: 474-6071, E-mail: thomas.semkow@health.ny.gov

Project 1: We are interested in the determination of alpha-emitting radionuclides in environmental samples for emergency response to incidents involving ionizing radiation, such as accidents and terrorist acts. Alpha emitters can be determined by counting, alpha spectroscopy, or mass spectroscopy. In this project we are concerned with the counting and alpha spectroscopy. There are a variety of research tasks which can be undertaken by interested students. The tasks include preparation of samples for alpha counting, measurements of alpha spectra using an ion chamber as well as counting on an ultra-low background proportional counter. Other assignments involve interpretation of spectra and plotting the results.

Project 2: This project involves reduction of radiation background in the existing WC environmental gamma radiation measuring facility. Gamma radiation measurements are used is New York State mandated programs of ionizing radiation surveillance in water, air, food, vegetation, soil, as well as in nuclear emergency response. During 2006 and 2007, we have been participating in mapping out contamination of ground water from spent nuclear fuel tank at Indian Point nuclear reactor in Buchanan, NY. One of the persistent contaminants is cesium, a long-lived fission product which emits gamma radiation. In order to precisely determine the radioactive plume gradient, which is necessary for predicting the future plume behavior, one has to measure high and low levels of radioactivity, the latter requiring very low external radiation background. The rotation student involvement includes testing of plastic scintillators to detect cosmic-ray muons. The laboratory work consists primarily of working with electronic and computer instrumentation.

David C. Spink, Ph.D., Associate Professor, E410, ESP. Phone: 486-2532, E-mail: david.spink@health.ny.gov

Project: Studies in our laboratory are focused on the complex interactions between estrogen and environmental contaminants in the initiation of human breast cancer. Estrogens have long been associated with breast cancer, because numerous risk factors for the disease relate to a woman's lifelong exposure to endogenous and exogenous estrogen. While prevailing theories for the role of estrogen in carcinogenesis in the mammary gland have been focused on the stimulation of breast- cell proliferation by estrogen, there is also evidence that reactive metabolites produced by cytochrome P450 (CYP)-catalyzed metabolism of exogenous compounds and endogenous estrogens are involved in mutagenesis and breast cancer initiation. The aryl hydrocarbon receptor (AhR), which binds to and is activated by polycyclic aromatic hydrocarbons and other environmental contaminants, controls the expression of CYP1A1 and CYP1B1, enzymes that are known to catalyze the metabolism of numerous procarcinogens to ultimate carcinogens and estrogens to catechol estrogens.

Our research is based on the novel hypothesis that a significant role of estrogens in breast carcinogenesis is the up-regulation of AhR expression, leading to elevated

expression and inducibility of the carcinogen-bioactivating enzymes, CYP1A1 and CYP1B1, and a greater propensity for mutations and the initiation of carcinogenesis. A laboratory rotation project would involve determining the time course, dose-response for estrogen, and effects of antiestrogens, LY117019 (Lilly) and ICI182780 (Tocris), on AhR, CYP1A1 and CYP1B1 expression in MCF-7 cells at the mRNA, protein and enzyme activity levels. This is a laboratory-based project.

Buu Tran, PhD, Assistant Professor, D408, ESP. E-mail: buu.tran@health.ny.gov

Dr. Tran lab has a focus on the study of toxic compounds in foods including a broad range of chemicals from persistent organic pollutants (POPs) to mycotoxins and terrorist chemical agents. Contamination of food by these toxic chemicals could be a severe concern for the safety of the human food supply. Techniques studied include separation methods such as solid phase extraction (SPE) for target analyte isolation and structural identification using Infra-Red (IR), GC-MS, LC-MS. Students will be conducted in literature search, developing method, analysis and interpretation of the data.

JoEllen Welsh, Ph.D., Empire Innovations Professor, Cancer Research Center, Rm 304D, University at Albany East Campus. E-mail: jwelsh@albany.edu
591-7232 office

The Welsh lab uses cellular and molecular approaches and animal models to study nuclear receptors in development and cancer. Ongoing projects focus on the influence of nuclear receptors on mesenchymal stem cell lineage determination, the role of vitamin D receptor signaling in mammary gland development and

breast cancer, and the effect of chemopreventive agents on ionizing radiation induced DNA damage in organ culture. Rotation students can participate in an ongoing project of their choice, and will be supervised by current graduate students or post-doctoral fellows.

Xiaobo Xue Romeiko, Ph.D., Assistant Professor, School of Public Health, 1 University Place GEC, 155, Rensselaer NY, e-mail: xxue@albany.edu

Students interested in sustainability, food-energy-water nexus, risk assessment, life cycle analysis and data analysis are invited to join the investigation. Usually, the projects are designed for student on an individual basis. Two examples of on-going studies are below.

1 Assess environmental footprints and human health impacts of resource recovery based wastewater treatment systems (i.e. greywater recycle and reuse, wastewater for energy and fertilizers, etc.). The student may conduct literature review, human health risk assessment and environmental footprint analysis. Opportunity exists for coauthoring manuscripts and presenting at academic conferences.

2. Assess life cycle environmental impacts of biofuels and foods. The student may collect literature datasets and conduct environmental footprint analysis. Opportunity exists for coauthoring manuscript and presenting at academic conferences.

Xianliang Zhou, Ph.D., Associate Professor, D498B (office), E503 (lab), ESP. E-mail: xianliang.zhou@health.ny.gov.

Project: Test and validation of measurement method for atmospheric nitrogen species, including HONO, HNO_3 and NH_3. Student is to assemble, test and improve a measurement system based on aqueous phase scrubbing using a coil sampler, followed by a derivatization procedure and photometric detection using an optical fiber spectrometer with a 1-m flow cell. Experiments are to be conducted to determine detection limit of the method and to examine potential interference. Laboratory based.

Lei Zhu, Ph.D., Professor, D421C (office), D414 (lab), ESP. E-mail: lei.zhu@health.ny.gov

2-Nitrophenol is released into the atmosphere by combustion and industrial sources, and is formed in situ by photochemical reactions. It has been detected in ambient air, suspended particles, clouds, fog, water, snow, and soil, and is phytotoxic. Recent laboratory study of this group observed fast gas phase photolysis of 2-nitrophenol, with high HONO and OH quantum yields at 308 nm and 351 nm photolysis wavelengths. However, the contribution of 2-nitrophenol photolysis on surfaces to form HONO and OH has not been evaluated.

The student will work with a post-doc in the group to determine UV absorption cross sections of 2-nitrophenol adsorbed on fused silica surfaces using Brewster angle cavity ring-down spectroscopy. Through measurements to be made at selective wavelengths, assessment will be made as to whether 2-nitrophenol surface photolysis is enhanced compared to its gas phase photolysis. The student will work with the post-doc to determine HONO and OH absorptions from 2-nitrophenl photolysis in a surface-study cell. The student will work with lasers, cavity ring-down spectrometer, vacuum apparatus, and will learn how to analyze results. Laboratory based.