The WFIRM Annual Undergraduate Summer Scholars Program
Introducing the 2021 Summer Scholars

Offering undergraduate students opportunities to engage in impactful, multidisciplinary regenerative medicine research at the Wake Forest Institute for Regenerative Medicine, at the interface of engineering and biology.

Summer 2020 Program Canceled: After carefully considering all options, the escalation of COVID-19 worldwide has led to the decision to cancel WFIRM’s annual Summer Scholar Program. However, students selected for the 2020 program have been offered the opportunity to instead join during the summer 2021. All of the 17 selected scholars have expressed strong interest and commitment to joining during summer 2021. Learn more about these inspiring and committed students via their profiles below! Here’s to an exceptional 2021 program.

Jacqueline Dizon
University of Connecticut

I am a rising junior at the University of Connecticut, studying Molecular and Cell Biology with a minor in Nutrition for Exercise and Sport. Ever since I was a young girl, I have always been enthralled with science and medicine. As I progressed through high school, I fell in love with biology and learning about the fundamental units of life. This passion has stayed consistent through my academic journey and is what continues to drive my desire to learn about the field. In the past, I have had the fortune of assisting in an introductory Biology course as a lab mentor. This included answering students’ questions and helping Teaching Assistants run the lab, performing tasks such as Polymerase Chain Reactions (PCR) and Gel Electrophoresis. Currently, I am working as an undergraduate research assistant, studying oxidative stress and mitochondrial dysfunction observed in skeletal muscles and how it relates to aging.

During summer 2021 at WFIRM, I hope to learn from brilliant mentors and meet the other summer scholars, gaining a network of likeminded, equally motivated peers. I am interested in regenerative medicine because it is so different from other medical fields, in a way that closely parallels science fiction. I am fascinated by the ability to fabricate organs and manipulate tissues and stimulate growth and regeneration in the human body. While the established discoveries and procedures are mind-blowing, many questions have yet to be answered. The endless room for discovery is what drives my excitement towards participation in the WFIRM program. I hope to gain deeper insight into the research field research and the monumental breakthroughs regenerative medicine will future patients’ lives.

My main goal has always been to attend medical school. However, as I progress through my education I have become more fascinated with working in research and now plan to pursue an MD-PhD, in which I will be granted the ability to work as both an anesthesiologist and researcher.
Hi—it’s great to meet you! I’m Ananya, a rising sophomore at UCLA majoring in human biology and society. Outside of my pre-med life, I greatly enjoy exploring the city, really analyzing popular artists, and taking photos.

Growing up with Indian parents deeply invested in health, I grew up with the philosophy that great health directly correlates to a great quality of life, and a great quality of life is something everyone deserves to experience. Yet, I noticed chronic diseases with no lasting cures—diabetes, heart disease, gut diseases, etc.—growing increasingly common household names; a majority of people, including myself, either struggled with one or knew someone who did. So, in a world full of prescription pills and dancing around lasting treatments (especially during this trying time of quarantine), regenerative medicine is what deeply sparked my curiosity to explore these cures and has KEPT it there.

At WFIRM, I am genuinely looking forward to researching regenerative medicine’s promising potential in curing these chronic diseases. In ten years, I envision myself as an MD/PhD who conducts translational/clinical research and implements regenerative medicine-based treatments, cures, and procedures where fit for my patients. Whether it be from reconstructing skin grafts from stem cells to replacing failing organs, I seriously hope to be fortunate enough to contribute to advancing the regenerative medicine forefront and ultimately, honestly and significantly better lives through health—for the long run.

Malcolm Frazier
Elizabeth City State University

My name is Malcolm C. Frazier. I am a 2020 graduate of Elizabeth City State University, bachelors of science: Mechanical Engineering Technology. Ever since I was a young boy, I wanted to be a part of the industry bringing artificial tissues and advanced electromechanical technology into human physiology. My goal is to help advance the field of restorative medicine specifically through innovative cyborgization to repair or totally replace damaged tissues. I hope that during my 2021 summer research at WFIRM and throughout my ongoing education, I am able to gain the necessary skill to integrate robotic technologies into human bodies. The interface between human and computer/machine has yet to be perfected, and I am excited at the prospect to be a part of the development of these technologies and approaches.

In 2003, a close friend of mine was in a terrible car accident that left him confined to a wheelchair and with limited use of his hands. Over the 16 years since his accident, not much has been done to change
and improve his situation. While today’s wheelchairs may have a longer charge time and the wheels are a bit more rugged, it seems like science and technological development has forgotten about him and others in similarly exhausting situations impacting their autonomy and quality of life. Simple things that we all take for granted – like getting out of bed in the middle of the night for a glass of water or stopping by the grocery store to pick up a few things – have not been a reality for him and many others like him in a long time and I get upset thinking that on our current course, maybe it will never be. I am interested in the summer research scholar program at WFIRM because it will provide me a unique opportunity to participate in regenerative medicine research that could really change the lives of many for the better.

With the work that WFIRM has done leading the Armed Forces Institute of Regenerative Medicine as well as the bioprinting breakthroughs, it’s clear that WFIRM is on the forefront of solving problems for people the rest of the world might readily forget. With the diversity of projects going on at WFIRM, I may somehow find that the research being done on tissue replacement aligns with my interest more and I’m open to that possibility. Ultimately, what I hope to accomplish by the end of the summer is a greater diversity of understanding as to where the world of regenerative medicine research stands as a whole. I also hope to make lifelong connections that can help point me further down this path I’m trekking while sparking new ideas in me. I know that as an undergrad, my wheels are spinning at 100 miles an hour and that I need help in directing that energy to put it to best use. I strongly feel that a summer research experience at WFIRM will give me that direction and I hope that I can provide meaningful contribution and perspective to whatever project I’d work on.

The pandemic of COVID19 has caused much tragedy, yet progress has been made on other fronts addressing the rising need for more remote and virtual capabilities. Will surgeons be able to collaborate from all over the world to remote into robots and perform surgeries in virtual operating rooms that translate to actual physical surgery for the patient? Will we be able to give a woman without hands new ones? Will the man without legs be able to walk again, maybe even faster than with the two he was born with? I believe we can achieve all of these through innovative research, a united community, a good amount of hard work, a dash of faith and a splash of child-like imagination.

Ellie Gabriel
Yale University

Hi! My name is Ellie Gabriel, and I am a Biomedical Engineering major at Yale University in New Haven, Connecticut. I was initially inspired by the mystery that is the human brain when my younger brother was diagnosed with autism a decade ago, after which I noticed we saw the world in such different ways. My brother always wakes with a smile despite the daily challenges he faces. I strive to make life easier for him and everyone else on the autism spectrum through technology. Medical devices like cochlear implants can mean the difference between a child hearing his/her environment or being deaf to it. There is so much power and potential in technology waiting to be discovered, and I am on a mission to make it happen. Beginning college, I worked in a behavioral lab, building a rat model of schizophrenia. Then I began (and continue) to work in a clinical psychology lab studying biomarkers of autism primarily through electroencephalography data. Using experimental data from this lab, I submitted a proposal to the International Society for Autism Research (INSAR) 2020 Symposium. I am happy to say that my proposal was accepted, and my poster will be published online! Summer 2020, I will be working full-time remotely for an autism genetics lab at UPENN, primarily coding in R. I will also be doing a separate part-time biomedical illustration project for a separate autism lab at UPENN seeking illustrations for their journal publications.
During my time in the pending WFIRM 2021 Summer Scholar program, I hope to learn the engineering lab skills that will provide a foundation for my future research endeavors. I am very excited to learn about the lab techniques that I read about in Science magazine and discuss with my professors at school. A few decades ago, the term “regenerative medicine” would have been inconceivable. Now, it is our present and our future, and I hope to contribute to the revolutionary work taking place at WFIRM and continue in the science field with that same vigor and motivation to innovate that the WFIRM researchers have. I am also intrigued by the prospect of taking the Medicine Essentials course and listening to special seminars on regenerative medicine, topics that I am not exposed to in my college courses but eagerly wish to know more about. Speaking of topics that I do not regularly engage in when I am at school, since COVID-19 has prevented my leaving the house much, I have taken the time to paint more, write more, and code more. It is a hassle to bring canvases and acrylics to college, and I never found the time for it—until now! I have also challenged myself to write one blog post a week on Medium.com to engage the insightful part of my brain even during break. Lastly, even though MATLAB is the only language I am required to learn in the BME major at school, I hope to learn more this summer like C++, Ruby, and Swift. I always find ways to fill my time!

During the remainder of my undergraduate years, I plan to apply to the B.S./M.S. in Biomedical Engineering program, so that I will finish my four years with both degrees. Then I will spend a gap year studying biomedical illustration before pursuing an MD/PhD in Biomedical Engineering. Ultimately, I would like to be a medical scientist, researching autism and the applications of technology to the human brain while also meeting with individuals on the spectrum in a more clinical way.

**Nitin Gharpure**  
*University of Alabama at Birmingham*

My name is Nitin Gharpure and I am currently a junior at the University of Alabama at Birmingham. I am a public health major and I am enrolled in the Early Medical School Acceptance Program (EMSAP). One of the concepts central to EMSAP is enhancing undergraduate education by enabling members to pursue a broader range of activities beyond the typical premed experience. I maintain an avid interest in narrative medicine, bioethics and medical ethics. At UAB, I am currently the president of our medical literature club and I am the vice president of our model united nations club where I focus on biomedical/health-oriented legislation. My interest in health outcomes and health policy extends towards monitoring and modelling health outcomes in various populations in order to create targeted approaches or find more detailed, demographic-specific information.

I work at UAB’s Department of Cardiology as a research trainee. Cardiology is perhaps the field of medicine most entangled within the realm of public health. Cardiovascular health is heavily associated with comorbidities like diabetes and obesity – two conditions especially targeted by public health interventions. As a research trainee at UAB, I use biostatistics and machine-learning oriented approaches to break up patient populations into smaller, well-defined subgroups. These groups are stratified based on their response to medication as well as demographic and clinical factors. Through this process of patient population segmentation, I can find groups in which certain drugs or therapies work to prevent a condition. I have applied this broad methodology towards multiple publications, mainly in the areas of immunocardiology and heart failure.

Most recently, one of my publications, where I was a first author, was accepted for presentation at the
American College of Cardiology conference in Chicago. After nearly a month of preparation, obtaining grants for furthering the project and fine-tuning my presentation, I felt ready to display my hard work on the national stage. Unfortunately, that day never came because the conference was canceled due to COVID-19. Instead, within the span of a week, my college shut down, my PI and mentor contracted COVID at the hospital, and the dorms were vacated. During that week of cancellations, the one bright spot was that the Wake Forest Institute for Regenerative Medicine remained in contact with us regarding the future of our participation in their Summer Scholars Program. Although I’ve tried to meticulously plan every year of my life from undergrad to medical school to beyond, COVID underscored that while even the best laid plans can collapse, it also revealed invaluable examples of strong ongoing student support from institutions like Wake Forest.

Ultimately, I plan to continue my education as a public health major, member of EMSAP and attend a medical school aligning with my future goals. I am not fully certain as to which field of medicine I would like to pursue, be it building upon my experiences in cardiology or moving into a new field altogether. Despite the uncertainty inherent to the future, or perhaps because of it, I know that what will be invaluable in all aspects of advancing my career, will be close ties to institutions like Wake Forest that care about their members.

Juley Harper
Clemson University

My name is Juley Harper and I am a rising junior at Clemson University. I am majoring in Biological Sciences (B.S.) and minoring in Psychology. Growing up, science was always my favorite class in school. However, it wasn’t until the summer after my sophomore year of high school when I participated in a Neuroscience program at MUSC that I realized I wanted to attend medical school in my future.

This year as a sophomore at Clemson, I partnered with my professor to write a literature review on stem cell therapy as a regenerative treatment for patients with cerebral palsy. The Stem Cell Research International journal actually ended up publishing our final product! As I was working on this research, I developed a very intense fascination in regenerative medicine. I knew immediately that I wanted to expand my horizons and learn more about the potential of stem cell therapy.

I am beyond thrilled for the opportunity WFIRM is going to give me in summer 2021. I look forward to working in a community that values research and its potential. I look forward to waking up every morning, believing that I have the power to find something extraordinary in my work that day... something that could potentially change the world of biology and engineering. I have a passion to serve others and a passion to learn. In fact, these passions of mine have led me in to discovering that medicine is my dream career. I strongly believe that research is the most active way of learning. I also strongly believe that research can be the most active way of saving lives.

Of course, I feel disappointed that COVID-19 has disallowed us from our WFIRM experience this summer. However, I know that my anticipation to meet all my fellow scholars will only grow. I feel grateful to have something I can look forward to over this next year!

Like I mentioned earlier, I want to attend medical school and become a physician. COVID-19 and the
impact it has made on healthcare workers has definitely led me to ask myself if medicine is my calling. Even though I remain unsure of the field I am interested in, I do know that every physician's life has been affected by this pandemic. I can confidently say, however, that COVID-19 has only strengthened my desire to become a physician and uphold the responsibilities a doctor has for his or her patients. It has assured me even more that I want to sacrifice my life for the good and safety of others.

Ms. Schanck, thank you for the opportunity to still grow and connect with my potential fellow summer scholars over the next year. I cannot express my appreciation enough.

**Mollie Harrison**  
*University of Missouri – Columbia*

My name is Mollie Harrison and I am a rising senior at the University of Missouri - Columbia studying chemical engineering with a minor in biology. For the past two years, I have performed tissue engineering research in a biomaterials laboratory, investigating the use of hydrogen peroxide in vascularization for bone tissue regeneration. I’ve led this project independently, which, although challenging, has been extremely rewarding. Last summer, I had the opportunity to work full-time at my university as a Cherng Summer Scholar on a research project which I designed and proposed myself. This experience solidified my plans to pursue a Ph.D. after I complete my undergraduate education.

As previously a pre-med student, I am excited by the field of regenerative medicine and especially by the emphasis on translational research at WFIRM. I hope to explore a new area of regenerative medicine other than tissue engineering during summer 2021 at WFIRM, in order to help me determine my Ph.D. specialization. Specifically, I am most interested in exploring drug delivery systems research. I am eager to continue applying engineering principles to solve problems in the field of medicine and can’t wait to engage in the impactful research at WFIRM.

Upon completing my undergraduate education, I plan to pursue a Ph.D. in biomedical engineering with a specialization in an area of regenerative medicine. After my recent selection as a Barry Goldwater Scholar, I have more confidence in my dreams to one day work at the NIH performing impactful translational biomedical research.

**Olivia Jochl**  
*Harvard College*

As a member of the Harvard College Class of 2023, I plan to pursue a concentration in Chemistry and a secondary in Economics. During my first two semesters, I discovered my interest in chemistry and biochemistry through the eye-opening lab work associated with these classes. The comparison between theoretical problems and tangible results found in the lab introduced me to the true complexity of physical science and further increased my appreciation for the power of
chemistry. In my second semester, I began working with a postdoctoral fellow in the Aizenberg Research Group on the development of new and improved tympanostomy tubes. While this opportunity was unfortunately cut short by the COVID-19 crisis, I had the chance to learn about materials and their properties in an entirely new and medically focused light.

In transitioning to research at WFIRM, I’m excited to apply the knowledge I gained in the classroom and in the lab to an innovative and important project. As a competitive alpine ski racer throughout high school, my personal experiences with knee injuries and surgical reconstructions first sparked my interest in orthopedics and regenerative medicine. Because my struggles with injury and recovery eventually pushed me to leave an incredible sport, I’m motivated to learn more about the medical science surrounding injuries, especially those related to sports, and pain. In 2021, I hope to combine my knowledge from the classroom and my personal experiences in order to pursue a regenerative medicine project that can eventually help me to lessen the mental and physical hardships facing high-level athletes after injury.

Following my time at WFIRM and the conclusion of undergrad, I aspire to attend medical school and eventually focus on the field of orthopedic surgery and research, specifically in sports medicine. In the future, I hope to positively influence the long-term outcomes following orthopedic injuries by discovering new perspectives and approaches that greatly decrease the struggles of physical recovery and returning to sport.

Brianna Lorenz
Marquette University

I am currently a rising senior at Marquette University in Milwaukee, Wisconsin, majoring in Biomedical Sciences with a minor in Business Administration. As a student at Marquette, I have been fortunate to have access to modern instrumentation and the opportunity to engage in laboratory research, which has allowed me to develop my laboratory techniques and piqued my interest in the medical innovation process. Through my research under the direction of Dr. John Mantsch, I am actively involved in studying the relationship between stress, an unpredictable and inevitable aspect of life, and drug addiction to identify the neurobiological mechanisms underlying drug craving and relapse. Aside from my scholastic pursuits, I have also had the humbling opportunity to serve others in a variety of volunteer settings. Most notably, I am a member of Global Medical Brigades, a student-led social responsibility movement traveling to impoverished countries to empower under-resourced communities to resolve global health and economic disparities.

My interest in regenerative medicine has ultimately stemmed from my desire to provide patients a better quality of life and help revolutionize clinical therapies. As a summer scholar at WFIRM in 2021, I hope to learn more about the dynamic relationship between regenerative medicine laboratory research
and clinical application. I am enthralled by the pursuit of using a patient’s own cells in therapy and engineering scaffolds to develop functional blood vessels, muscles, tendons, and organs to provide improved patient outcomes. I truly believe that regenerative medicine has the potential to change the face of medicine by offering an entirely new approach to medical treatment. Through the WFIRM Summer Scholars Program, I look forward to working towards developing novel and efficient treatments for numerous chronic diseases and foresee myself playing an integral part in translating the science of regenerative medicine into clinical therapies in the future.

Upon graduation from Marquette University, I aspire to attend medical school to pursue either an MD or MD/PhD degree, allowing me to make meaningful contributions to the field of medicine. While I have not yet refined my specialty of interest, I am fascinated by the astounding complexity that medicine offers and have great interest in pursuing orthopedic surgery.

Lauren Monroe  
NC State University. GO WOLFPACK!

I am majoring in Biomedical Engineering with a concentration in biomaterials and minoring in Biomanufacturing. I have always had a strong interest in how the nexus of technology and medicine can change and effect lives. When given the opportunity to get involved in research with Dr. Driss Elhanafi to develop a Chinese Hamster Ovarian cell line for CRISPR application, I jumped on it. In working with CRISPR I learned about the many ways it can be used to edit genes. It was inspiring to find out that this new technology had the ability to treat chronic diseases that were thought to be terminal. This led me to search for other new ways scientists were reinventing the medical field, and in the process discovered the Wake Forest Institute for Regenerative Medicine. I was amazed by what the institute was doing and wanted to be involved in the incredible science being conducted. Consequently, I was humbled and excited when I was offered a spot to be a summer scholar.

In this program, I am particularly interested in tissue engineering and stem cell research and hope to gain experience and learn more about the field. In some of the courses I have taken under my major, we built scaffolds from biomaterials, which makes me interested in learning how scaffolds are utilized in the field of regenerative medicine. As a biomedical engineering student, I am also interested in learning more about the processes involved in generating real medical innovation. Upon graduation from college, I would like to make a difference in both science and lives by specializing in a biotechnology innovation area exemplified by tissue engineering or regenerative medicine.
My name is Sarah Pennebaker, and I am a rising third year undergraduate at the Georgia Institute of Technology, where I study Neuroscience with minors in Science, Technology, & Society and Medical Science. Since beginning my time at Georgia Tech, I have had opportunities to see the impact of research on both the scientific field and on people within my community. In the Natural Products laboratory at GIT, I have been able to work on projects focused on novel drug discoveries: searching for new natural products that could change the fields of treatment through antibiotic and antitumor options. While studying abroad in Lyon, France, I studied organic chemistry while touring sites of scientific innovation, whether that was underground at CERN or in the mountainside at the Melvita Cosmetics processing plant. However, it was at a Head and Neck Clinic in downtown Atlanta that I was blown away through Tumor Board discussions, where physicians described utilizing the most recent treatments and research studies to treat their patients. Each physician brought different evidence to the table, each with a treatment plan fueled by the most recent advancements in the field.

These experiences and interactions with healthcare were what initially drove me to apply for the WFIRM program. Outside of my interests in the sciences, I love to study history and literature and take every opportunity I can to travel to the places that made history or inspired writers. I am also an avid outdoor enthusiast whether it is backpacking, hiking, or long-distance running.

Looking forward to 2021, I am more than thrilled to know that I will be working on a research project at the Wake Forest Institute for Regenerative Medicine. While I have spent many hours in the lab working to sequence Genomic Data and analyze chemical composition, I have yet to work in a lab geared closer to patient applications. Being able to work with projects that may include the fabrication of tissues and organs presents an exciting challenge to anticipate next summer.

Currently, I am pursuing coursework and positions with the goal of further education in medical school. As a physician, research will be an extremely important part of my career that provides new options to patients as a primary mechanism for the advancement of medical treatments and practices. Following medical school, my goal is to specialize in Perinatology-neonatology, an OBGYN subspecialty that treats high-risk mothers, so that I can open a practice that uses innovative treatments and surgical techniques to provide the best outcomes for mothers and their children.
Meaghan Quinn
University of North Carolina at Chapel Hill

I am a rising senior studying Biomedical Engineering (BME) at the University of North Carolina at Chapel Hill. Currently, around 20% of practicing engineers are women. In today’s world, I think this is a shockingly low number. I am not intimidated by the large title of “engineer”, nor am I worried about pursuing a career in a male-dominated field. In fact, I am excited by it! I selected engineering wanting to be challenged, wanting to problem solve, and wanting to prove that women belong in this male-dominated world of science while inspiring young girls to do the same. Right now, I see myself doing research in either drug delivery techniques and pharmacoengineering or regenerative medicine. These are the branches of BME that interest and excite me the most. Regenerative medicine interests me because of its life-changing ability and its uncertainty.

I know I am an engineer. I am a natural problem solver. I want to research and seek new methods to assist with safe and effective healthcare. Ever since I was age 4, I have been playing soccer. My junior year, an opportunity arose that enabled me to marry my love for soccer and BME. I started my first research work in the Applied Biomechanics Laboratory under a Ph.D. student at UNC. Our research is focused around anterior cruciate ligament (ACL) tears in the knee. ACL tears ring very close to home because I have seen many of my teammates on my soccer teams over the years fall to the clutches of ACL tears. Why are they so common in soccer players? Why are they more common in females than males? And what, if anything, can athletes do to prevent such tears from occurring? These are all questions I found myself asking while playing soccer. It has been so fun doing my work in this lab over the past eight months; it has allowed me to think about answering these questions. Currently, we are collecting data using dual-probe ultrasound imaging to investigate the musculoskeletal structure and function in the quad post-ACL tear and operation. Using MATLAB, we analyze patient-specific data measured during collection to provide walking feedback. This feedback allows the patient to readjust his/her body force loading while walking and helps to prevent arthritis in the knee. This lab opportunity completely changed my perspective on conducting research. My work mattered; it was making an impact, and I found it exhilarating. I am excited to expand my research opportunities in regenerative medicine, an area of interest to which I was exposed this past Fall, in the WFIRM program during summer 2021.

Motivation to explore regenerative medicine and hopes for 2021 research at WFIRM: If I have learned anything from the recent coronavirus events, it is that there is so much demand in the field of medicine and engineering. This only excites me to bring my skills into the research and/or industry community. While I was disappointed about the cancellation of the WFIRM Summer 2020 program, I have taken this opportunity to grow and reflect on what I can do to take advantage of my time at WFIRM. Being a part of this Program, I hope to gain skills in the lab, further my knowledge in a specified biomedical engineering branch, and become one step closer to finding my passion. In the lab, my goal is to increase and hone my lab techniques and common instrumentation. Within regenerative medicine specifically, my goal is to gain more knowledge in drug delivery systems, pharmacoengineering, and biomaterials.

Future research plans and career goals: When I started at UNC, my goal after graduation was to jump into the workforce in some fashion in the healthcare industry. After working in a lab, I now believe I want to focus my interests to further research in the regenerative medicine field.
Elisabeth Reese
DePauw University

My name is Elisabeth Reese and I am a rising senior, biochemistry and sociology double major, at DePauw University in Greencastle Indiana. Prior to WFIRM, I conducted research in a biology lab at my home institution, DePauw University. We explored how various chemicals and substances have the ability to reduce inflammation. My particular project explored the impact of antidepressants on inflammation created through NET production. In addition to this research experience, I was also a part of a neuropsychology lab at Northern Arizona University where we attempted to modulate mirror neuron activity and the ability to self-other discriminate through hypnosis with the hope of increasing empathy among people. I’m very excited to embark on a research project at WFIRM during summer 2021 because I ultimately intend to work within the medical field, so being a part of a research project that has translational applications to my future clinical work is exciting.

Specifically, I hope to do organogenesis research during the WFIRM summer 2021 program. I have strong interest in exploring the function, and eventually treatment, of diseases utilizing regenerative medicine approaches. Studying Alzhiemers and the generation of beta-amyloid plaques would be especially intriguing, but I'm open to a wide range of potential projects within the regenerative medicine field. I find regenerative research, in general, to be very interesting. In high school I chose to give a presentation centered on regenerative research. Little did I know that one day I would be take part in this fascinating field of research at WFIRM. As mentioned above, I have ambitions to attend medical school with long term goal to work as an emergency medicine physician and attending. If i am able to do research and work as a physician, that would be ideal!
Kelly Speckl  
*University of Colorado at Boulder*

"Hi, I'm Kelly Speckl. I attend the University of Colorado at Boulder and I am pursuing a B.S. in chemical and biological engineering. I have been interested in researching medicine from a young age, although I didn’t understand what it entailed. I was fortunate enough to finally explore research my first year at CU Boulder. I became immersed in a lab where the purpose of my research was to identify biochemical cues that lead to aortic valve stenosis, a heart disease where there is a need for a therapeutic treatment. To explore this disease, I have investigated the different phenotypes of valvular interstitial cells within a 3D hydrogel matrix. This undergraduate research experience has been an amazing inspiration to me and helped me realize my passion for regenerative medicine. I will continue with my same research group this coming academic year, but with different mentors, studying organoids.

I am excited to be a participant in the WFIRM Summer Scholars Program in the summer of 2021. This program will give me the opportunity to learn new scientific techniques and delve into a new regenerative medicine project. I am thrilled at the opportunity to expand my research horizons, as I have only studied aortic valve stenosis up to this point. Regenerative medicine is a field I am passionate about, as it has the potential for real patient impact and I greatly look forward to next summer.

After completing my B.S. I aspire to pursue a PhD and continue studying regenerative medicine. With this degree I hope to work in the biopharmaceutical industry or the biotechnology industry."

Exel Valle-Estrada  
*Guilford College*

My name is Exel Estrada. I am a rising senior at Guilford College working toward a BS in Biology and Health Science with a minor in Chemistry. I grew up in Guatemala where science is not commonly taught in elementary and middle school. When I started high school in the U.S., I was introduced to science through my environmental class. I loved it because of its precision, and it reminded me of my grandfather in Guatemala. He worked in the field all day while suffering from severe back pain, he used his knowledge of medicinal plants and remedies to relieve his back pain.

I have been introduced to research through several projects in undergraduate. In Chemistry, I collaborated with a team investigating how to better understand and control the mechanism of Oscillating Chemical
reactions, as it promises ways of understanding different biochemical pathways. In Biology, I have been collaborating with two faculty members for a year, searching for new sources of antibiotic sources, as antibiotic resistant threats increase globally. This summer 2020, I will be doing a virtual research experience with NYU, where I will be working on a research project focused on infectious diseases. But my initial excitement in research started when conducting a correlational study in Greensboro, looking at hypertension and exercise. I was shocked by the prevalence of hypertension and the correlation between hypertension and different terminal illnesses. My hopes for being part of different research projects have been to develop techniques and the preliminary skills needed to critically and ethically conduct research.

Sarah Wachtman  
*Florida State University*

Hi! My name is Sarah Wachtman and I am a rising junior at Florida State University. I am majoring in biology with a dual degree in neuroscience. Last summer I worked in a High Throughput Drug Discovery lab at Scripps Research, Florida. Drug discovery was entirely foreign to me at the time, but I learned quickly and had an incredible experience in the lab. My focus was tissue culture, and I preformed many assays using these cells, allowing me to see how my work fit into the research project as a whole. Seeing and contributing to the interplay between biology, chemistry, and engineering struck a chord with me, and this collaborative nature is something I hope to experience throughout my career.

During the Summer Scholars 2021 program at WFIRM I hope to experience similar collaboration through the application of regenerative medicine. I was introduced to stem cells towards the end of my summer at Scripps, and it is a topic that interests me. There is incredible potential in stem cell research, especially as it applies to regenerative medicine, and I am excited to learn more about it throughout the summer. Foremost, I cannot wait to meet the faculty, staff, and fellow scholars. I am truly elated to be part of this group and learn more about regenerative medicine in such an incredible institute. I am always aiming to expand my horizons, and there is no place I’d rather explore regenerative medicine than at Wake Forest. I have had minimal exposure to regenerative medicine, and I am curious to dive into such a progressive field and explore new ideas with the team at WFIRM. It is unfortunate that this program will have to wait until 2021 due to COVID-19, but I feel the outbreak has drawn a focus to the importance of science and research. The fate of our future is resting in the hands of scientists around the world, all racing to meet the same goals. My prior lab experience granted me a great appreciation for the time, effort, and energy researchers dedicate to finding a cure, and seeing those efforts applied to such a critical, global cause has re-enforced my aspiration to be a researcher. While there may be little action I can take during the fight against COVID-19, it is my hope to decrease the impact of other diseases on our society in the future.

At the completion of my undergraduate studies, I plan to attend graduate school for a PhD in biological research and eventually lead my own lab. Thus far my interests lie predominantly in
genetic research, but my goal is to explore as many research fields as possible before graduate school, including regenerative medicine. I am looking forward to enhancing my research experience by joining the team at WFIRM and I am eager for all that awaits in Summer 2021!

Wen Ting Zheng  
Massachusetts Institute of Technology

Hello, my name is Wen Ting, and I am a rising junior at the Massachusetts Institute of Technology (MIT) studying biological engineering. Having a long-term goal of attending medical school in the future and becoming a doctor, I am excited to participate in WFIRM Summer Scholar’ 2021 program because of the opportunity to combine both medicine and research. While I have not had much prior exposure to regenerative medicine, I have been very fortunate to gain hands on research experience through MIT’s laboratory curriculum and many undergraduate research opportunities.

Currently, I have been working with Dr. Nan Li in the Jasanoff Lab on a project studying the functional input-output mapping of thalamocortical circuitry with genetically-targeted fMRI. The thalamus area of the brain has not been previously studied in depth, and our work focuses on gaining a better understanding of the function of the thalamic circuitry, which will potentially facilitate future applications in treating Parkinson’s disease and motor disorders.

In my summer at WFIRM in 2021, I hope to gain valuable research skills through working closely with my mentor on a project exploring regenerative medicine. This field of research is so innovative and intriguing to me, especially in terms of advances in biological engineering, and I look forward to learning so much more. Some specific topics I find particularly interesting are organoids and body-on-a-chip devices, which have the potential to have a transform future clinical studies and medical treatment. While at WFIRM, I also hope to build strong relationships and learn from fellow scholars who are also passionate about research as well as create meaningful connections to leaders in regenerative medicine research.

After completing my bachelor’s degree in biological engineering, I plan on obtaining an M.D. while continuing clinical research as a physician. I have always thought of directly treating patients as the most immediate way I could improve patient outcome, but I have also realized how important research behind the scenes is for medical advancements, especially now in the time of coronavirus. Overall, I hope to use my passion for helping others as well my curiosity for discovering novel research to leave a positive impact in my community.