2023 Mentor Directory: Summer Research Experience Program in Oncology for Medical Students

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Mentor	Research Areas	Project description
Ethan Abel *Dept. of* ***Molecular and Cellular Biology*** **www.roswellpark.org/Ethan-Abel** **Mentoring style-** *As a new investigator, my mentoring approach is very hands-on. I typically go into great detail with trainees as to what the hypothesizes we are trying to answer are, what techniques we will use to answer it and why, and the actual principles behind the techniques. I typically demonstrate techniques first, followed allowing students to do techniques in supervised manner until they are proficient, but remain regularly within reach for experimental guidance, technical support, or anything else a student has questions regarding.* **Expectations of summer student-** *By the end of their time in the lab a summer student should be able to become proficient in a small number of routinely used techniques/approaches (generally 5 or less), and with guidance/supervision carry out a set of pre-designed experiments in a reproducible manner (at least 3 times) so that some conclusions regarding the questions behind the experiments can be confidently made (e.g. results support or refute the hypothesis). Students should gain a general/basic understanding of field the lab is in and the lab's overall research interests/goals and a solid understanding of why the experiments they are conducting are being done (e.g. what is their project about). I expect all trainees to be excited, hardworking, careful, honest, and mutually respectful so as to promote and maintain a*	**Scientific Research** Cancer molecular and cellular biology;Cancer pharmacology and therapeutics	**Epigenetic targeting of pancreatic cancer stem cells** Students will test the effects of drugs called BET-inhibitors on pancreatic cancer stem cells (PCSCs), which are a subtype of cancer cell that fuels the tumor, as well as the interplay between BET-inhibitors and proteins that drive PCSCs. Students will use human cancer cells as models, and utilize protein, RNA, and DNA analyses in their studies. **Project phase:** Elements of all three (Design, Discovery, Validation)

Mentor	Research Areas	Project description
collaborative work environment that conducts high-quality science at all times.		
Boyko Atanassov *Dept. of* ***Pharmacology and Therapeutics*** **www.roswellpark.org/Boyko-Atanassov** **Mentoring style-** *n/a* **Expectations of summer student-** *n/a*	**Scientific Research** Cancer genetics;Cancer molecular and cellular biology	**Defining the functions of Ubiquitin Specific Proteases in the regulation of Receptor Tyrosine Kinase Signaling Pathways in Cancer** Abnormal expression of several cell growth-promoting factors, such as receptor tyrosine kinases (RTKs) and cyclins, has been recognized as a critical factor driving tumor progression and resistance to therapy. Work in our laboratory is focused on elucidating the molecular mechanisms by which ubiquitin-specific proteases (USPs) are involved in stabilizing these factors in cancer cells, hence potentiating tumor growth. **Project phase:** Elements of all three (Design, Discovery, Validation)
Andrei Bakin *Dept. of* ***Cancer Genetics*** **www.roswellpark.org/Andrei-Bakin** **Mentoring style-** *I have mentored over 20 summer students for the past 15 years participating in the program. I provide general guidance, my graduate students and a lab manager will help in planning, performing, and analysis of specific experimental techniques.* **Expectations of summer student-** *na*	**Scientific Research** Cancer genetics;Cancer molecular and cellular biology;Tumor immunology & immunotherapy;Cancer pharmacology and therapeutics	**Novel therapeutic strategies for cancer-specific genetic abnormality and immune microenvironment** Metastatic breast cancer (MBC) is a deadly disease and novel therapeutic approaches are urgently needed. The first project deals with tumor-immune interplay. The tumor microenvironment (TME) has evolved as a complex and dynamic network of intercellular interactions that influences tumor formation, progression, and response to therapy. To this end, we identified a specific signaling pathway that controls immune composition in the TME. The goal of the project is to define the impact of systemic blockade of this pathway on immune cell composition in MBC models in mice. The second project investigates novel combination therapies for cancers with a genetic alteration in the p53 tumor suppressor using breast, pancreatic, and colon cancer models. The goal is to develop a drug combination therapy that selectively damages p53-deficient cancers. Students will become familiar with the following techniques: mammalian cell culture, immunoblotting (western), quantitative PCR, flow cytometry, microscopy (bright field and IF), CRISPR technology, single cell RNA sequencing; potentially with animal studies using mouse and patient-derived material (PDX). **Project phase:** Elements of all three (Design, Discovery, Validation)

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Dhyan Chandra *Dept. of* ***Pharmacology and Therapeutics*** **www.roswellpark.org/Dhyan-Chandra** **Mentoring style-** *Provide opportunities to brainstorm ideas. Encourage student to ask questions. Guide student to develop collaborative skills to understand scientific research project.* **Expectations of summer student-** *I expect summer students to learn new ideas and approaches. I expect them to brainstorm these ideas/approaches during laboratory meeting or discussion. These activities will help student developing independent thinking process in scientific research.*	**Scientific Research** Cancer molecular and cellular biology;Cancer pharmacology and therapeutics;Urology	**Mitochondrial Regulation of Cell Death and Resistance in Cancer** The main focus of our research is to define the role of mitochondrial biology in cancer and understand the molecular basis of therapeutic resistance in multiple types of cancer including in prostate, pancreatic, breast, and colon cancers. We are working on several interconnected and complementary research projects. The first project defines the role of mitochondrial unfolded protein response in cancer progression and development of therapeutic resistance in cancer patients. The second project delineates how mitochondria-mediated cell death signaling is defective in cancer cells and cancer stem cells. The third project characterizes the role of mitochondria in cancer health disparities among Americans. We also investigating the role of mitochondrial dysfunction in age-related neurodegenerative diseases and drug abuse. Our research suggests that deregulation of protein complexes contributes to tumor progression and therapeutic resistance in cancer. We use multiple biochemical, genetic, cellular, patient-derived cancer models, mouse models of cancer, clinical, and molecular approaches to identify and characterize protein complexes in subcellular compartments including in mitochondria. We envision that detailed understanding of protein complexes will lay a foundation for targeting mitochondria, cell death, and survival machineries for better therapeutic outcomes in cancer patients. Our ultimate goals are to understand the mitochondrial biology and identify novel targets for prevention and treatment of multiple types of cancer as well as other age-related diseases. **Project phase:** Discovery- initial probing of scientific problem using established methods with a concentration on techniques, data analysis
Subhamoy Dasgupta *Dept. of* ***Cell Stress Biology*** **www.roswellpark.org/Subhamoy-Dasgupta** **Mentoring style-** *Provide trainees with necessary tools, guidance, support, and feedback to make the internship successful.*	**Scientific Research** Cancer genetics;Cancer molecular and cellular biology;Cancer pharmacology and therapeutics;Tum	**Metabolic Control of Tumor Progression and Metastasis** Metabolic reprogramming is an essential hallmark of tumor progression and metastasis. Cancer cells use altered metabolic pathways to sustain rapid growth and to overcome enormous stress encountered in tumor microenvironment. Tumor cells constantly alter their metabolic state in response to oncogenic stimuli, nutrient availability, and interaction with immune cells however the precise regulation that precedes the metabolic alteration is poorly understood. Our lab uses state-of-art facilities such as metabolomics, proteomics, and genomics along with molecular biology techniques to investigate the crosstalk between metabolic signaling and

Mentor	Research Areas	Project description
Expectations of summer student- *1. Learn cancer biology 2. Explore opportunities to better understand the molecular complexities of the disease. 3. Perform experiments to fill the gap-in-knowledge.*	or immunology & immunotherapy	transcriptional networks. Multiple animal model systems including genetically engineered mouse models (GEMMs), patient-derived xenograft (PDX), and syngeneic tumor models are used to investigate metabolic adaptations that tumor progression and metastasis. Projects: (1) Metabolic adaptations driving castration resistant prostate cancer, (2) Oncogenic drivers of bone metastatic prostate cancer, (3) Mechanisms of breast tumor recurrence and metastasis. **Project phase:** Elements of all three (Design, Discovery, Validation)
Todd Demmy *Dept. of* ***Thoracic Surgery*** **www.roswellpark.org/Todd-Demmy** **Mentoring style-** *na* **Expectations of summer student-** *na*	**Scientific Research & Clinical Research** Thoracic Surgery;Cancer pharmacology and therapeutics;Other (please specify)	**Methods of Organ Deconstruction to Enhance Minimally Invasive Organ Resection and Pathologic Evaluation** Students will be able to explore methods to reduce lung organ specimen size to improve extraction mechanics. **Pulmonary Suffusion for Metastatic Sarcoma** The goal of this research project will be to study the outcomes of patients who undergo a new minimally invasive form of regional lung chemotherapy to address sarcoma tumors that have spread to the lung. Projects available for participation are designing **Project phase:** Elements of all three (Design, Discovery, Validation)
Prasenjit Dey *Dept. of* ***Immunology*** **www.roswellpark.org/Prasenjit-Dey** **Mentoring style-** *Folks in my lab are highly collaborative and we work as a team.* **Expectations of summer student-** *You will be exposed to various mouse modeling, molecular biology, immunology, genetics and biochemistry tools. Along with that you will see how tumor evolves in animal model of cancer.*	**Scientific Research** Cancer genetics;Cancer molecular and cellular biology;Tumor immunology & immunotherapy	**Role of tumor microenvironment in pancreatic, colon and lung tumor** A major component of tumor microenvironment is the secreted factors arising from infiltrating immune cells, stroma, intra-tumor microbiome and cancer cells itself, which shapes the overall trajectory of the disease. We will evaluate the components that directly support pancreatic cancer initiation, progression and metastasis. and progression. **Project phase:** Elements of all three (Design, Discovery, Validation)

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Mentor	Research Areas	Project description
John Ebos *Dept. of* ***Medicine*** **www.roswellpark.org/John-Ebos** **Mentoring style-** *As a group we come to the lab everyday and push ourselves to be as conceptually innovative and creative as possible, we see no limits to how much we can invest, know, read, or test experimentally. As a mentor I try to bring out your best in these areas and work on things that are needed in any profession, such as writing, speaking, and problem solving.* **Expectations of summer student-** *An ideal summer student is someone who can give their best effort, commit to learning from experienced mentors, and match the enthusiasm in the lab.*	**Scientific Research** Cancer molecular and cellular biology;Cancer pharmacology and therapeutics;Tumor immunology & immunotherapy;Surgical Oncology;Cancer genetics;Medical Oncology;Cancer bioinformatics;Cancer biostatistics	**Resistance and metastasis following tumor microenvironment inhibition** Student will use clinically relevant models of spontaneous metastatic disease to study resistance to antiangiogenic (VEGF pathway) and immunecheckpoint (PD-1 pathway) inhibitors. Student will be mentored by experienced trainees and learn several novel techniques **Project phase:** Elements of all three (Design, Discovery, Validation)
Irwin Gelman *Dept. of* ***Cancer Genetics*** **www.roswellpark.org/Irwin-Gelman** **Mentoring style-** *I spend a lot of time up front teaching background and technical skills, but then allowing the intern to work with lab students on their project.* **Expectations of summer student-** *Expectations include learning some background via papers I will assign, then shadowing a graduate student to learn technical skills. Finally, the intern is expected to develop some independence to perform experiments and to produce graphical (and possibly publishable) representations of their data.*	**Scientific Research** Cancer genetics;Cancer molecular and cellular biology	**The role of AKT isoform-specific substrates in promoting prostate cancer progression** The intern will test, using mouse and human prostate cancer cell lines that vary in their PTEN status, how specific substrates controlled by AKT2 or AKT3 Src controls parameters of disease aggressiveness in vitro. This will involve cell culture, transfection, protein staining, fluorescence microscopy and signaling analysis (e.g.- immunoblots). **Project phase:** Discovery- initial probing of scientific problem using established methods with a concentration on techniques, data analysis

Mentor	Research Areas	Project description
Katerina Gurova *Dept. of* ***Cell Stress Biology*** **www.roswellpark.org/Katerina-Gurova** **Mentoring style-** *na* **Expectations of summer student-** *basic knowledge of molecular biology, principles of experimental design, interest and excitement about science.*	**Scientific Research** Cancer molecular and cellular biology;Cancer pharmacology and therapeutics	**Control of chromatin stability in normal and cancer cells** Control of integrity of genetic information in cells includes activation of DNA damage response, DNA-repair pathways and elimination of cells with damaged DNA[1]. The control of the integrity of epigenetic information is equally important and critical for the development and function of multicellular organisms, but far less studied. Epigenetic information is stored as chromatin, the highly organized complex of DNA, histone proteins and their chemical modifications[2]. Accelerated replication and transcription during early embryogenesis and in cancer, resulting in more frequent nucleosome disassembly and enhanced histone turnover, may cause intermixing of histones bearing epigenetic marks and loss of epigenetic information. In cancer, this should lead to the dissolution of original cell identity. However, transcriptome analysis clearly demonstrates that tumors, including cell lines propagated for years in culture, bear easily identifiable traits of tissue of origin in their transcriptional program (TCGA data), which suggests that factors ensuring chromatin stability during early development are activated in cancer to support increased chromatin dynamics. To test this hypothesis, we will optimize methods, used to study of chromatin structure/organization, to measure and compare chromatin stability in normal and tumor cells and to identify factors responsible for the maintenance of epigenetic integrity. These factors may be a source of novel cancer targets. Our data suggest that histone chaperone FACT (FAcilitates Chromatin Transcription) is one such factor[3-7]. We will validate FACT as a chromatin stabilizing factor and cancer treatment target. To understand how epigenetic integrity is preserved, we will use novel tools (small molecules and FACT genetic inhibitors) to controllably disassemble chromatin in cells to study consequences and cell response to chromatin destabilization. Our studies will build a foundation for understanding various phenomena, including the stability of the cell differentiation state, low rate of reprogramming and high sensitivity of tumor cells to chromatin desilencing agents. **Project phase:** Elements of all three (Design, Discovery, Validation)
Nitai Hait *Dept. of* ***Molecular and Cellular Biology*** **www.roswellpark.org/Nitai-Hait**	**Scientific Research** Cancer molecular and cellular	**Mechanisms by which sphingolipid mediators impact tumor progression and metastasis** My research interests focus on the role of sphingolipid mediators, sphingosine-1-phosphate (S1P), and ceramide-1-phosphate (C1P) in breast cancer progression and metastasis. We use patient-derived 3D cell models, molecular biology

Mentor	Research Areas	Project description
Mentoring style- *As a mentor, I will be supportive and enthusiastic with students. I will help students generating a hypothesis, exploratory ideas, designing and execute experiments, collect data, analyze and present data, finally, a publishable figure.* **Expectations of summer student-** *During the internship, the student should have the motivation to learn, gathering knowledge, and hands-on experiences.*	biology;Cancer pharmacology and therapeutics;Tumor immunology & immunotherapy	techniques, and genetic animal models to study sphingolipid mediators signaling in inflammation and cancer. We are also interested in identifying novel molecular targets and underlying mechanisms of actions for tumor metastases. Significant projects: i) to determine the role of S1P as a cofactor in regulating master transcription factors (HIFs, STATs, NF-kB) functions in tumor metastasis; ii) to determine the role of C1P/ceramide kinase in tumor metastasis; iii) to determine the role of sphingolipid mediators in the tumor microenvironment and metastasis. We have various small projects on the role of mediator signaling in the tumor microenvironment and metastasis suitable for students. Student can be a co-author for peer-review publications. **Project phase:** Validation- confirming previous data/results with a concentration on techniques, data interpretation and science reporting; potential for contributing to a scientific paper
Kathleen Kokolus *Dept. of* ***Immunology*** **www.roswellpark.org/Kathleen-Kokolus** **Mentoring style-** *I am present in the laboratory but would like students to learn to work somewhat independently by the end of the program.* **Expectations of summer student-** *Students will be expected to work in a collaborative group interacting with graduate students, researchers, clinicians, and technicians. Students will need to follow directions, spend time reading about relative subjects, and be comfortable being involved in translational research.*	**Scientific Research** Tumor immunology & immunotherapy	**Exploring Ways to Mitigate Side Effects Caused by Cancer Drugs** Many cancer drugs cause unwanted side effects and toxicities that negatively impact the quality of life of cancer survivors. In some cases, these toxicities may be so debilitating that patients may choose to forgo lifesaving treatment. This project will investigate combination therapy approaches, in in vitro and in vivo settings, that could help mitigate side effects caused by cancer treatment. **Project phase:** Design- early stage development of experimental components/methodologies with a concentration on techniques
William Magner *Dept. of* ***Head and Neck Surgery***	**Scientific Research** **Clinical Research**	**Translational Research in Head & Neck, Plastic & Reconstructive Surgery** The Head and Neck Cancer Translational Laboratory carries out multiple projects with the goal of improving treatment responses in head and neck cancers.

Mentor	Research Areas	Project description
www.roswellpark.org/William-Magner **Mentoring style-** *We maintain multiple projects at different stages employing several approaches so communication is key. We attempt to understand each student's interests and goals then match them with appropriate project options. My colleagues and I are all accessible but busy so we are happy to make time to teach and support student projects but rely on student initiative to address interests, skills and needed support.* **Expectations of summer student-** *Student success is directly proportional to their effort; therefore, we expect students to put in full days of sincere effort. Students need to take initiative and work as independently as possible but we will train and support every effort. Students need to communicate clearly their interests, skills and needs.*	Cancer bioinformatics;Cancer biostatistics;Cancer molecular and cellular biology;Tumor immunology & immunotherapy; Medical Oncology;Surgical Oncology	Current projects investigate immune features of the tumor microenvironment that affect tumor growth and response to therapy. We use human and mouse cell lines in vitro as well as patient samples and mouse models. In silico studies of gene expression differences may help characterize head and neck tumor behavior. **Prospective and retrospective studies in Head & Neck, Plastic Reconstructive Surgery** The Department of Head & Neck, Plastic & Reconstructive Surgery includes 11 surgeons with broad surgical specialties and research interests including surgical technique, patient outcomes, and complications among other issues. Our tools include prospective **Project phase:** Elements of all three (Design, Discovery, Validation)
Kent Nastiuk *Dept. of* ***Cancer Genetics and Genomics, Urology*** **www.roswellpark.org/Kent-Nastiuk** **Mentoring style-** *My ultimate goal is to give the trainee experience as an independent researcher. I think this requires working collaboratively to tackle a significant problem, but give the time limits, this is likely limited to a small part of a larger project. My role is to develop both technical and critical thinking skills, while helping the trainee to gain both the specific and broad knowledge necessary to produce new knowledge. I see success as clear*	**Scientific Research** Cancer experimental diagnostics;Cancer genetics;Cancer molecular and cellular biology;Cancer pharmacology and therapeutics; Urology	**muscle loss during androgen deprivation therapy for prostate cancer, or imaging of prostate cancer** My lab studies androgen regulated growth and apoptosis signaling pathways in prostate cancer. Androgen deprivation therapy (ADT) causes frailty so a major focus is examining the mechanism of (cytokines that signal) ADT-induced muscle loss. We are also developing targeted molecular agents for both MR and PA imaging of prostate cancer (with Hans Schmitthenner, RIT). Interns will tackle a small chunk of one of these projects. **Project phase:** Discovery- initial probing of scientific problem using established methods with a concentration on techniques, data analysis

Mentor	Research Areas	Project description
communication of the products of the internship. **Expectations of summer student-** *I value students of diverse backgrounds with a passion for science, and both strong quantitative and critical thinking skills. I expect students to: 1) communicate! 2) work hard during your limited time in the lab 3) be a good lab citizen 4) be flexible! Sometimes science doesn't take you down the path you expect. I expect summer students will attend all appropriate lab meetings and seminars.*		
Chukwumere Nwogu *Dept. of* ***Thoracic Surgery*** **www.roswellpark.org/chukwumere-nwogu** **Mentoring style-** *I believe that everyone learns differently and I hope to provide a space in which students can learn and grow at their own pace. I aim to provide enough mentoring to guide the projects in my lab without limiting the creativity of my students.* **Expectations of summer student-** *I expect an intern to attend rounds, observe in the clinic and operating room while taking on a research project. I will expect the student to also participate in research meetings, perform literature reviews and perform chart reviews or other research tasks that are well within his/her capabilities. This will lead to writing an abstract and a manuscript under supervision. A brief presentation at a national surgical meeting is also a common accomplishment that my interns achieve.*	**Clinical Research** Surgical Oncology; Thoracic Surgery;Cancer bioinformatics	**Technology Enhanced Multidisciplinary Oncology Care** This Internship offers the opportunity to participate in evaluating and enhancing multidisciplinary tumor board conferences in three disease sites - Thoracic, Breast and Gynecology Oncology. There will be exposure to thoracic surgery clinics and operative procedures - primarily minimally invasive (Robotic and VATS) thoracic surgical operations. . Global health projects are also available. **Project phase:** Validation- confirming previous data/results with a concentration on techniques, data interpretation and science reporting; potential for contributing to a scientific paper

Mentor	Research Areas	Project description
Scott Olejniczak *Dept. of* ***Immunology*** **www.roswellpark.org/Scott-Olejniczak** **Mentoring style-** *I believe that everyone learns differently and I hope to provide a space in which students can learn and grow at their own pace. I aim to provide enough mentoring to guide the projects in my lab without limiting the creativity of my students.* **Expectations of summer student-** *Students should be curious, hard working and responsible.*	**Scientific Research** Cancer molecular and cellular biology;Tumor immunology & immunotherapy	**Molecular mechanisms of cancer immunotherapy** The Olejniczak lab focuses on molecular changes that occur in immune cells as they respond to cancer immunotherapy. Summer students will work collaboratively with members of the Olejniczak lab to explore novel and exciting ways immune cells are reprogrammed by cancer immunotherapies in order to kill tumor cells. Summer projects will provide an opportunity for students to gain first hand experience with cutting-edge approaches and technologies being used to improve immunotherapy for cancer.. **Project phase:** Discovery- initial probing of scientific problem using established methods with a concentration on techniques, data analysis
Gyorgy Paragh *Dept. of* ***Dermatology & Cell Stress Biology*** **www.roswellpark.org/Gyorgy-Paragh** **Mentoring style-** *In the laboratory, you will test your ability to ask questions and find answers in one of the ongoing research projects. Based on your interest, you will select your project from a wet-lab and in silico project and work with a Ph.D. on your independent or supportive subproject. We provide an environment to understand basic research concepts and techniques, learn about scientific presentation and writing and expand your understanding of early carcinogenesis.* **Expectations of summer student-** *Come with enthusiasm to learn, a tenacity to find answers, and be a superb team player.*	**Scientific Research** Cancer genetics;Cancer prevention and epidemiology; Cancer bioinformatics; Dermatology	**Advancing skin cancer prevention by tackling UV-induced clonogenic mutations** Squamous cell skin cancer is the second most common cancer in the US. There are methods available to prevent skin cancer but are not widely used because we lack methods of evaluating their effectiveness in a timely manner. Sun induced genomic damage as measured by UV-induced clonogenic mutations (CM) can be used as way of evaluating early treatment strategies and sun protection interventions. CM are in low abundance in the skin which make them very difficult to detect. However recent advances in genomic sequencing allows accurate identification and quantitation of CMs in the skin using ultra-deep targeted sequencing. This approach gives estimates of size and number of CMs. Preliminary data has identified specific region of the genome that have mutations associated with sun damage in the skin. These regions are also found in precancerous and cancer lesions. The central hypothesis for this application is that CMs are biomarkers of sun induced skin damaged and that CMs can measure the how well strategies for skin cancer prevention and treatment work. In the first set of studies, we will refine the previously developed panel of sun induced CMs by identifying the most common CMs in sun exposed versus non-sun exposed skin in humans and mice. Subsequent studies will examine the impact of UV exposure on changes the CM panel and development of skin cancer. These studies will evaluate patterns of CMs and the risk of developing skin cancer. Next, the refined panel of CMs will be used to examine how well

Mentor	Research Areas	Project description
		treatments designed to prevent skin cancer in heavily sun damaged skin areas reduce CMs and skin cancer formation. In the final set of studies, CMs will be used to evaluate the efficacy of sun protection strategies, such as sunscreens. These studies will change how we evaluate a patient's risk of developing skin cancer and how we determine the effect of skin cancer prevention. These studies have the potential to shift the focus from treating cancer to preventing the occurrence of skin cancer and will have implications on other cancer types. **Project phase:** Elements of all three (Design, Discovery, Validation)
Gyorgy Paragh *Dept. of* ***Dermatology & Cell Stress Biology*** **www.roswellpark.org/Gyorgy-Paragh** **Mentoring style-** *My goal is to create a safe, and fun research environment where trainees can develop their technical, analytical, and communication skills while pursuing a project they feel enthusiastic about.* **Expectations of summer student-** *Be enthusiastic about learning.* *Uphold the highest academic and ethical standards.* *Do not hesitate to ask for help when help is needed.*	**Scientific Research** Cancer bioinformatics; Cancer prevention and epidemiology; Dermatology	**Establishing efficacy of preventative early field treatment in a mouse model of immunosuppression-induced accelerated photocarcinogenesis** Ultraviolet light exposure is the most important risk factor for cutaneous squamous cell carcinomas (CSCC). CSCC are the second most common human malignancies with over 1 million cases diagnosed annually. Immunosuppression (IS) increases both the incidence and the mortality of CSCC. Because of immunosuppression CSCC are a major cause of morbidity and mortality in solid organtranplant recipients (SOTRs). CSCC are preventable by topical field (FT) treatment with topical chemotherapeutic or immunomodulator medications. The antimetabolite 5-fluorouracil (5FU) is the most frequently used FT, but as other FTs it is underutilized and currently used almost exclusively in patients with high number of apparent precancers or visible early CSCCs. Most CSCC arise in skin areas of profound prior UV damage and are heralded by the appearance of early clonal mutated cell groups (CMs) harboring tumor suppressor mutations. As we and others have shown CMs can be detected by ultra-high-depth targeted sequencing (UTS) and are emerging as a tool to objectively evaluate early skin carcinogenesis and as early targets of FT for skin cancer prevention. Although immunosuppression can increase CSCC risk by up to 250-fold, and field treatment has the potential to reduce cancer risk, we do not currently use FT to target CM in the absence of clinical signs of skin carcinogenesis even in individuals who will undergo immunosuppression. We hypothesize that immunosuppression modifies cutaneous CM and that early FT before immunosuppression can reduce CM and significantly decrease post immunosuppression skin cancer risk. We will study the effects of IS on CM in the SKH-1 mouse chronic UV exposure model of skin carcinogenesis. We will use solar simulated light to mimic sunexposure and will induce

Mentor	Research Areas	Project description
		immunosuppression by cyclosporine A to mimic immunosuppression in SOTR. The CM is IS and controls will be compared using UTS. We will assess changes in CM along with features or cutaneous and systemic immunosuppression. Moreover, we will perform field treatment with 5FU in the same model before initiating immunosuppression and we will follow tumor growth and CM and features of immunosuppression. This work will provide crucial preclinical data for future clinical studies aiming to identify patients on solid organ transplant list at risk of catastrophic cutaneous carcinomatosis after immunosuppression and will provide essential first line evidence for the utility of early FT to prevent CSCC in IS. **Project phase:** Validation- confirming previous data/results with a concentration on techniques, data interpretation and science reporting; potential for contributing to a scientific paper
Santosh Patnaik *Dept. of* ***Surgical Oncology*** **www.roswellpark.org/Santosh-Patnaik** **Mentoring style-** *Full guidance when needed; encouragement to explore.* **Expectations of summer student-** *The student is curious, communicative, and has a sense of responsibility for the project.*	**Scientific Research** Cancer bioinformatics; Cancer biostatistics; Cancer genetics;Cancer molecular epidemiology; Cancer pharmacology and therapeutics; Tumor immunology & immunotherapy; Surgical Oncology; Cancer molecular and cellular biology;Radiation Oncology	**Experimental and computational examination of genes in cancer and immunology** We are interested in genetics (gene mutations, gene expression, etc.), epigenetics (microRNAs, RNA editing, etc.), and metabiomics (microbiome, etc.) as it pertains to cancer and the human body's immunological response to it. These are very broad areas, and allow a visiting student to contribute their ideas to develop an exciting yet feasible project to carry out during their stay. The project work will involve one or more of the following: (1) Cell biology: cell culture, genetic engineering of cells, etc. (2) Molecular biology: various DNA, RNA, and protein assays, including their development. (3) Animal biology: growing foreign tissue/cells in the mouse, analysis of DNA/RNA/proteins of mouse, etc. (4) Patient biology: various assays of diseased tissues, including association with clinical parameters; (5) Computation: large-scale data analysis, data visualization, bioinformatics, software programming, etc. As a mentor, my goal will be to help the visiting student attain the following: (1) Experience these aspects of scientific research: collate facts from published knowledge and knowledgeable individuals; use facts and imagination to generate hypotheses and exploratory ideas; design, prepare for, and execute experiments; collect, analyze, and present data; set forth a future direction. (2) Learn some common biomedical or computational research techniques. (3) Bring to completion during the student's stay a small but independent

Mentor	Research Areas	Project description
		project that the student helps with the design, execution, and analysis of. **Project phase:** Elements of all three (Design, Discovery, Validation)
Denise Rokitka *Dept. of* ***Pediatrics*** **www.roswellpark.org/Denise-Rokitka** **Mentoring style-** *Provide supportive environment to learn about clinical research* **Expectations of summer student-** *1. Data review* *2. Anaylsis* *3. Manuscript writing*	**Clinical Research** Pediatrics;Other (please specify);AYA oncology	**AYA oncology** Create database and enter data for AYA QOL, financial toxicity, anxiety/depression. Analyze available for trends and unmet needs in AYA oncology. Opportunity to shadow in pediatrics/ peds survivorship and AYA consults. **Project phase:** Validation- confirming previous data/results with a concentration on techniques, data interpretation and science reporting; potential for contributing to a scientific paper
Mukund Seshadri *Dept. of* ***Oral Oncology/Dentistry and Maxillofacial Prosthetics*** **www.roswellpark.org/Mukund-Seshadri** **Mentoring style-** *Democratic but expect interns to be professional in their interactions and diligent with an outstanding work ethic.* **Expectations of summer student-** *Motivated, willing to take ownership of the work*	**Scientific Research** **Clinical Research** Cancer biophysics;Radiation Oncology;Cancer experimental diagnostics;Medical Oncology;Surgical Oncology;Oral Medicine;Cancer pharmacology and therapeutics;Cancer prevention and epidemiology	**Developing novel combination strategies for oral cancer** Research in my laboratory is focused on three main areas: (i) understanding the biology of head and neck cancers and exploiting them for therapeutic benefit, (ii) development of safe and effective bio-adjuvant approaches for the prevention of oral cancers and, (iii) the use of advanced imaging methods such as MRI, CT in preclinical models and in patients to study response of head and neck tumors to chemotherapy and radiation. The work is interdisciplinary in nature and draws on concepts from biophysics, cancer biology, pharmacology and molecular biology. Given my clinical background, I feel strongly about pursuing a research program that addresses clinically-relevant questions in the laboratory setting and potentially translates the knowledge gained into meaningful outcomes for patients. **Integrating AI/Machine Learning for Early Detection and Prognostication** We are investigating the potential of integrating artificial intelligence (AI) and machine learning (ML) with imaging methods to determine if the diagnostic or prognostic performance of traditional imaging methods such as MRI, CT and US can be improved.

Mentor	Research Areas	Project description
		Project phase: Elements of all three (Design, Discovery, Validation)
Gal Shafirstein *Dept. of* ***Cell Stress Biology*** **www.roswellpark.org/Gal-Shafirstein** ***CSTEP Peer-to-Peer Program?*** **Blank** **Mentoring style-** *A teamwork that includes students, faculty and outside collaborators. Use weekly lab meetings for reporting results, presentation of new ideas. I have an open-door policy for research discussions as needed.* **Expectations of summer student-** *Conduct experiments with supervision from graduate students in the lab. Document the work done. Record results. Present results and plans in our weekly lab meetings.*	**Scientific Research** Photodynamic Therapy;Cancer biophysics;Surgical Oncology	**Treatment Planning and Light Dosimetry in Photodynamic Therapy (PDT)** My research team is focused on the development and implementation of treatment planning and light dosimetry in PDT. My group includes 1 pre-doctoral student, a post doctoral and a technician. We collaborate with physicians, and faculty with expertise in radiation biology, biostatistics, and imaging at Roswell Park, and drug developers at other research institutes. We do preclinical and clinical studies, and investigate combination therapies. **Project phase:** Elements of all three (Design, Discovery, Validation)
Anurag Singh *Dept. of* ***Radiation Medicine*** **www.roswellpark.org/Anurag-Singh** ***CSTEP Peer-to-Peer Program?*** **Blank** **Mentoring style-** *Close oversight with concurrent exposure to the clinic* **Expectations of summer student-** *40 hours of work per week including 2 days/week in clinic*	**Clinical Research** Radiation Oncology;Cancer pharmacology and therapeutics	**Clinical Research Project in Radiation Medicine** The goal of our clinical research overall are to assess administration of radiation treatment regimens in relationship to survival outcomes. Projects involve existing data and chart review. Projects will vary for the summer program. Past project titles t **Project phase:** Elements of all three (Design, Discovery, Validation)
Pamela Sung	**Scientific Research**	**Novel therapies in Acute Myeloid Leukemia** My laboratory focuses on a pathway (FLT3) that is frequently abnormal in acute myeloid leukemia (AML), which is a blood

Mentor	Research Areas	Project description
Dept. of ***Pharmacology and Therapeutics*** **www.roswellpark.org/Pamela-Sung** ***CSTEP Peer-to-Peer Program?*** **No** **Mentoring style-** *I plan to meet one-on-one with a student on at least a weekly basis to discuss the project and ensure that the experience is catered to the student's educational goals. I believe in maintaining a good work-life balance and have no set hours that one "must" be in lab, so long as you continue to be productive.* **Expectations of summer student-** *I expect students to be engaged in understanding the rationale behind the experiments and learn techniques to be able to perform them independently. Students will have their own project, but are welcome to be involved with other ongoing projects in the lab.*	Cancer pharmacology and therapeutics	cancer affecting people of all ages. A drug targeting FLT3 was FDA approved recently. While it is effective, it is not curative. My goal is to better understand the biology of FLT3, so we can improve upon this therapy. We use a number of techniques including molecular biology, cell culture, flow cytometry, and mouse modeling. As a leukemia physician, I hope these studies will lead to clinical trials for AML. **Project phase:** Discovery- initial probing of scientific problem using established methods with a concentration on techniques, data analysis
Li Tang *Dept. of* ***Cancer Prevention and Population Sciences*** **www.roswellpark.org/Li-Tang** **Mentoring style-** *I believe that teaching is to introduce but not to force-feed knowledge.* **Expectations of summer student-** *The expectation is that the summer student may be inspired and prepared to embark on the pursuit of careers in biomedical research.*	**Scientific Research** Cancer molecular epidemiology;Cancer prevention and epidemiology	**Gene, Diet, and their interactions contributing to cancer characteristics and prognostic outcomes** Our research program is engaged in molecular epidemiological study of cancer and is developed in two directions with a central theme of enhancing treatment efficacy and improving cancer prognosis. The first direction is to understand the role of gene-diet interaction in cancer prognosis and treatment outcome. The primary focus is on cruciferous vegetables and their key anti-cancer effectors, the phytochemical isothiocyanates. The second research direction is to understand the biological basis for cancer characteristics. The particular interest is in genetic and epigenetic contributions to racial disparities in cancer aggressiveness. The goal is to target high risk population with specific lifestyle and/or dietary intervention approaches to decrease cancer mortality. **Project phase:** Elements of all three (Design, Discovery, Validation)

2023 Mentor Directory: Summer Research Experience Program in Oncology for Medical Students

Mentor	Research Areas	Project description
Lei Wei *Dept. of* ***Bioinformatics/Biostatistics*** **www.roswellpark.org/Lei-Wei** **Mentoring style-** *Flexible* **Expectations of summer student-** *The trainee will be expected to: 1) develop a good understanding of cancer NGS data; 2) by doing literature search and data-mining, identify novel mutations/mechanisms that may contribute to tumor initiation, progression and recurrence; 3) contribute to scientific publications.*	**Scientific Research** Cancer bioinformatics	**Characterize somatic mutations in cancer genomes** Next generation sequencing (NGS) is providing an efficient system for characterizing cancer genomes. By comparing with the matched normal DNA, we can identify additionally acquired mutations, so called somatic mutations in cancers. Certain somatic mutations may directly contribute to tumorigenesis process by disrupting tumor suppressors or activating oncogenes. Identifying such driver mutations is an important step for understanding the mechanism of cancers and facilitating the development of personalized treatments. The current research will work on the somatic mutations found by NGS in various cancer types. The trainee will be expected to: 1) develop a good understanding of cancer NGS data; 2) by doing literature search and data-mining, identify novel mutations/mechanisms that may contribute to tumor initiation, progression and recurrence; 3) contribute to scientific publications. **Project phase:** Blank
Li Yan *Dept. of* ***Bioinformatics/Biostatistics*** **www.roswellpark.org/Li-Yan** **Mentoring style-** *Lead by example* **Expectations of summer student-** *Self-motivated & Team player*	**Scientific Research** Cancer bioinformatics;Cancer biostatistics;Tumor immunology & immunotherapy;Cancer genetics	**Translational Bioinformatics; Computational Oncology** We will offer a number of Translational Bioinformatics & Computational Oncology projects, leveraging our recently funded NCI Cancer Moonshot Immuno-Oncology Translational Network (IOTN, https://www.iotnmoonshot.org/). **Project phase:** Elements of all three (Design, Discovery, Validation)