



2018 Gates Summer Internship Program



THANK YOU FOR MAKING THE GATES SUMMER
INTERNSHIP PROGRAM A GREAT SUCCESS!



Gates Center for Regenerative Medicine
UNIVERSITY OF COLORADO **ANSCHUTZ MEDICAL CAMPUS**



Having worked with my fellow interns, I can assure you that your contributions to GSIP are helping to develop the next generation of physicians and scientists who have major goals to push regenerative medicine forward. Thank you for investing in our development and our futures.

The following notes of thanks echoing the sentiment in the quote above are from the college undergraduates who participated in the Gates Summer Internship Program (GSIP) during the summer of 2018. These young people are grateful for the myriad opportunities they found here on the Anschutz Medical Campus and cognizant of the many sources of support that made their experience possible.

In 2015, a generous gift from Gates Center friends Rhondda and Peter Grant helped establish the GSIP program for 12 students to further the dream of the Gates Center to encourage exceptional college undergraduates to pursue careers in stem cell biology and regenerative medicine. Thanks to wonderful, continued support from the Grants and others, the program has grown appreciably, and last summer 18 interns from a nationwide pool of over 200 applicants and three affiliate students participated. Students assigned to the labs of individual Gates Center mentors pursued a wide variety of research topics and therapies across the Anschutz Medical Campus in addition to career development and social activities.

We at the Gates Center join these students in thanking those who have made the Gates Summer Internship Program possible and to those who might do so in the future. We also want to acknowledge the researchers and clinicians listed in this brochure along with their lab staffs who kindly agreed to take GSIP interns under their wings in addition to the busy days they spend advancing research and/or caring for patients.

Finally, we want to thank the hard-working directors of our program (see photo on page 4) and especially our interns for the sparkle, intellect, energy and countless hours they contributed toward their respective labs, individual research projects and to the Gates Center itself. As Dean John Reilly said at the GSIP closing day ceremony,

We hope that you have seen the allure of being a part of an academic campus and that we have helped satisfy your curiosity as to how we might move the field of regenerative medicine forward to make a positive impact on humans. We have tried to pique your interest in science, discovery and health, and would love to see you back on campus in a few years.

Sincerely,

A handwritten signature in black ink, appearing to read 'D. Roop', with a stylized flourish at the end.

Dennis R. Roop, Ph.D.

Director, Gates Center for Regenerative Medicine



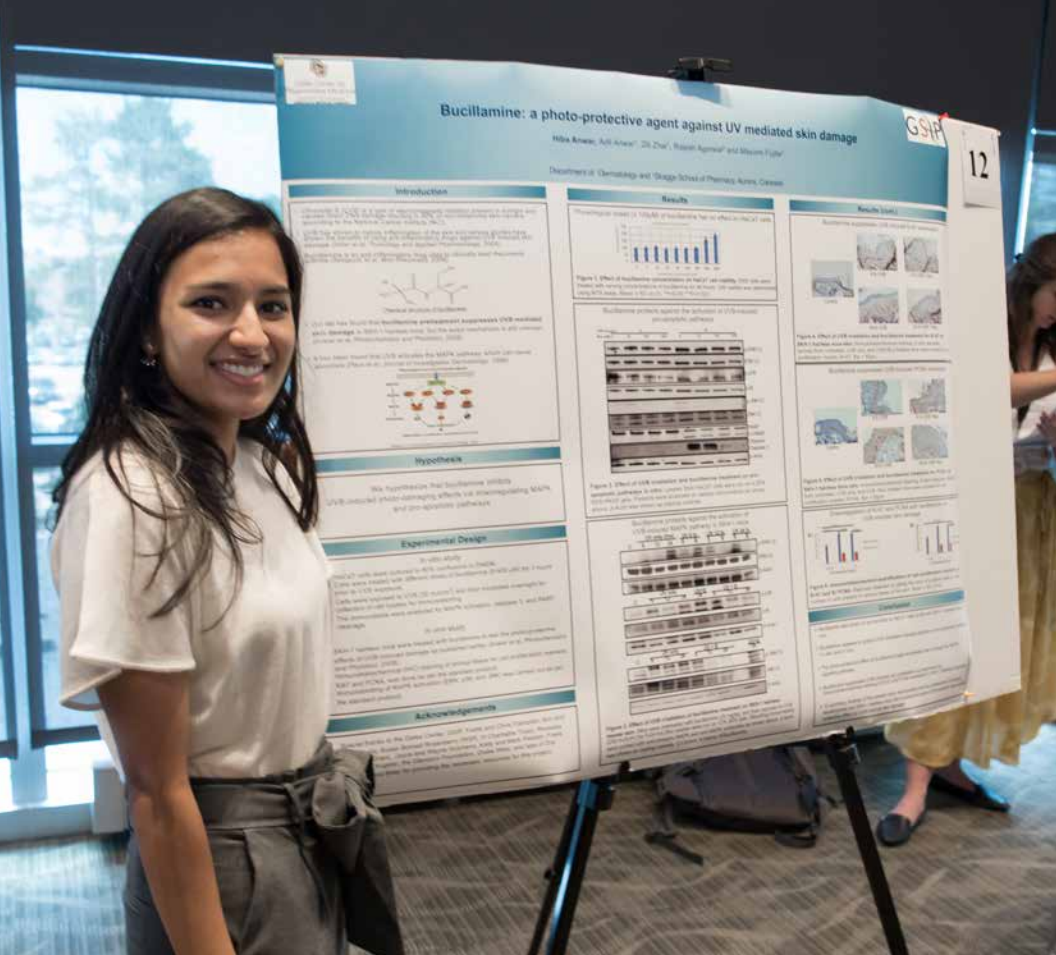
2018 GSIP DIRECTORS



GSIP Directors (left to right) Neil Box, Ph.D., Tamara Terzian, Ph.D. and Enrique Torchia, Ph.D.

2018 GSIP MENTORS

Kristin Artinger, Ph.D.	Associate Professor	Department of Craniofacial Biology
Ganna Bilousova, Ph.D.	Assistant Professor	Department of Dermatology
Stanca Birlea, M.D., Ph.D.	Associate Professor	Department of Dermatology
Neil Box, Ph.D.	Associate Professor	Department of Dermatology
Joe Brzezinski, Ph.D.	Assistant Professor	Department of Ophthalmology
Peter Dempsey, Ph.D.	Associate Professor	Department of Pediatrics
Curt Freed, M.D.	Professor	Department of Medicine/Clinical Pharmacology and Toxicology
Mayumi Fujita, M.D., Ph.D.	Professor	Department of Dermatology
Paco Herson, Ph.D.	Principal Investigator	Department of Anesthesiology, Neuronal Injury Program
Jeffrey Jacot, Ph.D.	Associate Professor	Department of Bioengineering
Antonio Jimeno, M.D., Ph.D.	Professor, Daniel and Janet Mordecai Chair in Cancer Stem Cell Biology	Department of Medicine/ Medical Oncology
Shi-long Lu, M.D., Ph.D.	Assistant Professor	Department of Otolaryngology
Karin Payne, Ph.D.	Assistant Professor	Department of Orthopedics
Mark Petrash, Ph.D.	Professor	Department of Ophthalmology
Holger Russ, Ph.D.	Assistant Professor	Barbara Davis Center for Childhood Diabetes
Yiqun Shellman, Ph.D.	Associate Professor	Department of Dermatology
Tamara Terzian, Ph.D.	Assistant Professor	Department of Dermatology
Enrique Torchia, Ph.D.	Assistant Professor	Department of Dermatology
Michael Verneris, M.D.	Professor, The Barton Endowed Chair of Pediatric Bone Marrow Transplant	Department of Pediatrics/ Hematology, Oncology and Bone Marrow Transplantation
Lori Walker, Ph.D.	Associate Professor	Department of Medicine/ Cardiology
Xiao-jing Wang, M.D., Ph.D.	Professor, John S. Gates Endowed Chair in Stem Cell Biology	Department of Pathology



Dear Peter and Rhondda Grant,

I would like to express my gratitude for your and others' contributions to the Gates Center in order to make my research possible this summer. Thank you for all the kindness and generosity you have shared with this community.

Most sincerely,

Hiba Anwar

University of Colorado Boulder

Mentor: Mayumi Fujita, M.D., Ph.D.

Dear GSIP Donors,

Thank you so much for your generosity in support of the Gates Center Summer Internship Program! This program is an invaluable stepping-stone that will help me immensely as I pursue a career in scientific research. I have learned so many important scientific techniques and research skills that I would have been unable to develop without your support. In addition, GSIP has further fueled my passion for scientific inquiry and provided me with important connections that will be incredibly beneficial as I apply to graduate school this fall. Thank you so much for your investment in my future and in the future of the other GSIP interns. We will be forever grateful.

Best,

Lisa Blackmer-Raynolds

Colby College

Mentor: Curt Freed, M.D.





Mr. and Mrs. Grant,

It was my honor to participate in GSIP for my second year, and I must say that this program has impacted me more than any other academic experience in my life to date. My fellow interns and I agree, and I am thankful that your generosity and personal investment and that of others in this program allowed my new friends and me to grow so much in such a short time.

*Sincerely,
Zachary Feuer*

Rensselaer Polytechnic Institute
Mentor: Karin Payne, Ph.D.

Dear Mr. and Mrs. Grant and other donors,

Thank you so much for your continued support of this exceptional program that I was so lucky to be a part of this summer. My participation in GSIP was an amazingly transformative experience, and the skills and knowledge I gained are invaluable. Being able to actively participate in impactful research and have direct contact with inspiring, established researchers and clinicians at CU Anschutz encouraged me to constantly learn and improve myself as a thinker, a scientist and a person, providing me with a lot of confidence as I move forward in my college career. There aren't many reasons I would take a 27-hour car ride across the country, but my time at GSIP more than made up for it all. I thank you again for your generous support to an essential program, and hope it inspires the next class of interns as much as it inspired me.

Best wishes,

Joseph Gerlach

Cornell University

Mentor: Kristin Artinger, Ph.D.

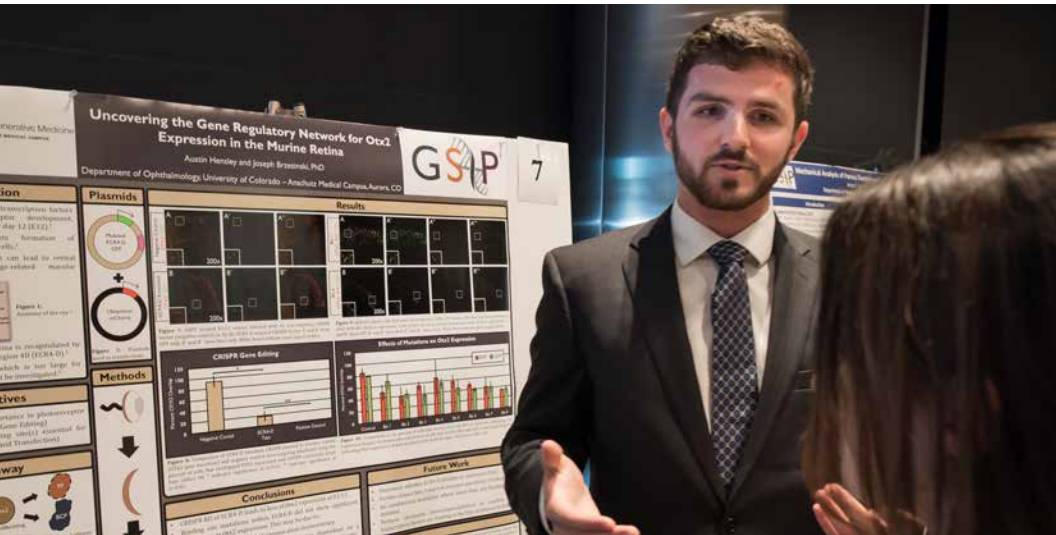


Mr. and Mrs. Grant and others,

Thank you so much for your generosity in making the Gates Center for Regenerative Medicine Internship Program possible for people like me! It was an incredible experience to come out to Colorado and be able to do cutting-edge research alongside some of the brightest students and investigators in the country. Coming from South Carolina, the opportunity to spend a summer in the Denver area doing interesting work that I am passionate about is not very common, so having this chance was fantastic. Because of this program, I will definitely be considering the University of Colorado for my Ph.D. and hope to return to the Anschutz campus. I look forward to recommending GSIP to several colleagues in the near future and to hearing about the program as it becomes increasingly competitive every year.

Thank you tremendously once again!

Warm regards,
Austin Hensley
Clemson University
Mentor: Joseph Brzezinski, Ph.D.





Dear Grant family and GSIP donors,

Thank you very much for supporting the Gates Summer Internship Program. I had an incredible summer and learned so much. Being in GSIP was so unique; I felt very honored to be with such a smart group of interns in facilities and programs nationally renowned. I was fortunate to have Dr. Peter Dempsey as my mentor in a lab where we studied the novel development of human intestinal organoids to model intestinal diseases. By the end of the summer, I felt so proud to present my research, and I knew that I would not find this experience anywhere else. Thank you again to you and to others for your support of GSIP. I truly appreciate it.

Best,
Halley Herbst
University of Colorado Boulder
Mentor: Peter Dempsey, Ph.D.

Dear Mr. and Mrs. Grant and GSIP donors,

Thank you very much for your kind-hearted investments to this program. You all have made this program possible, and it has left a massive impact on me. The opportunity to conduct research at the world-class Anschutz Medical campus is something that would have been unavailable to me without this program's assistance. The ability to work daily at such a phenomenal biomedical complex allowed me to interact with professionals from many different career paths. These interactions informed my decision-making process as I decide what path to pursue for myself. The program also brought together an amazing cohort of talented, hard-working students that I now call friends. It is rare to meet such a diverse group of exceptional peers and connect so meaningfully in a span of only 10 weeks.

I have been a part of four summer undergraduate research experiences, and the GSIP program is a cut above the rest in terms of scope, activities, quality of students, passion of mentors, and overall immersive experience. Thank you for making such a phenomenal program possible.

With Sincere, Enthusiastic Gratitude,

Ryan A. Lupi

Virginia Polytechnic Institute

Mentor: Lori Walker, Ph.D.





Dear GSIP donors,

Thank you so much for your contributions to the Gates Summer Internship Program. This program has had many positive effects on my life that I would like to share with you.

I am an undergraduate Bioengineering student in the CU Denver dual-campus program. This year, I am taking my upper division classes on the Anschutz campus. This enables me to continue working in the Jacot Lab as I continue my studies. I am so grateful GSIP connected me with the Jacot Lab because I am very passionate about the research and the guidance I have gotten from lab members, and Dr. Jacot has helped me continue to pursue goals that advance my development as a scientist and engineer. Before getting into GSIP, I was very unsure about attending graduate school because of my initial experiences with research. The Gates Summer Internship Program enabled me to participate in translational research, where I could see the direct effects on human health to which my work could contribute. Working with graduate students and post-doctoral associates helped me envision my future. Now I know I want to get a PhD in Bioengineering after completing my undergraduate studies so that I can continue advancing the field of tissue engineering.

Having worked with my fellow interns, I can assure you that your contributions to GSIP are helping to develop the next generation of physicians and scientists that have major goals to push regenerative medicine forward. Thank you for investing in our development and our futures.

Sincerely,
Anne Lyons

Affiliate - University of Colorado Denver
Mentor: Jeffrey Jacot, Ph.D.

Dear Mr. and Mrs. Grant and other GSIP donors,

Thank you, thank you, thank you for helping to make this outstanding program possible. Your generosity allowed me to explore my passion for medicine while developing techniques and strategies that will follow me into my scientific career. The internship offers invaluable training and experiences, most of which would not be possible without your thoughtful contributions. Between the expert lecturers, community service and independent benchwork, GSIP allows interns to grow as both scientists and global citizens. Your monetary donations are much appreciated, and your support and trust have meant the world. Thank you for this gift.

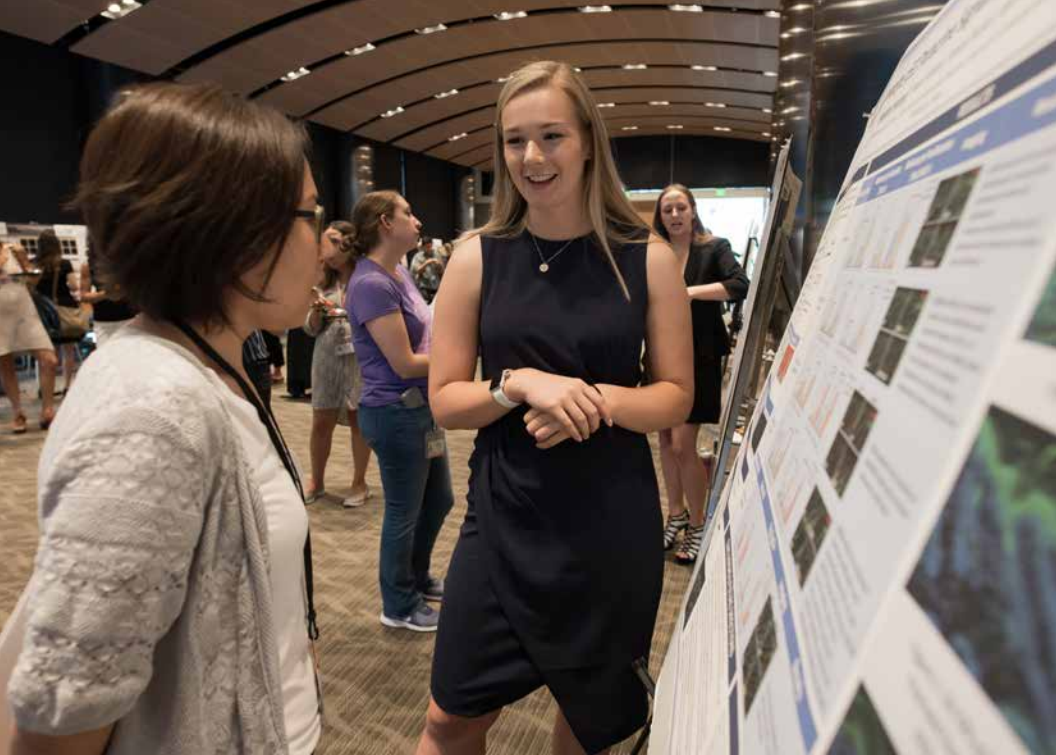
*Gratefully,
Ellie Mackintosh*

Affiliate - Davidson College

Mentor: Tamara Terzian, Ph.D.



Ellie Mackintosh (on left) shares her poster with Gates Center Advisory Board member and Davidson College trustee Yvette Pita Frampton



Dear Donor to the Gates Summer Internship Program (GSIP),

My name is Madeline, and I am a rising senior in the class of 2019 at Middlebury College. I'm a Molecular Biology and Biochemistry major and a Global Health minor, and I aspire to attend medical school and become a physician post-graduation.

This summer, I was extremely fortunate to participate in the GSIP here at the Gates Center in Colorado. I cannot thank you enough for your support of my summer internship experience! As I entered the program, I hoped I would be able to learn more about how laboratory research was conducted, learn hands-on research techniques, develop the skills necessary to collect data and contribute to a research study, improve my statistical analysis skills, interact with other researchers and leave the program feeling more prepared to take on my research at Middlebury, and to enter medical school. I knew I was interested in medicine, but I wanted to further explore the field of research, to see if I would potentially be interested in pursuing a career as a physician-scientist.

(Continued on page 16)

I spent my summer working with Dr. Neil Box, PhD, on his study of skin pigmentation and melanoma in mouse models. My project was focused specifically on the effects of keratinocyte paracrine signaling on melanocyte behavior and proliferation. I assisted with mouse maintenance and mating and performed immunofluorescence staining for three cellular markers. I then counted cells that stained positive for these markers. I also performed a number of other laboratory tasks. In addition to my research, as part of the GSIP, I also attended research presentations and participated in career development seminars and social activities with my fellow interns.

I learned an incredible amount in my ten weeks at the Gates Center, and I am so grateful to you for allowing me to do so. This internship gave me practical, hands-on research experience that will benefit me in both the short- and long-term. I was able to learn important lessons from everyone around me, including my mentor Dr. Box, the GSIP program directors, various other faculty and researchers, and my fellow interns. This experience solidified my aspirations to continue to pursue research and made me excited to see all that is being done at the frontier of medicine to treat a wide variety of debilitating conditions.

My summer experience would not have been possible without your support. Being from Massachusetts, I had a number of expenses that posed a significant barrier to my participation in the program, but your generous donation to the Gates Summer Internship Program made this incredible experience a reality! Thank you for affording me this outstanding opportunity.

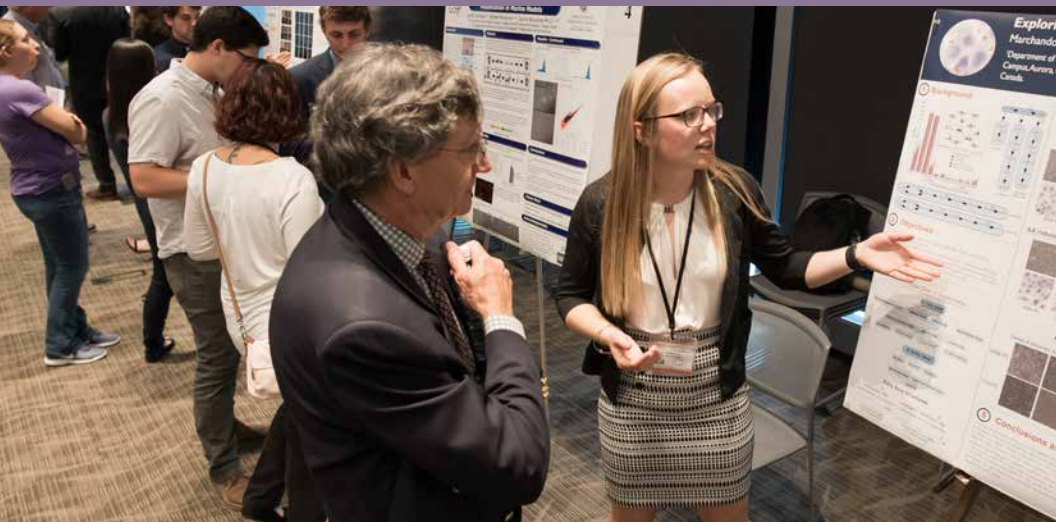
Sincerely,
Madeline O. Maloney
Middlebury College
Mentor: Neil Box, Ph.D.

“

I'm impressed at how competitive the GSIP program is with a big and excellent applicant pool. Enthusiastic summer students provide energy to every lab they come to...

-2018 GSIP Mentor

”



Dear Peter and Rhonda Grant and all generous donors,

From the bottom of my heart, I would like to thank you for making this incredible summer internship possible. This was an experience that truly changed my life in ways that I may never fully know, and it wouldn't have been possible without your generous support. I thank you for allowing me to meet so many powerfully intelligent individuals, and to be able to fully experience what a career in research would entail. This opportunity allowed me explore career paths I had never considered, and I know I will carry the connections and knowledge of this summer with me long into my future. Again, I am so appreciative, and your generosity will have lasting impacts in the lives of others for many years to come.

Best,

Sydney Marchando

Colorado School of Mines

Mentor: Enrique Torchia, Ph.D.

Dear Peter and Rhondda Grant,

Thank you so much for your continued involvement in GSIP. As a graduate of the program, I personally am so grateful for your generous donations that make such an engaging and educational opportunity possible. I not only gained valuable skills and experience working in a research lab this summer, but I really enjoyed getting to make so many professional connections, as well. It was an unforgettable experience.

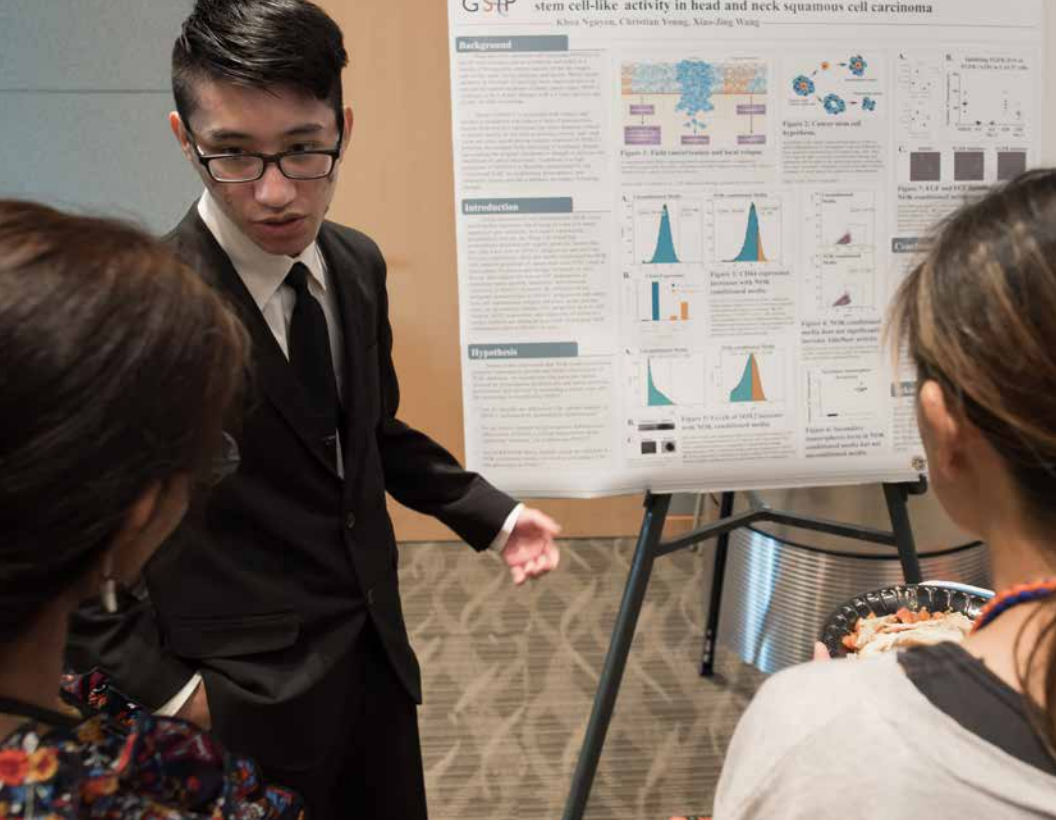
Kindest Regards,

Molly Murphy

University of Notre Dame

Mentor: Shi Long, M.D., Ph.D.





Dear generous donors,

My parents fled their home country to the United States in hopes of a better future for their children. As living witnesses of how war can tear apart a country, they feared the uncertainty their future held; however, it is thanks to the generosity and compassion of Americans like yourselves that my household has come so far from such humble beginnings. Your kindness has truly made a positive impact on not only my life, but the lives of countless other interns, their families and future patients. Thank you so much for supporting the next generation of researchers and healthcare professionals.

Respectfully,
 Khoa Anh Nguyen
University of Colorado Boulder
Mentor: Xiao-Jing Wang, M.D., Ph.D.

Dear Peter and Rhondda Grant,

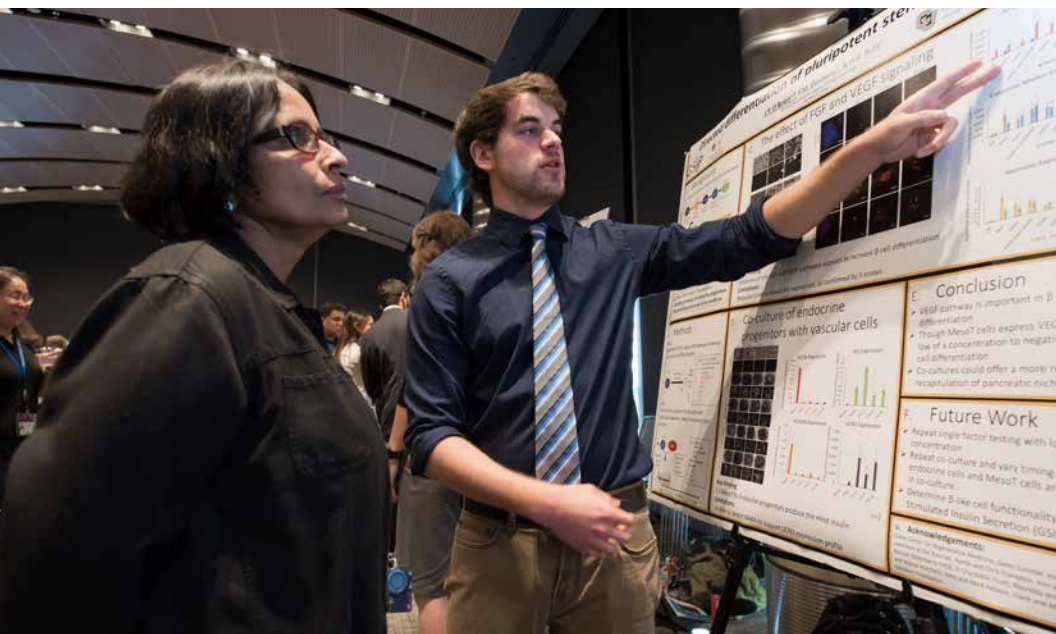
I would like to thank you for your generous donations to the Gates Center for Regenerative Medicine, which made the Gates Summer Internship Program possible. It was a very formative summer where I gained many laboratory skills, learned career development tips and made new friends—all thanks to contributions to the Gates Center made by you and others. In addition to amazing learning experience provided by the Gates internship, I also was able to explore different aspects of Colorado through the program's social outings. This internship reinforced my desire to study science and helped me uncover my passion for research and discovery. The field of regenerative medicine is the future of medicine, and thanks to your efforts, you have helped motivate over twenty young students into further pursuing this up-and-coming field.

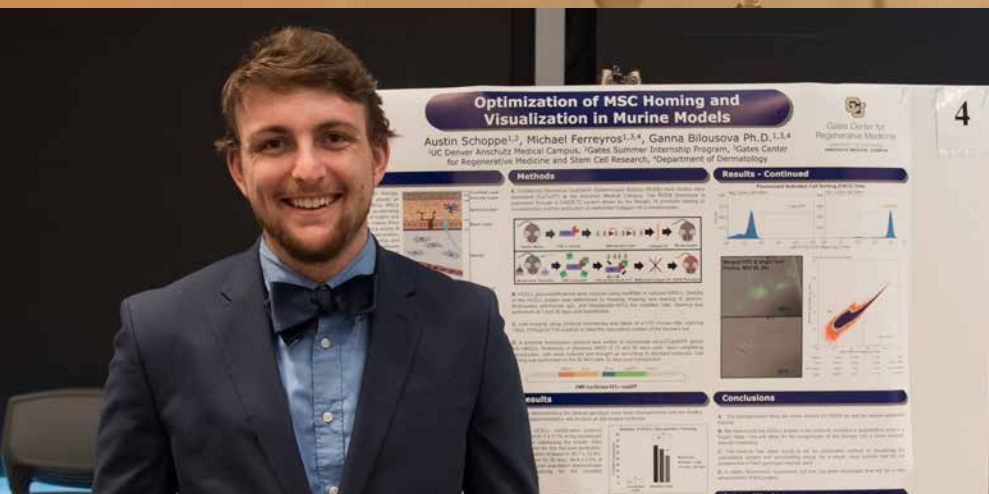
Thank you again,

Joe O'Brien

Affiliate – Middlebury College

Mentor: Holger Russ, Ph.D.





Dear GSIP Donors:

I am writing to you to express my gratitude for your willingness to contribute to the Gates Summer Internship Program. I cannot express how worthwhile and beneficial it was for me as well as my fellow interns to participate in this experience.

As part of this program, I was given the opportunity to attain a plethora of basic lab skills, techniques, and experience that will certainly aid me as I progress through my college and professional careers. Most importantly, I garnered an appreciation for how novel research is conducted, and the immense amount of patience, hard work, and intuition that is required to make this research translational. All of this will be of immense help as I pursue a profession in the field of medicine.

I'd like to reiterate my gratitude for your generosity, as well as establish the fact that us GSIP interns have benefited greatly as a result.

Sincerely,

Austin Schoppe

University of Texas at San Antonio

Mentor: Ganna Bilousova, Ph.D.

Dear GSIP donors,

To all of you who made my internship experience at the Gates Center possible, I sincerely thank you. This research opportunity was a fantastic experience in many respects. Not only did my research skills grow tremendously, but the internship exposed me to a number of career and graduate school exploration events that were invaluable in helping to determine my career trajectory. Your continued support has not only helped me, but will help to educate the scientists of the future for years to come.

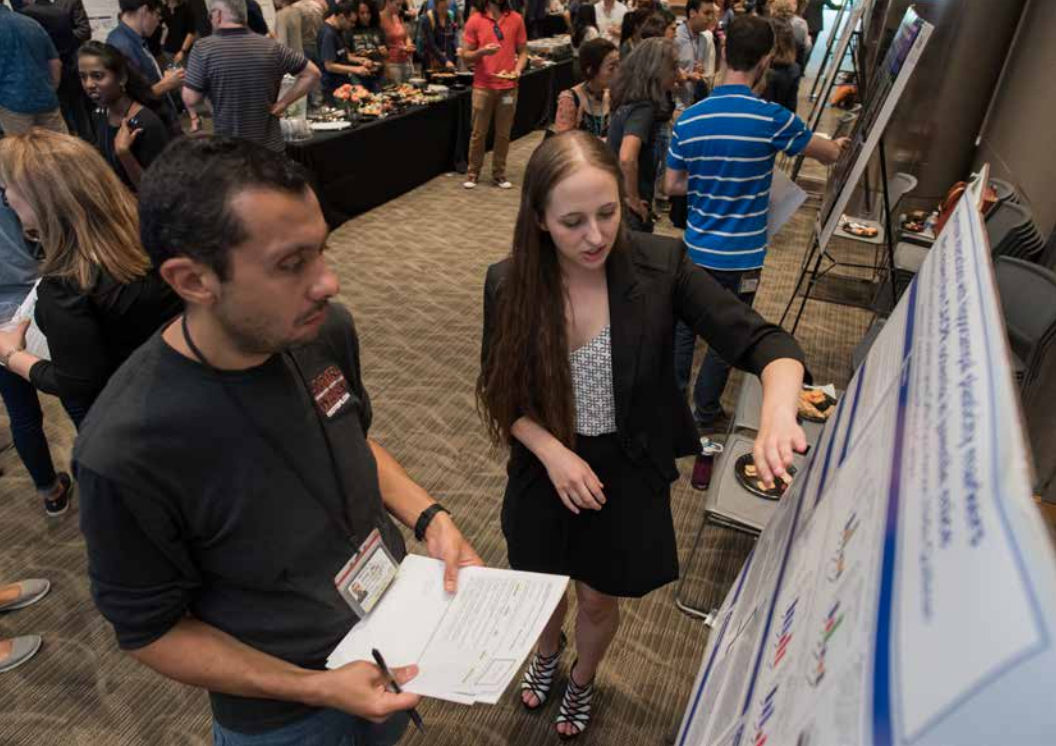
Best,

Zachary Trottier

Carleton College

Mentor: Stanca Birlea, M.D., Ph.D.





Dear Peter and Rhondda Grant,

I just wanted to say thank you to you and others for making GSIP possible. This summer, through GSIP, I have learned so much, not only about lab methods and protocol, but also about neuroscience, stem cells, biomedical engineering, problem solving in the lab, and even a little bit about life. This internship granted me future job opportunities, great experiences and many new friends. GSIP introduced me to many professionals in the fields I am interested in going into, and professionals that I will interact with constantly in my career path. I have made friends with everyone in my lab, along with everyone in the internship. It was a blast this summer getting to know everyone and learning so much. So thank you for making this program possible and as amazing as it is.

Best,
MacKenzie Walz
Regis University
Mentor: Paco Herson, Ph.D.

Dear Mr. and Mrs. Grant,

My name is Madison Weber. I am a recent graduate of Bard College at Simon's Rock, a small liberal arts school on the East Coast. Due to the nature of our biology program and our distance from other schools, I was unable to acquire biomedical research experience on campus.

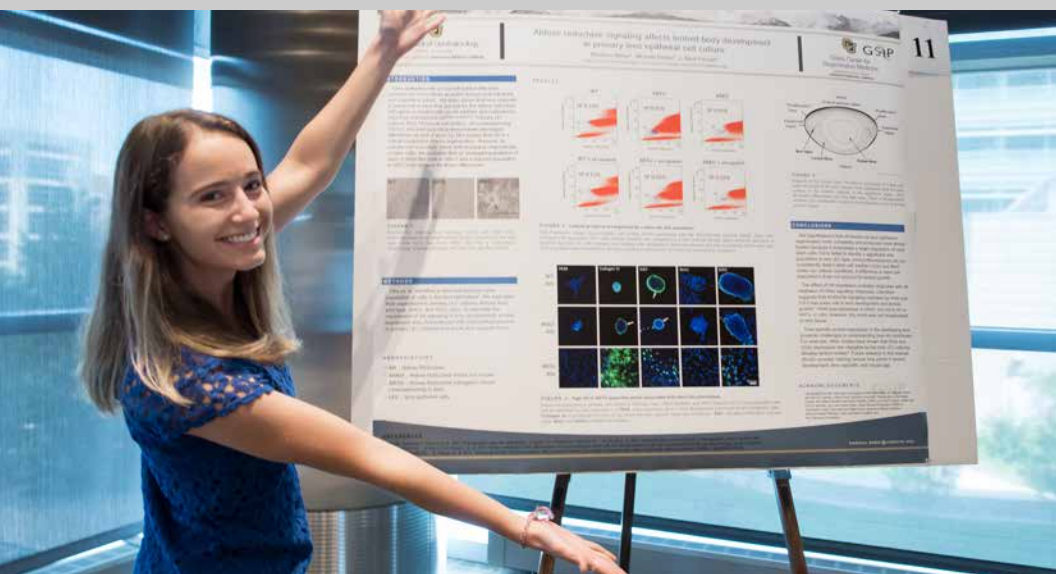
Your donations allowed me to spend my summer researching ocular regeneration on the Anschutz Medical Campus as part of the Gates Summer Internship Program. The past ten weeks working in the lab have not only clarified my desire to pursue a career in the biomedical sciences, but also equipped me with the hands-on experience and research know-how that are imperative to a strong graduate school application.

I am so excited to apply for doctoral programs in biomedical research this fall. I cannot express how thankful I am for the donations from you and others that facilitated this next step in my education and career.

With great gratitude,
Madison Weber

Bard College

Mentor: Mark Petrash, Ph.D.





Dear Generous Donors,

I cannot say thank you enough for this amazing opportunity. It's no exaggeration when I say this was the best summer of my life. Through my lab, I learned so much about techniques, stem cell biology, and myself. Every day I was excited to research, work hard and contribute to something profound and beneficial. I never thought I could take away so much from a summer, but I feel like I've gained a hundred lifetimes of knowledge through this program. Thank you for your support and making this possible.

*Sincerely,
Drake West*

University of Wisconsin - La Crosse
Mentor: Yiqun Shellman, Ph.D.

Dear Mr. and Mrs. Grant,

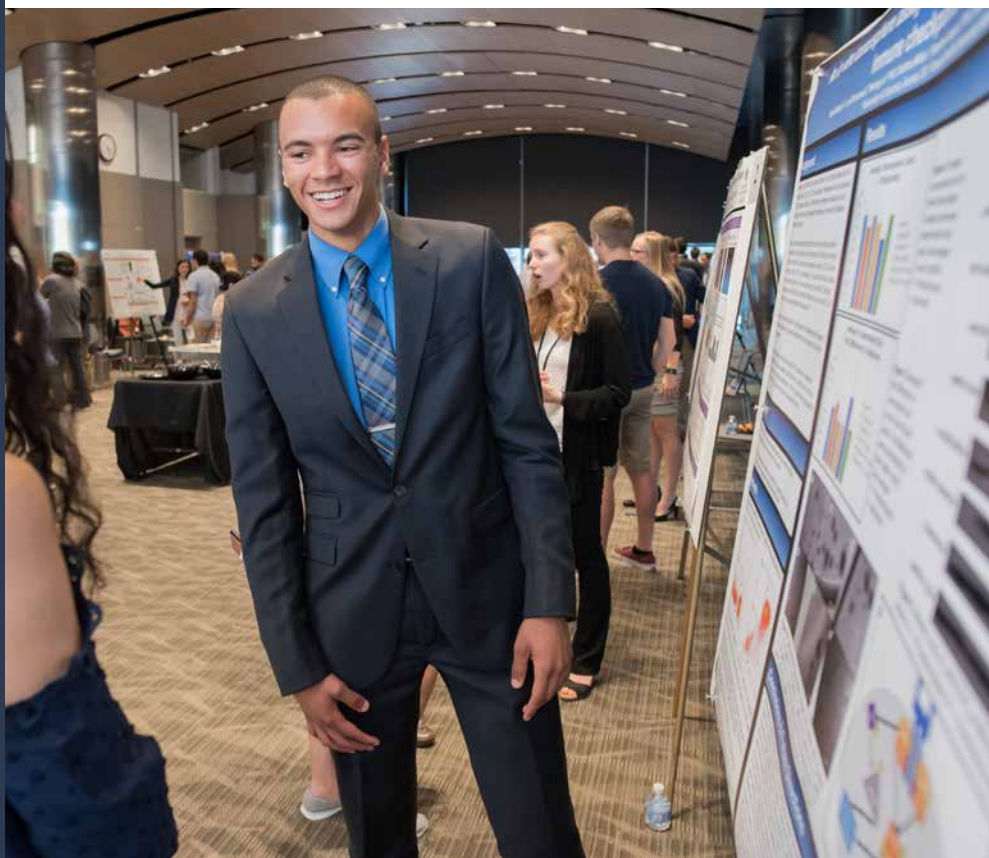
Thank you so much to you and others for helping to make the Gates Summer Internship Program possible! I thoroughly enjoyed the exposure to running my own research project from abstract to poster presentation, and I know that this experience will be very valuable to me as a future physician. I admire your commitment to philanthropy and making a difference in the world. I hope to do the same in the future! Again, thank you very much.

Best,

Grant Wilson

Azusa Pacific University

Mentor: Antonio Jimeno, M.D., Ph.D.





Dear Peter and Rhondda Grant,

Thank you so much for providing me the opportunity to participate in the Gates Summer Internship Program. It made my summer very rewarding. I know I've made lifelong friends and established valuable professional relationships. Without you and all the other contributors, this internship would not be possible. It was wonderful meeting you, and I hope that the poster presentations conveyed how important your contributions are to this program.

Again, thank you for all that you do.

Renee Woods

University of Colorado Denver

Mentor: Michael Verneris, M.D.

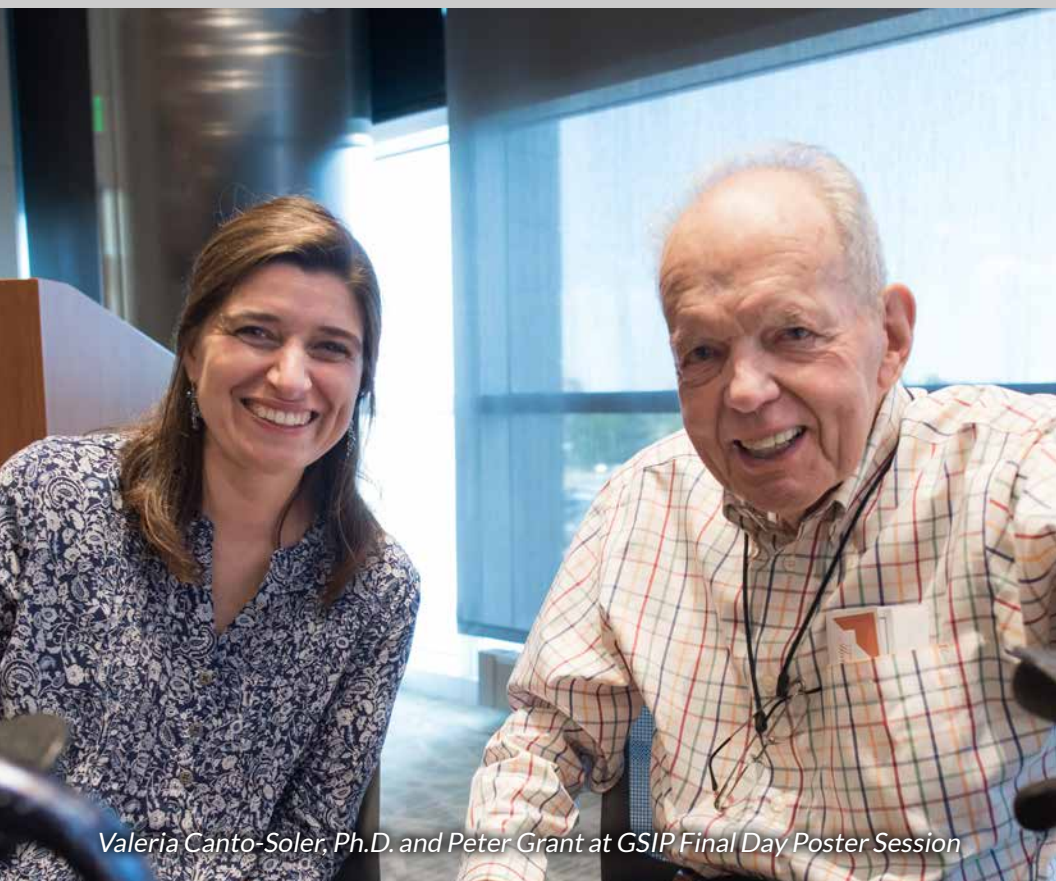


Gates Center for Regenerative Medicine

UNIVERSITY OF COLORADO **ANSCHUTZ MEDICAL CAMPUS**

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Valeria Canto-Soler, Ph.D. and Peter Grant at GSIP Final Day Poster Session

We are grateful to all those who have made this program possible.

Special thanks to our college and university partners:

University of Colorado Denver

Davidson College Middlebury College