**SPIRE Undergraduate Summer Research Program**

**Summer 2021**

***Due to the COVID-19 pandemic, this program is tentative and dependent upon UNC Chapel Hill policies for acceptance of undergraduate students into research labs for summer 2021.***

**Program Description**

The goals of the program are to provide undergraduate students the opportunity to participate in innovative research at UNC Chapel Hill, develop professional skills as a scientist, and contribute to a scholarly community. Research opportunities exist in areas such as molecular biology, cell biology, chemistry, genetics, cancer research, marine biology, and microbiology. The program will run from **May 23 – July 28, 2021** and includes required professional development seminars, journal clubs, and social events throughout the summer in conjunction with other summer research programs. Research mentors for the program will be current SPIRE postdoctoral scholar. ***See the end of this application form for a list of potential mentors.***

**Eligibility**

Research internships are awarded on a competitive basis to students who meet the following requirements:

1) Enrolled full-time at one of the following institutions: Johnson C. Smith University, North Carolina A&T State University, North Carolina Central University, UNC Pembroke

2) Current sophomore, junior, or senior majoring in a biological, biomedical or chemical science

3) A minimum grade-point average of 3.0

Previous research experience is not required. Underrepresented students are strongly encouraged to apply.

Students must be able to participate in the entire program (see dates above) including weekly professional development seminars, lab meetings, and poster session at the end of the summer.

 $5000 stipend and on-campus housing accommodations will be provided.

**How to apply -** All materials MUST be RECEIVED on or before **February 28, 2021** for consideration.

1) **Submit completed application and personal statement** (subsequent pages of this document)– submitted by student applicant directly to Dr. Rybarczyk (brybar@unc.edu)

2) **Transcripts:** Request your institution to submit a copy of your transcript directly to Dr. Rybarczyk (brybar@unc.edu). Preference is given to students with a **GPA of 3.0 or above. Unofficial transcripts are also acceptable for students to submit with their application materials.**

3) **Two Letters of Recommendation** Request a science faculty instructor, an internship advisor, or other relevant individuals to send us a letter commenting on your motivation and potential for scientific research, academic abilities, motivation, focus, work ethic, and interest in a research career. Faculty must submit letters directly to Dr. Rybarczyk **(email to** **brybar@unc.edu****).**

This program is supported by a grant from the National Institutes of Health (NIH), National Institute of General Medical Sciences (NIGMS), Training, Diversity, and Workforce Development Division and funding from various administrative offices at UNC Chapel Hill.

**SPIRE Undergraduate Summer Research Program 2021**

**Application Form & Instructions**

**Deadline for Receiving ALL Application and Supporting Materials: February 28, 2021**

**PERSONAL INFORMATION**

**Name:**

**Female** 🞏**Male** 🞏(important for housing/roommate matches)

**Date of Birth:**

**Current Address:**

**(Number, Street, City, State)**

**Permanent Address:**

**(Number, Street, City, State)**

**Telephone:**

**E-mail address:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**DEMOGRAPHIC INFORMATION**

What race(s) do you consider yourself to be (check all that apply) OPTIONAL

🞏**American Indian or Alaskan Native:** A person having origins in any of the original peoples of North,

Central, and South America, and who maintains tribal affiliation or community attachment.

🞏**Asian:** A person having origins in any of the original peoples of the Far East, Southeast Asia, of the

Indian Subcontinent, including Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, The Philippine

Islands, Thailand, and Vietnam.

🞏**Black or African American:** A person having origins in any of the black racial groups of Africa.

🞏**Hispanic** or **Latino:** A person having origins from Mexico, Puerto Rico, Cuba, Central or South America

or other Spanish culture or origin.

🞏**Native Hawaiian or Other Pacific Islander:** A person having origins in any of the original peoples of

Hawaii, Guam Samoa, Micronesia, the Northern Marianas, or other Pacific islands.

🞏**White:** A person having origins in any of the original peoples of Europe, North Africa, or the Middle East.

🞏**Other**

(Pleasespecify)**:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

🞏 **Decline to Indicate.**

**EDUCATION**

**College/University:**

**Year in School:**

**Expected Graduation Date:**

**Major field of Study:**

**Minor:**

**Overall GPA:**

**Science GPA:**

Are you a first-generation college student? 🞏Yes 🞏No

**Are you affiliated with any of these programs at your home institution?**

🞏**MARC** 🞏**MBRS** 🞏**McNAIR** 🞏**HHMI** 🞏**RISE**

🞏**OTHER\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**The SPIRE program will provide housing for the summer and stipend if not already provided by your home institution.**

**Please provide the contact name and information of the program director:**

Name:

Address:

Email:

Phone:

Have you participated in any summer research program(s) previously?\_\_\_\_\_\_ If so, list program(s)

Are you applying to other programs this summer? Yes 🞏 No 🞏

If yes, please list program name(s)/location:

If you are accepted into this program, would you require on-campus housing? Yes 🞏 No 🞏

**RESEARCH EXPERIENCE**

Please describe any research experience you may have. Include projects you have done for your

science courses (200 words max).

**IN WHAT AREAS OF STUDY ARE YOU MOST INTERESTED? (Choose up to 3)**

\_\_\_Biochemistry and Structural Biology \_\_\_Cell Biology and Genetics

\_\_\_ Bioinformatics and Genomics \_\_\_ Cancer Biology

\_\_\_Immunology \_\_\_Molecular Biology

\_\_\_Neuroscience \_\_\_Pharmacology

\_\_\_Physiology \_\_\_ Developmental Biology

\_\_\_ Other:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Personal Statement (750 Words Max):**

Please state why you want to participate in this summer research program, describe your short- and long-term career goals and how this program will help you reach your goals. Also include the names of the researchers you would like to work with as your research mentor (see below).

**Please rank your preferences for possible research mentor matches (rank 1st 2nd and 3rd preference) from list below and provide justification for your choices.**

**Research Mentors and Project Descriptions**

**Whitney Edwards, Ph.D.**

**Nikea Pittman, Ph.D. (in the lab of Saskia Neher, Ph.D. Department of Biochemistry and Biophysics) -** Lipoprotein lipase (LPL) breaks down fats so that they can be cleared from the blood. When genetic mutations occur that inactivate LPL, people develop a severe disease known as hypertriglyceridemia. It turns out that LPL is a very high-maintenance protein. In fact, it needs special assistance from another protein called Lipase Maturation Factor 1 (LMF1). For these reasons, LMF1 is also of great interest to our lab. We want to understand the structure of LMF1 in order to answer questions about its function. However, determining the three-dimensional structure of LMF1 has proven to be very challenging. This leads us to consider studying similar proteins in order to better understand LMF1. One of these related proteins is RclC, which is produced by bacteria to evade the host immune response or to help the bacteria develop resistance to antibiotics. Although the roles of these two proteins are very different, our work suggests that LMF1 and RclC may participate in some of the same activities within the cell. Furthermore, we hypothesize that they share similar structural features. We are interested in finding undergraduate students to help investigate RclC and its related proteins by pursuing a research project that incorporates biochemistry, microbiology, and molecular biology concepts.

**Amy Pomeroy, Ph.D. (in the lab of Adam Palmer, Ph.D. Pharmacology)** – Projects involve a variety of computational biological techniques related to studies of curative combination therapies used to treat non-Hodgkin lymphomas and targeted therapies used to treat rare cancers. Mentees will have the opportunity to learn and apply the following skills to research questions: (1) reading and digitizing clinical trial results, (2) analyzing the results of real and simulated clinical trials, and (3) developing and running computational models of clinical trials. Mentees’ individual projects will be personalized based on their own skills and interests. Previous coding experience is preferred but not required.

**Kate Reissner, Ph.D.** (Psychology and Neuroscience) - Research in the Reissner lab is focused on understanding how cocaine affects astrocyte structure and function, and how this in turn affects addiction-related behaviors. Astrocytes are non-neuronal cells in the brain that play important roles in modulating neuronal activity and nervous system function. We approach this using the rat self-administration model of cocaine abuse. Rats are able to control intravenous administration of cocaine, thus allowing for investigation of the cellular mechanisms which drive drug craving and use. This behavioral approach is combined with high resolution microscopy, slice electrophysiology, and pharmacology to investigate the role of astrocytes in the development of substance use disorders.