Tufts Research Experience
2019-2020 Lab Placements (Fall, Spring, Summer)

Last updated: 7/1/2019

The Tufts Research Experience and the Tufts Summer Research Experience offered through the Tufts Pre-College Programs and University College has opened research lab placements to highly qualified high school juniors and seniors (ages 16+) with distinguished scholars, scientists, and clinicians in a wide array of disciplines across the university.

Current lab placements include faculty in the departments of Anthropology, Child Study and Human Development, and Physics in the School of Arts and Sciences, Biomedical Engineering and Mechanical Engineering in the School of Engineering, the School of Dental Medicine, the School of Medicine, the Sackler School of Graduate Biomedical Sciences, and the Cummings School of Veterinary Medicine. Lab placements include opportunities in the Fall 2019, Spring 2020, and Summer 2020 terms, and at the Medford/Somerville, Boston, and Grafton campuses of Tufts University.

Please see the links above for program details. Here are some important notes for you:

- Additional lab openings will be listed as they become available and labs will be marked as ‘closed’ as soon as possible when slots are no longer available
- Students must be juniors / seniors and 16 years or older at the time of the program to apply
- This is a commuter program
  - Please carefully check the location of the lab to which you are applying
  - You are responsible for getting yourself or your child to / from the lab during the program
  - We do not offer on-campus housing, transportation, meals, etc. as a part of this program
- Admissions to this program are competitive and rolling
  - During the admissions process, you will be permitted to select up to three lab preferences
  - After you are accepted, we will process your lab selections on a first-come, first-served basis
  - If your three lab preferences are no longer available when you are admitted, we may reach out to you to discuss other options (if they are available)
  - You will have a limited amount of time to accept your offer of admission and deposit before your spot is given to another student

Our staff are available for questions and advice in selecting lab preferences. Please contact us at courses@tufts.edu.
Anthropology: Kibale Chimpanzee Project
Faculty: Zarin Machanda
Lab Placements: Fall 2019 and Spring 2020
The Kibale Chimpanzee Project, established in 1987, is a long-term field study of the behavior, ecology, and physiology of wild chimpanzees. Our researchers and field staff conduct daily behavioral observations on a group of approximately 60 chimpanzees in the Kanyawara region of the Kibale National Park, Uganda. We also conduct non-invasive urine sampling for hormonal analysis, fecal sampling for genetic studies and photographic data for studies of growth. The KCP archive is located at Tufts University and projects in the lab involve archiving, coding and analyzing this data. This research contributes to our understanding of primate behavioral diversity, human evolutionary ecology, and chimpanzee conservation.

Child Study and Human Development: DevTech Coding and Robotics in Early Childhood
Faculty: Marina Bers
Lab Placements: Fall 2019, Spring 2020, and Summer 2020
The Developmental Technologies Research Group aims to understand how new technologies that engage in coding, robotics and making, can play a positive role in children’s development and learning. Their research involves three dimensions: theoretical contributions, design of new technologies, and empirical work to test and evaluate the theory and the technologies. Their long-time commitment is to inspire sustainable and scalable evidence-based programs for young children that promote the learning of programming and computational thinking with a playful, developmentally appropriate approach.

Physics and Astronomy: The Energy Frontier Research Lab
Faculty: Hugo Beauchemin
Lab Placements: Fall 2019 and Spring 2020
The Energy Frontier research lab at Tufts aim at using data collected with the Large Hadron Collider at CERN, the largest particle accelerator ever built, to probe fundamental questions about nature. Beauchemin’s group has focused on measurements aiming at various goals such as understanding the structure of the strong nuclear interaction, searching for elusive dark matter particle, or studying the fundamental structure of space-time. The group is also involved in more phenomenological studies where Monte Carlo simulations are used to identify what are the promising area for potential discoveries in the field.
School of Engineering
Medford/Somerville Campus

**Biomedical Engineering: Regenerative Medicine**
*Faculty: David Kaplan*
*Lab Placements: Fall 2019*

The Kaplan Lab focuses on biopolymer engineering to understand structure-function relationships, with emphasis on studies related to self-assembly, biomaterials engineering, tissue engineering and regenerative medicine. The studies include a variety of structural proteins, including collagens, elastins, resilins and silks. The lab has pioneered the study of silk-based biomaterials in regenerative medicine, starting from fundamental studies of the biochemistry, molecular biology, and biophysical features to the impact on stem cell functions and complex tissue formation.

**Biomedical Engineering: Materials at the Interface between Technology and Life Sciences**
*Faculty: Fiorenzo Omenetto*
*Lab Placements: Fall 2019*

Structural proteins are Nature’s building blocks, conferring stiffness, structure, and function to ordinarily soft biological materials. Such proteins are polymorphic which allows controlling the end material format through their self-assembly. These biomaterials provide a unique opportunity by being simultaneously “technological” and “biological” making them ideally suited for applications at the interface between these two domains. The Silk Lab’s goal is to provide innovation for new advanced material processing and manufacturing based on sustainable carbon-neutral technologies, and imagine a new class of applications for living materials that operate seamlessly at the interface between the biological and the technological worlds.

**Mechanical Engineering: Educational Robotics**
*Faculty: Chris Rogers*
*Lab Placements: Fall 2019 and Spring 2020*

The Rogers lab works on researching how the brain learns engineering and then try to apply that learning into developing educational robot kits. The lab also works with LEGO Education to develop new ways of teaching engineering with these kits, including new sensors and actuators as well as ideas around cloud-based intelligence (IoT), cameras, and AR.
Health Sciences (Medicine and Dental Medicine)

Boston Campus

**Tissue Development, Disease and Regeneration**
*Faculty: Pamela C. Yelick*
*Lab Placements: Fall 2019, Spring 2019, and Summer 2020*

The focus of the Yelick Lab research is study of mineralized tissue development, disease and regeneration. We use zebrafish as genetic models for human mineralized craniofacial and skeletal tissue diseases, and Tissue Engineering approaches to regenerate craniofacial bone and dental tissues.

**Dry Mouth and Dry Eye Research Lab**
*Faculty: Driss Zoukhri*
*Lab Placements: Fall 2019, Spring 2019, and Summer 2020*

The research in the Zoukhri lab aims to investigate the impact of chronic inflammation on lacrimal and salivary gland myoepithelial cells functions that lead to symptoms of dry eye and dry mouth. A variety of cellular and molecular techniques, such as tissue culture, PCR, immunostaining, Flow cytometry, Western blotting and live cell imaging are employed to perform these studies.

**Pulmonary Division Research Laboratory**
*Faculty: Krishna Penumatsa*
*Lab Placements: Fall 2019, Spring 2019, and Summer 2020*

The research group studies the signaling mechanisms of lung and cardiac remodeling that lead to increased tissue stiffness in pulmonary hypertension and heart failure diseases. The lab uses in vitro and in vivo experimental models to test novel genetic approaches and small molecule inhibitors. Their long-term research goal is to develop and characterize new molecular target systems for early detection and treatment of pulmonary hypertension.

**Molecular Biology and Microbiology**
*Faculty: Marta Gaglia*
*Lab Placements: Fall 2019, Spring 2019, and Summer 2020*

The reprogramming of host gene expression is an aspect of the interaction between viruses and infected cells that can be crucial for the success of the viral infection. We are interested in uncovering mechanisms viruses use to control host gene expression through the exploitation of cellular pathways. We use a combination of high-throughput transcriptional analysis and classical approaches to tackle these questions.
The Mueller lab is integrated with the Tufts Institute for Human-Animal Interaction and the Center for Animals and Public Policy, and focuses on studying the psychological aspects of human-animal interactions. Our research includes assessing the health effects of pet ownership, the effectiveness of animal-assisted interventions, and the use of animal-based science and engineering educational programs.