

OVERVIEW

Summer 2021 Lab Offerings

Tufts Summer Research Experience (TSRE)

Last updated: 2/23/2021

The [Tufts Summer Research Experience](#) offered through [Tufts Pre-College Programs](#) and [University College](#) will be offered virtually for Summer 2021! Placements in labs are open for highly-qualified high school juniors and seniors (ages 16+) to learn from distinguished scholars, scientists, and clinicians in a wide array of disciplines across the university.

Current lab placements include faculty in the departments of Chemistry, Child Study and Human Development, and Psychology in the School of Arts and Sciences; the department of Urban and Environmental Policy and Planning in the Graduate School of Arts and Sciences; the Center for Engineering Research and Outreach and Mechanical Engineering in the School of Engineering, the Cummings School of Veterinary Medicine, the Graduate School of Biomedical Sciences, and Tufts University School of Medicine.

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 'filled' as soon as possible when slots are no longer available.
- Any lab that is listed as 'unavailable' are labs that are currently not planning on making a conversion to virtual research this summer.
- Students must be juniors/seniors and 16 years or older at the time of the program to apply.
- Admission to this program is 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 precollege@tufts.edu.

TSRE Summer 2021 Research Experiences

School of Arts and Sciences

Chemistry: [Thomas Research Lab - Functional Organic Materials](#)

Faculty: Professor [Sam Thomas](#)

We understand how chemical structure of organic molecules and materials influences functional properties. Application areas include organic electronics, triggered delivery of therapeutics, and chemical analysis. Summer lab student responsibilities will include literature reading and research, along with working with a lab mentor to learn advanced techniques in advanced lab techniques and methods, such as: chemical synthesis, analytical measurements with advanced instrumentation, experiment planning, data analysis, oral communication.

Applicants to this lab would benefit from previous chemistry knowledge from an advanced Honors or AP Chemistry course. Applicants will also be required to complete an Annual Lab Safety Training, as well as the Tufts Chemistry Department Lab Safety Training prior to program start.

Psychology: [Tufts University Social Cognition Lab](#)

Faculty: Professor [Keith Maddox](#)

The Maddox lab conducts social psychological experiments to explore ways to better understand elements of interracial perception and judgment. Research topics include using emotion regulation and humor to minimize interracial anxiety, exploring methods to encourage and empower efforts to confront expressions of racial bias, and exploring how within-race variation in facial characteristics can affect social judgments. During the summer, students perform various activities to support past and future data collection. These include psychological literature reviews, development of experimental stimulus materials, IRB proposal preparation and revision, data coding and preliminary analyses, project pre-registration, and experiment survey design using Qualtrics or other relevant software. Occasionally, students can be involved in recruitment and data collection for virtual studies. These activities will be coordinated through meetings with the PI and smaller student research team meetings (in person or via Zoom) and supported using collaboration software (e.g., Canvas, Open Science Framework, Slack).

Applicants interested in conducting research with the Maddox Lab will need to have access to the Microsoft Office suite.

Urban and Environmental Policy and Planning: [Affordable Housing](#)

Faculty: Professor [Shomon Shamsuddin](#)

The lack of affordable housing can produce instability for families and neighborhoods, and create barriers to employment and educational opportunities. Critics argue that public housing concentrates poverty so recent U.S. housing policy has pursued strategies to create mixed-income communities. However, relatively little work has evaluated the effects of this policy on former residents. Professor Shamsuuddin's research seeks to understand how public housing residents perceive the redevelopment of their homes.

Research in our lab involves researching housing policy. Students will search for literature on federal, state, and local housing policies and programs, organize their findings, and write up summaries. In addition, students may be involved in collecting housing data using publicly available databases on the internet, conducting virtual surveys of residents, or analyzing housing data using basic computer software.

Applicants would benefit from: attention to detail; a basic knowledge of Excel and statistical software; and CITI training. Applicants should also have access to the Microsoft Office suite; access to STATA will be provided for the duration of the program.

School of Engineering

Center for Engineering Research and Outreach: [Engineering Education](#)

Faculty: Professor [Jennifer Cross](#)

The lab investigates how to improve engineering education and computer science education for teachers and students, primarily at K-12 (pre-college) levels. We explore all aspects of education, from how teachers are taught to bring engineering activities into their classrooms, to what activities students do in the classroom, to what technologies can be used to make engineering education better for everyone. We are looking for students to help us conduct education research (specifically engineering education). We aim to discover more about how students and teachers learn and do engineering and how we can make improvements. Students may be involved in engineering education research at different stages, this could include helping to design surveys, collecting and organizing research data, observing videos of classrooms, and analyzing data by taking notes or interpreting interview data to evaluate hypotheses. Students will be encouraged to think of small independent research questions to investigate as part of our larger projects.

Applicants to this lab would benefit from a previous knowledge or background in statistics, along with background in the Microsoft Office suite, specifically Excel. Applicants should also own a laptop for research, and also be comfortable having conversations with teachers and students, as well as interpreting recorded classroom conversations. Applicants accepted to this lab will also complete appropriate training at program start.



UNIVERSITY COLLEGE

Pre-College Program

Engineering: [Child-Human Interaction](#)

Faculty: Professor [Chris Rogers](#)

The Rogers Lab looks at developing educational toys / software / tools to help teach robotics and engineering concepts to K-12 students. While we do not know yet what the projects will be for this summer, students last summer built LEGO robot clones in CAD and had the real and virtual communicate, built cameras that worked with the LEGO set, used AR to program the robots, built AI systems for robot control, and designed new (better) webpages for building virtual communities and they designed numerous activities for the K-12 classroom.

Applicants to this lab would benefit from: curiosity, patience, persistence, resilience, and a love for making things. Applicants should have access to their own computer for this research. Applicants accepted to the Rogers Lab will also complete shop training at program start.

Labs Filled for Summer 2021

School of Arts and Sciences

Anthropology: [Kibale Chimpanzee Project](#)

Faculty: Professor [Zarin Machanda](#)

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 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 psychology, and chimpanzee conservation. Projects for the summer of 2021 include analyzing a photographic dataset to assess growth trajectories of wild chimpanzees, extracting long-term data on tool use to understand if some chimpanzees have innovative personalities, and analyzing how particular aspects of social behavior change as individuals enter old age.

Applicants to this lab would benefit from: being extremely detail-oriented and having some familiarity with using spreadsheet software (e.g. Excel or Google Sheets), and should have access to the Microsoft Office suite.



UNIVERSITY COLLEGE

Pre-College Program

Cummings School of Veterinary Medicine at Tufts University

Infectious Diseases and Global Health: [Discovery Pathology for Infectious Research](#)

Faculty: Professor [Amanda Martinot](#)

The Martinot Lab works on mycobacterial genetics and virulence factors. We are interested in tuberculosis host-pathogen interaction and the development of novel whole cell tuberculosis vaccines, using murine and non-human primate models of human disease. We also focus on comparative pathology (HIV/SIV, Zikavirus, TB, COVID-19). Students will be integrated in the current research projects of the lab, which will involve image analysis of digital histology and immunohistochemistry slides using Aperioscope (open source) software for image analysis and HALO (remote access) to analyze tissue specimens obtained from experimental animal models of tuberculosis infection or COVID-19.

Applicants interested in conducting research with the Martinot Lab will need a computer to access provided software.

Tufts University School of Medicine

Pulmonary Division Research Laboratory: [Cardiovascular Remodeling in Pulmonary Hypertension](#)

Faculty: [Dr. Krishna Penumatsa](#)

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. As part of the virtual lab experience the students will learn scientific skills including hypothesis testing, experimental methods, statistical analyses, manuscript preparation and grant writing.

Applicants interested in conducting research with the Penumatsa Lab will need access to the Microsoft Office suite, and a PDF reader software for research.

Friedman School of Nutrition Science and Policy

Biomedical and Nutrition Sciences: [International Dietary Data Expansion \(INDDEX\) Project](#)

Faculty: Professor [Jennifer Coates](#)

The focus of our International Dietary Data Expansion Project is to develop tools, resources, and databases needed for low and middle-income countries to collect and use dietary data to



UNIVERSITY COLLEGE

Pre-College Program

inform a wide range of agriculture, nutrition, food security, and environmental policies. Activities could include helping to amass data for a database of foods consumed around the world, helping to develop training materials to train low and middle-income country counterparts in the use of digital dietary assessment tools, engaging in the project's social media strategy, and potentially contributing to the development of grants to support the expansion of the project's long-term goals.

Applicants interested in conducting research with the INDDEX Project should be detail-oriented and organized, with experience in the Microsoft Office Suite and preparing professional communications. Familiarity with global food security and diet quality challenges is a plus.

Biomedical and Nutrition Sciences: [Mozaffarian Research Lab](#)

Faculty: Dean [Dariush Mozaffarian](#)

Dean Dariush Mozaffarian's research focuses on dietary priorities for obesity, diabetes, and cardiovascular diseases, and on evidence-based policy approaches to reduce these burdens in the US and globally. Projects continue exploring key dietary and metabolic fatty acids, other nutrients, foods and dietary patterns and incident cardiometabolic diseases, mortality, and healthy aging. There are data checking and analyses needed for both the Global Dietary Database and Food-Price projects that students can contribute to. Mentorship will be provided through the weekly Mozaffarian Research Lab meetings that take place, the project specific meetings that are held, as well as regular 1:1s, all of which take place via videoconference.

Applicants interested in conducting research with the Mozaffarian Lab will be provided with access to STATA and Zoom for the duration of the program, along with appropriate training.