Science Technology Summer Research Projects

Faculty Name	Email Address	Faculty College	Faculty Department	Project Location	Project title	Project Description - the general area of research involved in this project.	Important selection criteria	Student Majors	Hours Per Week
Ananias Escalante	Ananias.Escalante@temple.edu	CST	Biology	TU Main Campus	Phylomedicine of vector-borne pathogens	Despite substantial progress in their control, parasites remain important causes of disease and death worldwide. It is increasingly evident for the public health community that molecular information, together with concepts from epidemiology and evolutionary biology, allows for testing of hypotheses and exploration of scenarios that otherwise could not be investigated by traditional approaches. Our lab	I am looking for highly motivated students who are interested in gaining research experience. A minimum of 3.7 GPA is required. Basic knowledge on	Biology, Biochem, Applied Mathematics, Natural Sciences	20-25
Darius Balciunas	darius@temple.edu	CST	Biology	Main campus	Genetic analysis of vardiovascular development and regeneration	Unlike humans, zebrafish possess a remarkable regenerative capacity. We are working to figure out which genes control this process and precisely how. Our main focus currently is on different transcription factors required for cardiovascular development an	For more information, please see the lab website http://www.balciunaslab.com/research-opportunities.html	Biology, Biochemistry	40
Erik Cordes	ecordes@temple.edu	CST	Biology	TU Main Campus	Molecular stress response of deep-sea corals	Field studies and laboratory experiments have revealed the effects of various anthropogenic stressors (ocean acidification, oil and dispersant exposure) on deep-sea corals. The next step is to identify the molecular markers that underlie these responses. Once identified, these may reveal the potential for corals to be resilient to stress, or for use as biomarkers to identify stressed populations in	Students who are interested in pursuing graduate school in the natural sciences, ecology and evolution.	Biology and environmental science majors are preferred, but the	20-30
Jacqueline Tanaka	jtanaka@temple.edu	CST	Biology	TU Main Campus	Investigating ion channel mutations associated with complete color blindness.	My lab studies mutations in an ion channel protein expressed in cone photoreceptors that are associated with complete color-blindness in humans and day-blindness in dogs. The canine project is a collaboration with U Penn Vet school faculty.	I would like to recruit potential MARC students. The MARC U-STAR program provides mentoring and financial support for junior and seniors interested in PhD	Biology, biochemistry, chemistry, biophysics.	35

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Jody Hey	hey@temple.edu	CST	Biology	TU Main Campus	Evolution and the Human Genome	Student's will work on questions about how the human genome has evolved. Some of the work may involve comparisons with Ape genomes.	#1 Some computer programming experience.	planning a major in the life or health sciences, or in computer science.	30
Karen Palter	palter@temple.edu	CST	Biology	TU Main Campus	Investigating the mechanism of insulin resistance in Type II diabetes	Our laboratory has previously shown that Drosophila melanogaster lacking a functional sialic acid pathway display a range of metabolic defects. We hypothesize that the metabolic defects are a result of excess insulin secretion from the insulin producing cells (IPC). We have generated transgenic flies carrying an ectopic copy of the sialic acid synthase gene (SAS) under a Dilp2 (insulin promoter) that is active only in IPC cells.	Motivation and interest in research. Biology 2112	Biochemistry or Biology	35
Maria Pacheco	tug00270@temple.edu	CST	Biology	TU Main Campus	Biodiversity and evolution of parasites	All known multicellular organisms harbor diverse assemblages of dependent species, many of which are considered parasites. Despite a growing awareness of the importance of dependent species for biodiversity, parasitological investigations have largely focused on the harm caused by parasites to their hosts. However, the ecology and evolutionary biology of parasitic organisms are worthy of study in their own right	Highly motivated. A minimum of 3.7 GPA. Basic knowledge on biology (transcription/translation and DNA replication), analytical/quantitati	Biology, Applied Math, Natural Sciences, Information Science and	20-25
Rachel Spigler	rachel.spigler@temple.edu	CST	Biology	Main Campus	Floral trait variation in a native biennial plant, Sabatia angularis	Flowering plants display an amazing diversity of floral forms, with adaptations that enable them to attract pollinators and, in cases when pollinators are scarce, self- pollinate. We conducted a greenhouse study examining traits related to pollinator attraction and the ability to self-pollinate in a native biennial, Sabatia angularis. In the Spring, we will continue with this project and evaluate self-pollen deposition and pollen	Attention to detail Interest in biology and/or plant sciences Ability to follow directions - BIOL 1111	Biology	20 to 30

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Rachel Spigler	rachel.spigler@temple.edu	CST	Biology	Main Campus	Self fertilization and inbreeding depression in a native grassland plant	The ability to self-pollinate may be adaptive when pollinators are scarce, but we lack critical information on the extent to which plants rely on this ability and its consequences offspring viability. Students will help in greenhouse and lab (PCR).	Ability to follow directions. Exceptional attention to detail. Basic lab skills (work will involve DNA extraction and PCR under supervision).	Biology	20
Rob Kulathinal	robkulathinal@temple.edu	CST	Biology	TU Main Campus	Genomics of speciation	Is speciation driven by genes involved in reproduction? In this project, the student will: 1) identify genes under selection using evolutionary genomic approaches and/or 2) knock-down those genes using ready-made RNAi lines via our high-throughput behavioral arenas. The student will be trained by an active team of undergraduate and doctoral students who are already applying these	Determination, curiosity, and computationally-inclined	Biology, Computer Science	30
Robert Sanders	robert.sanders@temple.edu	CST	Biology	TU Main Campus	Mixotrophy - photosynthetic aquatic microalgae feeding on bacteria	There are numerous species of phytoplankton that ingest food particles in addition to photosynthesizing for their nutrition. The effect of temperature and/or UV radiation on the process will be investigated.	Interest in project with commitment to complete most of it over the summer. Biology 1111 or 1911	Biology, Environmental Science	~ 30 hours
Weidong Yang	weidong.yang@temple.edu	CST	Biology	Main Campus	Super-resolution study of interactions and competitions in normal and cancer cells	Super-resolution light microscopy won the Nobel Prize in Chemistry in 2014. In our lab, we combine super-resolution microscopy with single-molecule tracking, fluorescence recovery and innovative molecular biology techniques to study the following projects: 1) interactions between human cells (normal and cancer cells) and viruses. 2) trafficking of RNAs, vesicles and proteins through the nuclear pore complexes in live		Biology, biochemistry, biophysics and the relevant	20 to 30

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Daniel Strongin	dstrongi@temple.edu	CST	Chemistry	TU Main Campus	Reactivity of Pyrite and Acid Mine Drainage	The iron sulfide, pyrite, is found at active and abandoned coal mining sites. Its decomposition in the environment leads to acid mine drainage (sulfuric acid generation) which is a significant problems for coal mining companies and the surrounding environment. The goal of the project is to look into strategies to suppress the oxidation of pyrite and the resulting acid generation.	Motivation Academic performance - Introductory Chemistry Courses with Laboratory.	Chemistry ESS	25
Eric Borguet	eborguet@temple.edu	CST	Chemistry	TU Main Campus	Combining Photons, Electrons and Nanoparticles for Plasmonic Sensing and Catalysis	Students will develop and use nanoscale plasmonic materials for rapid, high sensitivity detection of biological and chemical agents, as well as catalytic conversion. They will learn to use a variety of analytical techniques such as spectroscopy, Atomic Force Microscopy http://www.temple.edu/borguet/index.html	Interest, curiosity and persistence - Undergraduate researchers in my group typically present at local, regional and even national	Chemistry, Physics	35 hours
Graham Dobereiner	dob@temple.edu	CST	Chemistry	TU Main Campus	Exploring the influence of Lewis Acids on Organometallic Compounds	Organometallic complexes, which feature metal-carbon bonds, underpin key catalytic reactions in chemical industry. This project will explore the synthesis of new complexes using air-free technique, and investigate the reactivity of these complexes in new chemical reactions.	Prior classroom laboratory experience (General Chemistry, and preferably Organic Chemistry).	Chemistry	35
Jonathan M. Smith	jonathan.m.smith@temple.edu	CST	Chemistry	Main Campus	High energy chemistry in combustion and the atmosphere	Molecules in extreme high energy settings are highly reactive as expected. Molecular reactions under these conditions can follow unique reaction pathways not possible at low energy including roaming radical pathways. Energized molecules emit light in the infrared providing a way to study these excited reactive molecules. This project will involve the study of energetic molecular reactions experimentally and	Enthusiasm for taking on supervised independent research. Skills can be learned as needed based on general chemical knowledge.	Chemistry, Biochemistry, Physics	TBD
Scott Sieburth	scott.sieburth@temple.edu	CST	Chemistry	TU main campus	Simple Methods for Complex Molecules	Using light to drive cycloaddition reactions and make strained, reactive new structures.	work hard, work smart.	science	30

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William Wuest	wwuest@temple.edu	CST	Chemistry	TU Main Campus	Synthesis of Natural Product-Inspired Molecules to Perturb Bacterial Biofilms	Bacteria form complex communities known as biofilms to protect themselves from environmental stresses like antibiotics proving troublesome to multiple factions of society. Biofilms affect human health (infections, dental plaque) and commercial interests (oil industry, water purification, shipping, residential) culminating in over $60M in costs and over 100,000 deaths , therefore, any discoveries that inhibit or kill	Grades and research interest	Biochemistry, Chemistry, Neuroscience	During Semester - 12-15; During Summ
Robert Stanley	rstanley@temple.edu	CST	Chemitry	Main Campus	Finding a damaged DNA needle in a haystack	Why do some people get skin cancer from sun exposure while others merely tan? This project will try to answer that question. You will use a DNA repair protein to identify damaged DNA in a unbiased manner. The project involves biochemistry (you will learn to make the protein and damaged DNA), analytical chemistry (Capillary Electrophoresis, a widely used technique in the pharma industry) and	separations, DNA techniques (gel electrophoresis) HPLC.... - BIO 3096, 4401, CHEM 3405 or 3301,	Biochemistry/Chemistry/Biology/Physics	20 to 30
Bo Ji	boji@temple.edu	CST	CIS	TU main campus	Allocation and Placement of Virtual Network Functions in Software Defined Networks	Network Function Virtualization and Software Defined Networking are two emerging technologies that enable rapid innovations in network provision, operation and management. This project concerns the problem of allocation and placement of virtual functions.	Good math background and/or good programming skills. Basic knowledge about networking protocols.	CIS/Math/ECE	30 hours per week
Bo Ji	boji@temple.edu	CST	CIS	TU Main Campus	Software-Defined Cellular Networks	The purpose of this project is to develop and implement resource allocation mechanisms in software defined radio access networks. For this project, participants will be exposed to the basics of cellular networks (such as 4G LTE and WiMAX systems) and software defined networks. This is a multi-faceted project with both theoretical and systems aspects suitable for students with different	Self-motivated. Backgrounds in networking, control or math.	Computer Science Electrical Engineering	30

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Krishna Kant	kkant@temple.edu	CST	CIS	TU Main Campus	Collaborative caching in content centric networks	The project will involve simulation study of a computer network designed for distributing content such as audio/video that is widely accessed and may have varying levels of demands from different parts of the network. The purpose of the simulation is to study various collaborative policies for caching the content.	The project would need good programming skills, exposure to discrete-even simulation, and basic background in computer networks.		300 hours over the summer
Krishna Kant	kkant@temple.edu	CST	CIS	TU Main Campus	Reliability prediction of large scale storage systems	This project involves analysis of data collected from storage systems and its characterization relative to the observed errors that can be used for reliability prediction of the storage system.	The project would need good programming skills, exposure to discrete-even simulation, and basic background in computer networks.		300 hours over the summer
Xiaojiang Du	xjdu@temple.edu	CST	CIS	TU Main Campus	Security and Privacy Issues of Android Phones	In this project, the undergraduate student will work with Dr. Du and his Ph.D. students on Security and Privacy Issues of Android Phones. First we will identify possible attacks on Android Phones security and privacy. Second, we will design effective security schemes to defend these attacks. Third, we will implement the security schemes in real Android Phones. Fourth, we will perform real experiments on	Good programming skills High GPA Sound math background	CIS, Math	20
Zoran Obradovic	zoran.obradovic@temple.edu	CST	CIS - Data Analytics Center, Computer and Information Science, Statistics	TU Main Campus	Predictive analytics in big data	Predicting the system behaviors by analyzing big data. Applications include social networks, medicine, climate and environment. For more details see http://www.dabi.temple.edu/~zoran/	Interdisciplinary interests; Self-motivation; Problem solving skills; Some programming experience in any language -the projects will be	Computer Science, Statistics, Physics, Biology, Chemistry, Pharmacy, Geology,	20-40

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Chiu C. Tan	cctan@temple.edu	CST	Computer and Information Sciences	Main Campus	Security of civilian-captured videos	There is a rise in everyday people using their smartphones to record potential criminal acts, e.g. people rioting, violence in public spaces, and so on. Smartphones cameras are not designed to provide evidence of wrongdoing. The project will explore the potential security issues related to civilian captured videos (e.g. potential for fake/tampered videos) and possible solutions to address them.	General interest in security. Some familiarity with video or photo manipulation software like Photoshop will be preferred.	CIS, Math, Physics	20 to 30
Sujith Ravi	sravi@temple.edu	CST	Earth & Environmental Sciences	TU Main Campus	Belowground responses to climate change: Root imaging and analysis	Belowground processes such as root dynamics can alter nutrient and water cycles and impact the response of terrestrial ecosystems to changing climate and disturbance regimes. Despite the relevance of belowground processes, studies addressing the response of fine roots to changing environmental conditions are rare, mostly due to the difficulties in quantifying root dynamics (production, growth and	interest in the project/research, critical thinking, quantitative ability - Basic statistics, interest in image processing, mostly computer-based	Biology, Computer science, Environmental Sciences	30 - 40 hours
Laura Toran	ltoran@temple.edu	CST	EES	Philadelphia	Stormwater monitoring	Use data loggers, sampling, and other instruments to understand how stormwater moves through and affects urban ecosystems	Comfortable with field work and with using computers to analyze data.	Geology, Environmental Science, Physics	15
Laura Toran	ltoran@temple.edu	CST	EES	Campus and suburban streams	Stormwater monitoring	Students will help conduct research on how stormwater affects streams and how to control stormwater. We evaluate effects using data loggers. Field work and computer analysis is involved.	Commitment to protecting the environment and plan to follow up with relevant coursework - Should like working outside, but also working	Geology and Environmental Science would consider Computer	20-30

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Sudhir Kumar	s.kumar@temple.edu	CST	iGEM and Biology	TU Main Campus	Genomics, Medicine, and Evolution (computer based)	Students will carry out biological and biomedical research using computers with emphasis on DNA data analysis. Biomedical questions will be focused on Genome Medicine. Biological questions will be on building the tree of life. Depending on the student's background, you may conduct primary data analysis research and/or assist in developing new methods, software, and databases. See igem.temple.edu and	Freshmen and sophomores with interest in biology, medicine, or computers. No requirements, as the projects will be tailored to the	Biology, Computers, Physics, Anthropology, Pharmacy, Chemistry	20-40 hours /week during the summer
Sudhir Kumar	s.kumar@temple.edu	CST	Institute for Genomics and Evolutionary Medicine	TU Main Campus	Genomic Medicine and Tree of Life	Evolutionary analytics of mutations, genomes, and species is the primary focus of my research group. We use integrative and comparative approaches to make fundamental discoveries in the fields of medicine, evolution and genomics. The common theme of all our research is the use of comparative analysis to reveal genome differences that are outcomes of natural selection on novel mutations arising in all species	Prefer freshmen or sophomores interested in devoting multiple years working in our group so they can carry out real research and	Biology, Computer Science, Chemistry, Physics, Biomedical engineering, and	We expect 30+ hours a week during the
Axel Kohlmeyer	a.kohlmeyer@temple.edu	CST	Mathematics	Main Campus	HPC Cluster Scheduler Software Development	The open source software used for resource management and job scheduling on Temple's HPC cluster has some known problems and would benefit from some general and specific improvements. Problematic code needs to be replaced and tools for improving code quality and reliability should be applied to identify additional improvements. Available patches from third parties should be identified,	- portable C programming - familiarity with git and bitbucket or github - some experience compiling applications on Linux	Computer and Information Science	20 to 30
Gillian Queisser	gillian.queisser@temple.edu	CST	Mathematics	Main Campus	Modeling and Simulation of Calcium Dynamics in Healthy and Diseased Neurons	In this project the student researcher will use novel simulation tools to simulate and evaluate the dynamics of calcium signals in neurons. Calcium is one of the most important molecules in neuronal signaling and is implicated in multiple ageing-related neurodegenerative diseases. The project will focus on systematically simulating cell-calcium dynamics under the influence of calcium regulating parameter sets	Programming skills (scripting language and/or object-oriented language) are a plus.	Mathematics, Computer Science, Biology	20 to 30

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Gillian Queisser	gillian.queisser@temple.edu	CST	Mathematics	Main Campus	Simulating networks of brain cells under synapse loss	The student researcher will get to know novel simulation tools to simulate neural networks and use these tools to investigate the behavior of networks when connections between cells, so called synapses, are lost. This effect is common in diseases like Alzheimer's and identifying ways for cells to compensate synapse loss is of great importance. The focus of this project is to systematically simulate	Programming skills (scripting language and/or object-oriented language) are a plus.	Mathematics, Computer Science, Biology	20 to 30
Gillian Queisser	gillian.queisser@temple.edu	CST	Mathematics	Main Campus	Grid generation and convergence analysis for the Poisson-Nernst-Planck equations	The student researcher will work on developing automated ways to generate grids for the numerical computation of the Poisson-Nernst-Planck (PNP) equations. PNP equations describe the behavior of charged particles under diffusive and electrical fluxes. Using an established numerical framework for solving the PNP equations this project will focus on ways to automatically create test geometries (grids) and to use	Programming skills (scripting language and/or object-oriented language) and an interest in applied mathematics/numerics	Mathematics, Computer Science	20 to 30
Gillian Queisser	gillian.queisser@temple.edu	CST	Mathematics	Main Campus	Vector graphic export of two- and three-dimensional scientific data	The student researcher will develop export routines for scientific data in two and three dimensions. The visualization of scientific data is critical when conveying new research results. The goal of this project is to develop ways to export ugx-data (an xml-based scientific computing file format) to vector graphics formats, such as svg. The students results can be included in broadly used open-source projects	Programming skills (scripting language and/or object-oriented language)	Mathematics, Computer Science	20 to 30
Yury Grabovsky	yury@temple.edu	CST	Mathematics	TU Main Campus	Links between effective elastic tensors of pairs of fiber-reinforced composites with common microstructure	Elastic properties of composite materials depend both on the microstructure and properties of constituent materials. This project aims to investigate latter dependence by characterizing those transformations of elastic properties of constituent materials that are preserved at the level of the effective properties of composites. In combination with results of prior work of URP students these transformations, called links,	Understanding of vector spaces and linear operators as in the Theoretical Linear Algebra course Math 3051 - Math 3051 is desired but not a hard	Any CST major with required knowledge	20-40 depending on the number of weeks

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Xingting Wang	xingting@temple.edu	CST	Mathematics Department	Main Campus	Quantum p-Groups	In this project, we are going to investigate the quantized version of p-groups in the classical group theory and to explore their classification in low dimensions using all sorts of modern mathematical tools.	Linear Algebra and some basic concepts of Abstract Algebra	Mathematics	20 to 30
Adrienn Ruzsinszky	aruzsinszky@temple.edu	CST	Physics	TU Main Campus	Accurate Methods in Electronic Structure	We are developing and improving electronic structure methods based on many-body electron and density functional theory.		Physics or Chemistry	25
Adrienn Ruzsinszky	aruzsinszky@temple.edu	CST	Physics	Temple main campus	First-principles electronic structure methods for materials	Development and applications of first-principles electronic structure methods in Physics and Chemistry.	Interest in theoretical research. Solid mathematical background. Satisfactory programming and computational skills.	Physics or Chemistry	25 to 30
Adrienn Ruzsinszky	aruzsinszky@temple.edu	CST	Physics	TU Main Campus	Electronic structure of layered semiconductors	ground-state and/or excited state calculations of layered semiconductors for nano-electromechanical device industry and photovoltaics	interest in theoretical/computational research, good computational skills	Physics, Chemistry	20
Bojana Gligorijevic	bojana.gligorijevic@temple.edu	Engineering	BioEngineering	Main Campus	Real-time imaging of cancer cell motility in the context of complex environments-integrated in vivo, in vitro, in silico	Student would use multiphoton and confocal fluorescent microscopes to image cancer cells labeled with 3 different fluorescent proteins. The goal is to compare how motility of cells relates to cell cycle stage distribution in 3D cellular spheroids embedded in collagen matrix. We hypothesize that cells which are motile will be arrested in G1 stage and that spatially, such cells will be positioned in the rim of the	use of microscopes, sterile cell culture, cell transfection and transduction, PCR, microarrays, immunofluorescence or histology...	biology	15

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Marc Ilies	mailies@temple.edu	School of Pharmacy	Pharmaceutical Sciences	TU Health Science Campus	Development of drug delivery systems with enhanced in vivo stability	Drug delivery systems can modify the pharmacokinetics of drugs, protect them from decomposition and control their spatial and temporal delivery in the organism. In recent years we were active towards the development of drug delivery systems based on amphiphilic compounds of different molecular weight, from simple surfactants, gemini surfactants, lipids, dendrons and polymers. We are	General knowledge in chemistry, biochemistry, biology and especially in the inter-disciplinary integration of this knowledge is	Chemistry, Biochemistry, Biology	40
Young-Jin Son	yson@temple.edu	TUSM	Anatomy and Cell Biology	TU Health Science Campus	Restoring Motor and Sensory Circuits after Peripheral Nerve Injury	We are currently carrying out two lines of translation-oriented research using clinically relevant mouse models, aiming to restore motor and sensory functions after peripheral nerve injury. Although it is commonly believed that the peripheral nerve regenerates, recovery from human nerve injuries typically takes months to years, and is incomplete in >90% of cases. The poor functional recovery in		Neuroscience, Biology, Chemistry, Premed	20 to 30
Ana Gamero	gameroa@temple.edu	TUSM	Biochemistry	TU Health Science Campus	STAT2 Signaling in Cancer	STAT2 is a transcription factor widely recognized for its role in host defense against microbial attack and inflammation. Published work from my laboratory now suggests that STAT2 is also implicated in cancer development. We have evidence in animal models of cancer that STAT2 functions to promote tumorigenesis. Based on this exciting finding, the main objective of my lab is determine the underlying	Strong knowledge of biological concepts Self-motivated and willingness to work hard Good communication skills Able to work well with others	Biology, Biochemistry	40-45hours
Madesh Muniswamy	madeshm@temple.edu	TUSM	Biochemistry	TU Health Science Campus	MCU gene knockout using zebra fish model system	We are creating a knockout zebra fish for the mitochondrial calcium uniporter (MCU) gene using Crispr/Cas9. We plan to breed the homozygotes for the MCU deletion and then use them for functional analyses. The goal is to measure how the deletion of MCU affects the ATP production/Calcium handling/Oxidative stress in the mitochondria.	Prior experience in a Biology/Life Science Lab Good Laboratory Practice General curiosity Bio 1, Bio 2, Genetics	Biology, Biochemistry, Molecular Biology	20 to 30

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Sara Jane Ward	saraward@temple.edu	TUSM	CSAR	TU Health Science Campus	Cannabinoids, Inflammation, and CNS Injury	Research focuses on determining the role of inflammation across a range of CNS disorders, from stroke to substance abuse. We take a behavioral and molecular immunological approach to studying the role of inflammation in CNS disorders and testing the hypothesis that cannabinoid based-treatments have a potential to reduce this inflammation and therefore improve behavioral outcomes.	Interest in neuroscience/experimental psychology	Neuroscience, Psychology	
Mahmut Safak	msafak@temple.edu	TUSM	Department of Neuroscience	TU Health Science Campus	Understanding the regulatory roles of JC virus agnoprotein in viral life cycle	JC virus is a human polyomavirus that causes a fatal disease, known as progressive multifocal leukoencephalopathy, in the central nervous system of a sub-population of immunocompromised individuals including AIDS and cancer patients. This virus encodes a small regulatory protein, Agnoprotein, from its late coding region. In the absence of its expression, this virus unable to sustain its productive		Biology, Chemistry, Biochemistry, Neuroscience	20 to 30
Mahmut Safak	msafak@temple.edu	TUSM	Department of Neuroscience	TU Health Science Campus	Investigation of the regulatory roles of JC virus Agnoprotein in viral life cycle	Agnoprotein is one of the important regulatory proteins of the human polyomavirus, JC virus. It is a relatively small and basic protein. we have recently demonstrated that it forms highly stable dimers and oligomers. It exhibits the ability to be released from the infected cells. The implications of this release unknown. It appears to bind to viral transcripts and ins involved in the splicing and nucleo-cytoplasmic	Student with a good work ethics	Biology, Chemistry Biochemistry Neuroscience	40h per week
Beata Kosmider	tug28074@temple.edu	TUSM	Department of Thoracic Medicine and Surgery	TU Health Science Campus	Mutation analysis in emphysema.	Two million Americans suffer from chronic obstructive pulmonary disease, costing $2.5 billion/year and contributing to 100,000 deaths/year. Emphysema is caused by the destruction of alveolar wall septa, which is associated with inflammation. Alveolar type II cells make and secrete pulmonary surfactant and restore the epithelium after damage. In our preliminary data we identified 6 mutations in genomic		Biology or Biochem	20-40 depending on the number of weeks

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Beata Kosmider	tug28074@temple.edu	TUSM	Department of Thoracic Medicine and Surgery	TU Health Science Campus	The role of microvesicles in emphysema.	Microvesicles are small membrane vesicles of 30–1,000 nm in diameter that are released into the extracellular environment under normal or pathological conditions by different types of cells including alveolar type II cells. Our hypothesis is that microvesicles secreted in emphysema may contain inflammatory factors, which can induce injury of neighboring cells. In our preliminary data, we found		Biology or Biochem	20-40 depending on the number of weeks
Nora Engel	noraengel@temple.edu	TUSM	Fels Institute for Cancer Research	Fels Institute for Cancer Research	Genetics and Epigenetics of sex-specific expression patterns in early embryogenesis	We are investigating differences between male and female embryonic stem cells and the mechanisms by which these early differences are established. Epigenetic assays will be performed to detect the impact of sex on differentiation of the cells.	Basic laboratory skills, such as pipetting and making solutions required.	Biology, Biochemistry	20 hours - two consecutive days.
Richard T. Pomerantz	richard.pomerantz@temple.edu	TUSM	Fels Institute for Cancer Research	TU Health Science Campus	How the process of transcription contributes to genome instability in human cells.	Genome instability in the form of chromosome breaks, rearrangements and deletions is a hallmark of cancer cells and contributes to tumorigenesis. The research project aims to understand how the process of transcription contributes to genome instability in human cells. Current research in the lab reveals a direct link between transcription and DNA deletions and rearrangements in human cancer cells. This	Intelligent, hard-working, independent, passionate about science and research. - General Biology, perhaps Chemistry --	Biochemistry, Biology, or Chemistry	40 hours /week

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Richard T. Pomerantz	richard.pomerantz@temple.edu	TUSM	Fels Institute for Cancer Research	TU Health Science Campus	This research will provide important insight into how polymerase theta functions during alt-EJ and promotes the survival of cancer cells and chemotherapy resistance.	A newly discovered DNA repair process called alternative end-joining (alt-EJ) or microhomlogy-mediated end-joining causes chromosome deletions and rearrangements and promotes the survival of breast and ovarian cancer cells. Current research in the lab has reconstituted the process of alt-EJ in vitro and has elucidated how a key protein in this pathway, DNA polymerase theta, generates insertion mutations at DNA repair junctions. The goal of the project is to analyze and annotate the sequences of insertion mutations generated by polymerase theta during alt-EJ in vitro. This research will provide important insight into how polymerase theta functions during alt-EJ and	Intelligent, hard-working, independent, passionate about science and research. - General Biology, perhaps Chemistry -- Successful summer research is likely to be published in peer reviewed journals.	Biochemistry, Biology, or Chemistry	40 hours /week
Laurie Kilpatrick, PhD	laurie.kilpatrick@temple.edu	TUSM	Lung Center/Physiology	TU Health Science Campus	Regulation of neutrophil-endothelial interactions in bacterial sepsis	Dr. Kilpatrick's research focuses on investigating molecular mechanisms regulating pro-inflammatory signaling in the innate immune system; particularly the role of activated leukocytes in the development of lung injury. An important focus of her work is examining the regulation of leukocyte migration into the lung. Using both in vitro and in vivo approaches, she is examining signaling pathways which regulate	Some previous lab experience, highly motivated with an interest in research	Biochemistry, Chemistry, Biology	TBD
Brad Rothberg	rothberg@temple.edu	TUSM	Medical Genetics and Molecular Biochemistry	TU Health Science Campus	Crystal structures of potassium channel proteins	Potassium channels are membrane proteins that are critical for electrical signaling in nerve and muscle cells. Our research is focused on crystallizing potassium channel proteins and their regulatory domains, with the goal of solving the structures of these proteins using X-ray diffraction. Note: This is expected to be a training experience, so previous experience in X-ray crystallography is not required.	Most important criterion is a strong interest in protein structure and/or neuroscience. Previous laboratory experience is preferred, but NOT	Biology; Biochemistry; Chemistry; Neuroscience	10 to 15

Science Technology Summer Research Projects

Faculty Name	Email Address	Faculty College	Faculty Department	Project Location	Project title	Project Description - the general area of research involved in this project.	Important selection criteria	Student Majors	Hours Per Week
Brad Rothberg	rothberg@temple.edu	TUSM	Medical Genetics and Molecular Biochemistry	TU Health Science Campus	Crystallization of potassium channel proteins	New Project Description: Normal function of nerve and muscle cells depends critically on potassium channels, and abnormal functioning of potassium channels can lead to epilepsy and other disorders. We have crystallized these proteins and solved their structures using X-ray diffraction, we are now focused on determining structures of these proteins bound with agonists and modulators of channel activity, to	Most important selection criteria are good organizational skills and interest in learning about protein structure.	Biology, Biochemistry, or Neuroscience majors are preferred.	30-35 hrs per week.
Parkson Chong	pchong02@temple.edu	TUSM	Medical Genetics and Molecular Biochemistry	TU Health Science Campus	Novel Membranes for Targeted Drug Delivery/Controlled Release and Other Technological Applications Such As Artificial Photosynthesis	Project 1: Archaeal bipolar tetraether liposomes (BTL) are remarkably stable and robust biomaterials, holding great promise for technological applications. They can be used as targeted carriers, slow-release drug carriers, biosensors, microbubbles for imaging and diagnosis, sterilized storage devices, and coating materials. The goals of this research are: (1) to gain a deeper molecular understanding of the structure-activity relationship of BTL liposomes in order to improve their usage as biomaterials and explore their possible new applications, and (2) to design and	having passion in science and technology; eager to learn new things; willing to devote a significant amount of time to the lab work; - general chemistry--required; advanced courses, including but not limited to	Chemistry, Biology, Physics, Bioengineering	25-30 hours per week
Bettina Buttaro	bbuttaro@temple.edu	TUSM	Microbiology and Immunology	TU Health Science Campus	Enterococcal pheromone inducible conjugative plasmids as virulence factors and disseminators of antibiotic resistance genes	Pheromone inducible conjugative plasmids, such as pCF10, play a central role in the ability of Enterococcal faecalis to cause disease. They encode antibiotic resistance and virulence genes in addition to mediating transfer of chromosomal determinants between strains. These plasmids also contribute to the ability of the bacteria to cause disease and to spread antibiotic resistance genes to other species and genera of bacteria. The goal of the chemistry/biochemisty projects is to characterize the	desire to learn to design and perform experiments independently under guidance --Students are given a scientific question to answer experimentally. They will be mentored in designing their	chemistry/ biochemistry and biology	It can vary - generally the 300 hrs should be compl

Science Technology Summer Research Projects

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Stefania Gallucci	gallucci@temple.edu	TUSM	Microbiology-Immunology	TU Health Science Campus	Regulation of Type I Interferons in Autoimmunity	The project includes studies of cellular immunology and molecular biology of signal transduction of cytokines involved in the pathogenesis of an autoimmune disease, Systemic Lupus Erythematosus. The goal of the project is to test novel biologics to be used in the therapy of autoimmune diseases.	Strong motivation to learn and hard working.	Biology_Premed	at least 40
Bassel E Sawaya	sawaya@temple.edu	TUSM	Neurology /Fels Institute	TU Health Science Campus	Can HIV-1 proteins promote premature brain aging	Patients infected with HIV-1 suffer from learning and memory deficit. The mechanisms leading to these alterations remain unknown. We are in the process of deciphering these mechanisms	Ask, Learn, Enjoy,	All	15hrs /week
Prasun Datta	dattapk@temple.edu	TUSM	Neuroscience	Medical Education and Research Building, Health Science campus	Macrophage Glucose Metabolism and Cocaine	The goals of this project are to dissect the mechanisms by which HIV-1 modulates host metabolism and bioenergetics for survival and replication in macrophages and microglia, and the impact of chronic cocaine.	Experience in cell culture, routine molecular biology techniques	Biology, Neuroscience, Biochemistry	20
Prasun K. Datta	dattapk@temple.edu	TUSM	Neuroscience	TU Health Science Campus	Regulation of glutamate transporter EAAT2 in the context of NeuroAIDS	Research focuses on determining the role of HIV-1, cytokines and drugs of abuse in the regulation of glutamate transporter expression in astrocytes, microglia and macrophages. If significant progress is made by the student then he/she will be allowed to submit an abstract to a national meeting or submit a manuscript for publication as a contributing author.	Selection criteria are good organizational skills, interest in learning and hardworking. Prefer prior experience in research	Prefer to have students with neuroscience, biochemistry or	At least 30 hrs per week

Science Technology Summer Research Projects

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Xuebin Qin	xuebin.qin@temple.edu	TUSM	Neuroscience	TU Health Science Campus	Applying a novel cell knockout model for CNS diseases	Conditional and targeted cell ablation is fast becoming a powerful approach for studying cellular functions and tissue regeneration in vivo. Taking advantage of the exclusive IL Y interaction with hCD59, I have developed a novel tool to investigate the role of specific cells in the pathogenesis of human diseases. IL Y administration to the transgenic mice expressing hCD59 in specific cells can be used to generate this cell	Working hard - Genetics Cell biology	Genetics or molecular biology	300 hours over the summer
Wenzhe Ho	wenzheho@temple.edu	TUSM	Pathology and Laboratory Medicine	TU Health Science Campus	Exoosme in Methamphetamine and HIV-associated Neurodegeneration	The proposed studies will reveal previous unidentified mechanisms by which METH and/or HIV compromise the BBB innate immunity, providing a favorable micro-environment for HIV neuroinvasion.	Prefer to have students with biology major, having a great interest in research (with or without experience, although research experience	Biology, Neuroscience	320 hours
Fabio A. Recchia	fabio.recchia@temple.edu	TUSM	Physiology	TU Health Science Campus	New pharmacological and biological therapies for heart failure and atrial fibrillation	The general aim of this project is to identify new pharmacological and biological agents for the therapy of heart failure and atrial fibrillation in experimental dog models. These are two major pathological conditions that affect millions of Americans and there is a pressing need for new therapies. Research in large animal models is called "pre-clinical" in that the related discoveries can be rapidly translated into	Interest in the biomedical field and potential interest in future medical studies. At least the basic courses of biology	biology, bioenginee ring, biochemist ry, kinesiology	25 hours /week
George Smith	george.smith@temple.edu	TUSM	Shriners Pediatric Research/ Neuroscience	TU Health Science Campus	Transplantation of neural stem cells to promote circuit relays in the injured spinal cord.	The prospects of inducing long-distance functional regeneration of supraspinal tracts leading to connectivity and restoration of function remain a challenge. However, selective treatments induce sprouting, prevent dieback, or induce short distance regeneration. These processes, particularly sprouting, contribute to spontaneous recovery after injury by forming relays onto propriospinal interneurons that	Basic understanding of stem cells, immunochemistry, and molecular biology	Neuroscience, Biology, or Chemistry	10 - 15

Science Technology Summer Research Projects

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Michael Shifman	mshifman@temple.edu	TUSM	Shriners Pediatric Research Center	TU Health Science Campus	Epigenetics regulation of axonal regeneration	The goal of this research is to use the advantages of the lamprey CNS to test the hypothesis that “good regenerating” RS neurons have higher levels of histone acetylation, favoring activation of a regeneration program, whereas histone deacetylation contributes to regeneration failure after SCI.	self-starter, good general laboratory skills	Neuroscience	30
Shuxin Li	shuxin.li@temple.edu	TUSM	Shriners Pediatric Research Center	TU Health Science Campus	Neural repair and CNS neuronal regeneration	Our lab is highly interested in neural repair and CNS axon regeneration research. Our projects focus on the molecular/cellular mechanisms for CNS neuronal growth failure and development of novel and effective strategies to promote neuronal regeneration, remyelination and functional recovery after injury and/or in neurodegenerative disorders. We employ various in vitro and in vivo research approaches,	Motivated person and basic background on research.		
Seo-Hee Cho	seo.hee.cho@temple.edu	TUSM	Shriners Pediatric Research Center	TU Health Science Campus	Examining the effects of Yap WT and Yap mutant genes overexpression in the developing retina using AAV (Adeno-associated virus) vectors.	This project consists of three parts. First, construction of AAV-Yap (WT), AAV-YapS1A and AAV-YapS1D via recombinant DNA technology. Second, expression of Yap, WT and mutant, genes in the neonatal retina by electroporation or viral injection. Lastly, characterization of resulting retinas with various analysis tools including immunofluorescennce assay followed by microscopic imaging.		Biology	20 to 30
Yang Hu	yanghu@temple.edu	TUSM	Shriners Pediatric Research Center	TU Health Science Campus	Neuroprotection by ER stress manipulation	We are explore the therapeutic potential of ER stress modulation on neuronal soma and axon survival. The students will learn some basic bench skills, for example genotyping transgenic mouse lines using PCR and immunostaining of mouse tissues. Also the students are expected to be involved in quantification of surviving neurons and axons.		Neuroscience	20 to 30

Class Preference
Freshman or sophomore
Sophmore

Class Preference
Freshman or sophomore
Any

Class Preference
Sophomores and Juniors are encouraged to apply.
Juniors and seniors

Class Preference
All levels
Freshman

Class Preference
juniors preferred
Senior

Class Preference

Class Preference
Sophomore, Juniors, Seniors
sophormore or higher

Class Preference
No preference
Juniors or Seniors

Class Preference
Juniors or Seniors
Juniors or Seniors
Juniors or Seniors

Class Preference
Seniors
Junior
Junior
seniors

Class Preference
Freshman to Seniors
Juniors or Seniors
Juniors or Sophomore

Class Preference
Sophomores and Juniors

Class Preference
Junior

Class Preference
Juniors or Seniors
Juniors or Seniors

Class Preference

Class Preference
Senior

Class Preference
Juniors or Seniors

Class Preference
Sophomore
Seniors