



OFFICE OF UNDERGRADUATE RESEARCH

UNIVERSITY OF UTAH

ANNUAL REPORT 2016-17

OFFICE OF UNDERGRADUATE RESEARCH

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OUR TEAM

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2016-17 AT-A-GLANCE STATISTICS

UNDERGRADUATE RESEARCH OPPORTUNITIES PROGRAM (UROP)

Fall 2016	242	(280 applications)
Spring 2017	226	(269 applications)
Summer 2017	115	(128 applications)

583 AWARDEES

UNDERGRADUATE RESEARCH ADVISING

245 ADVISING APPOINTMENTS

UNDERGRADUATE RESEARCH SYMPOSIUM (URS)

54 Oral presentations

293 Poster presentations

347 PRESENTATIONS

UTAH CONFERENCE ON UNDERGRADUATE RESEARCH (UCUR)

37 U OF U PRESENTERS

NATIONAL CONFERENCE ON UNDERGRADUATE RESEARCH (NCUR)

22 U OF U PRESENTERS

UNDERGRADUATE RESEARCH JOURNAL (URJ)

121 AUTHORS

SMALL AND TRAVEL GRANTS

28 Small Grants

66 Travel Grants

94 GRANTS AWARDED

UNDERGRADUATE RESEARCH EDUCATION SERIES (URES)

Summer 2016 **239** (10 events)

Fall 2016 **550** (14 events)

Spring 2017 **421** (14 events)

1210 ATTENDEES

RESEARCH ON CAPITOL HILL (ROCH)

27 U OF U PRESENTERS

SUMMER PROGRAM FOR UNDERGRADUATE RESEARCH (SPUR)

23 SUMMER 2017 PARTICIPANTS

UNDERGRADUATE RESEARCH SCHOLAR DESIGNATION (URSD)

Summer 2016 **8**

Fall 2016 **14**

Spring 2017 **115**

URSD RECIPIENTS 137

RESEARCH OPPORTUNITIES DATABASE

141 OPPORTUNITIES POSTED

WHY UNDERGRADUATE RESEARCH?

A thriving undergraduate research culture benefits:



STUDENTS

When we involve our undergraduate students in research, we demonstrate that we view them as colleagues in our pursuit of knowledge. Involvement in research can give students a sense of belonging, with their work forming a physical and/or intellectual home within the University. This is especially important at large institutions, as students crave an experience that is personal and allows them to work closely with faculty and other members of the academic community. Undergraduate research opportunities thus leverage some of our greatest assets as a Research I institution to the benefit of the student experience. In addition, we know that the experience of undergraduate research with a faculty mentor is associated with student retention and persistence to graduation.



FACULTY AND SCHOLARSHIP

The faculty experience is also enriched by research mentorship and collaboration with undergraduate students. Our undergraduate students bring new perspectives and enthusiasm for the work and they are the future of our fields. By investing in our students, we are investing in the next generation of scholars.



OUR COMMUNITY AND SOCIETY

Through research, students learn to navigate the nuances inherent to serious scholarly investigation and to interpret data responsibly and within a context. By collaborating with our students, we welcome students “into the fold” of the scholarly community and a reflective and critical-thinking public contributes positively to the long-term health of our community.

This opportunity to perform research has been amazing. It has motivated me to continue in research no matter what field I pursue. It has helped me to think critically in all aspects of my education.



CONTRIBUTIONS TO THE COMMON GOOD

Our mission is to facilitate and promote undergraduate student/faculty collaborative research and creative works in all disciplines throughout the University of Utah campus.

Our office contributes to the primary goals of Undergraduate Studies as follows:

Every student belongs to a learning community.

We are responsible for the Undergraduate Research Living and Learning Community. The Living and Learning Community helps initiate the feeling of belonging to the scholarly community by providing incoming students with a structured living environment and additional opportunities and resources to explore research at the University. It helps support students' self-identification as interested in engaged students and members of society and thereby reinforces their participation in the intellectual community at the University and society at large.

Every student has a deeply engaged learning experience.

Our programs facilitate and promote student involvement in deeply engaged learning experiences. We provide support and guidance to undergraduate student researchers through every phase of the experience: discovery, research dissemination, reflection, and recognition.

Every student has a Plan to Finish and is supported by student success advocates, mentors, and advisors.

Our Undergraduate Research Advisor is an available resource for students throughout the entire research process. By providing support and guidance throughout the students' involvement with our programs and by encouraging quality mentors from faculty mentors, our office supports students' research and overall academic achievement. This in turn supports students' accomplishment of their Plan to Finish and bolsters retention and graduation rates.



SUMMARY OF ACCOMPLISHMENTS

Launched the Summer Program for Undergraduate Research (SPUR).

The purpose of the program is to provide undergraduate students with an intensive 10-week research experience under the mentorship of a University of Utah faculty member. Our first cohort of 23 students includes 7 University of Utah students.



Refined and expanded the Undergraduate Research Leaders Program.

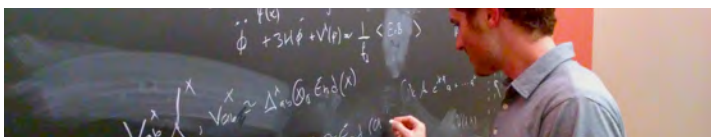
We increased Leaders' participation in programming and office involvement, deepening their professional development, and we provided new educational opportunities to larger student population through the Leaders-initiated educational programming.

Collaborated with other summer programs on campus to create the Summer Research Program Partnership.

This new partnership involves Research Experiences for Undergraduates (REUs) in the Departments of Chemistry and Astronomy & Physics, the Materials Research Science & Engineering Center (MRSEC), and the Native American Summer Research Internship (NARI) in the School of Medicine. Together, these programs are serving over 80 students in Summer 2017.

Launched the Undergraduate Research Mentor Development Program.

The program prepares graduate students, post-docs, and faculty to provide high-quality research mentoring to undergraduate students. Our first cohort of 13 scholars successfully completed the program in Spring 2017.



UNDERGRADUATE RESEARCH OPPORTUNITIES PROGRAM (UROP)

UROP provides undergraduate studies and faculty members the opportunity to work together on research or creative projects.

UROP recipients are hired by the Office of Undergraduate Research and are paid \$10.00 per hour for up to 120 hours of work during the semester of their award.

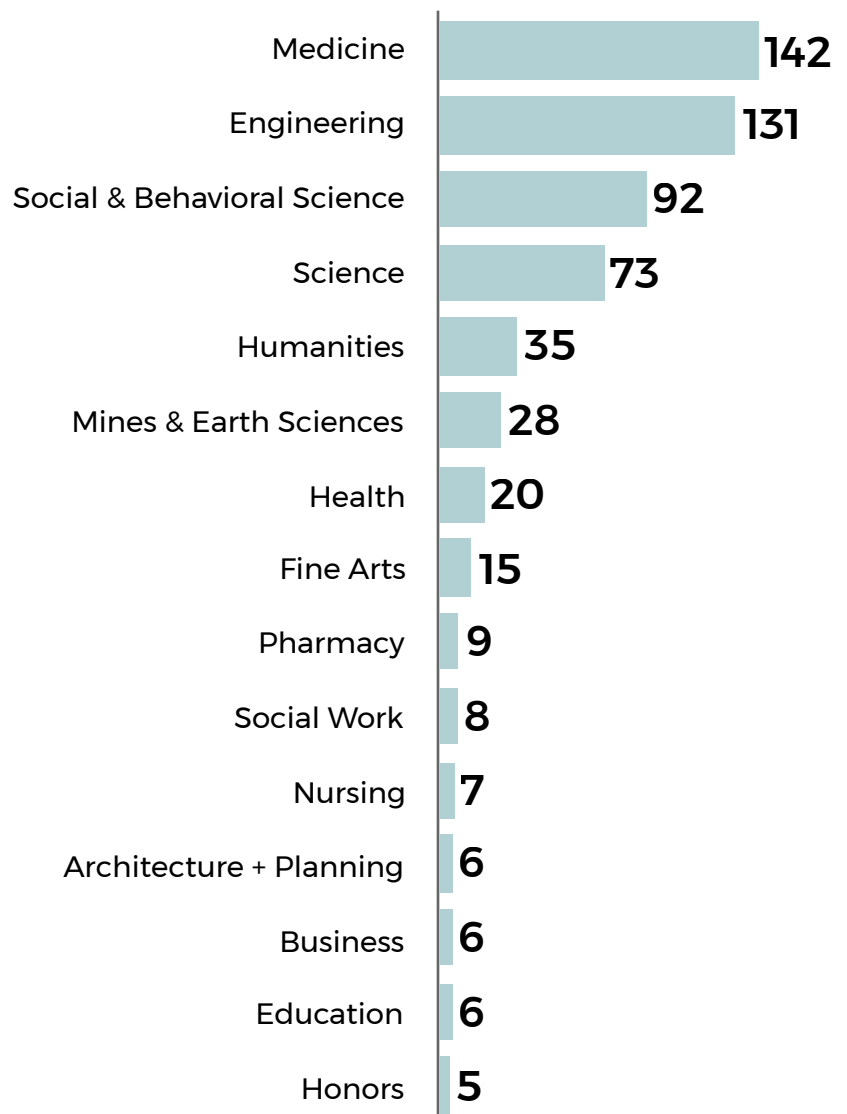


This has been the best part of my education, a capstone if you will. I was able to utilize the things I have learned in a real world setting that I will be able to use in my personal and professional life for decades to come.

UROP AWARD STATISTICS 2016-17

Fall 2016	242	(280 applications)
Spring 2017	226	(269 applications)
Summer 2017	115	(128 applications)
TOTAL AWARDS	583	(677 applications)

NUMBER OF UROP AWARDS BY COLLEGE/ SCHOOL OF THE STUDENT'S FACULTY MENTOR



SPECIAL UROP SCHOLAR AWARDS

CHEVRON FOUNDATION UROP SCHOLARS

Chevron's University Partnership Program (UPP) has partnered with the Office of Undergraduate Research to support female students working on STEM-specific projects.

Margaux Klingensmith (Prof. Dale Clayton): *The influence of neighbors on allopreening rates in mating pairs*

Elaine Ong (Prof. Clement Chow): *Identifying genetic modifiers influencing retinal degeneration diseases*

Asma Rokhaneevna (Prof. Clayton Williams): *Preparation of Single Mode Optical Fibers for Application in 3D Interferometry*

Annie Rowley (Prof. Kai Kuck): *Designing and Developing a Capnograph for Use in Developing Countries and Low-Resource Areas*

Sydney Stephens (Prof. Denise Dearing): *Dietary Changes in the Chisel-Toothed Kangaroo Rat: Reflections Through Stable Isotope Analysis*

Shalauna Thompson (Prof. Kevin Whitty): *Investigation of Carbon Dioxide Capture by Titanium Sorbents Using Thermogravimetric Analysis*

DEE FOUNDATION UROP SCHOLARS

The Lawrence T. Dee and Janet T. Dee Foundation was established for the purpose of promoting charitable activities in Ogden and the surrounding area.

Gemma Clark (Prof. Jennifer Weidhaas): *Effects of Temperature on Microbial Processes Influencing the Performance of Treatment Wetlands*

Warren Jensen (Prof. Claudia Geist): *Expressions of Masculinity Among LDS Men*

Zoe Kozlowski (Prof. Lori Gawron): *Assessing the Unmet Contraceptive Need in Homeless Women in Salt Lake City*

Sarah Patterson (Prof. Danielle Endres): *Utes Nickname Research Project*

FRANCIS FAMILY FOUNDATION UROP SCHOLARS

The Francis Endowment Fund recognizes outstanding undergraduate researchers in the arts, social sciences, and the humanities.

Emily Brixey (Prof. Lien Shen): *The Magical Girl's Influence on Female Empowerment*

Sally Goodger (Prof. Maera Shreiber): *The Ethics of Fairy Tale Retellings of the Holocaust in Children's and Young Adult Literature*

Tyler Herrera (Prof. James Curry): *United States House of Representatives: Understanding the Self-Executing Rule*

Emma Martin (Prof. Jerry Root): *Medieval Perspectives in Religious and Secular Contexts: the Legend of Theophilus and the Romance of the Rose*

Tyler Mattinson (Prof. Paul Bernstein): *Mechanism Behind the Improvement of Visual Performance by Carotenoids*

Eve Olson (Prof. Rachel Hayes-Harb): *Voice Onset Time in Arabic and English Stop Consonants*

Ashma Shrestha (Prof. Elisabeth Conrath): *A Biobehavioral Approach to Measuring Emotion Dysregulation in Pregnancy*

Vai Suliafu (Prof. Eric G. Poitras): *Using Mouse Cursor Coordinates to Predict the Learners' Usefulness Rankings of Online Resources with an Intelligent Web Browser*

UNDERGRADUATE ADVANCEMENT UROP SCHOLARS

Undergraduate Advancement is a mutual effort by Academic and Student Affairs to provide programs that both support and retain undergraduate students at the University of Utah.

Christina Jones (Prof. Lela Graybill): *The Pre-Raphaelite Sisterhood: Artist and Muse*

Jace Jones (Prof. Marc Calaf): *Modeling of Vertical and Horizontal Axis Wind Turbines to Improve Efficiency*

SMALL & TRAVEL GRANTS



SMALL GRANTS

Funding from the Small Grant program (maximum \$200) can help with future purchases of research supplies, training fees, or other research costs related to the student's work.

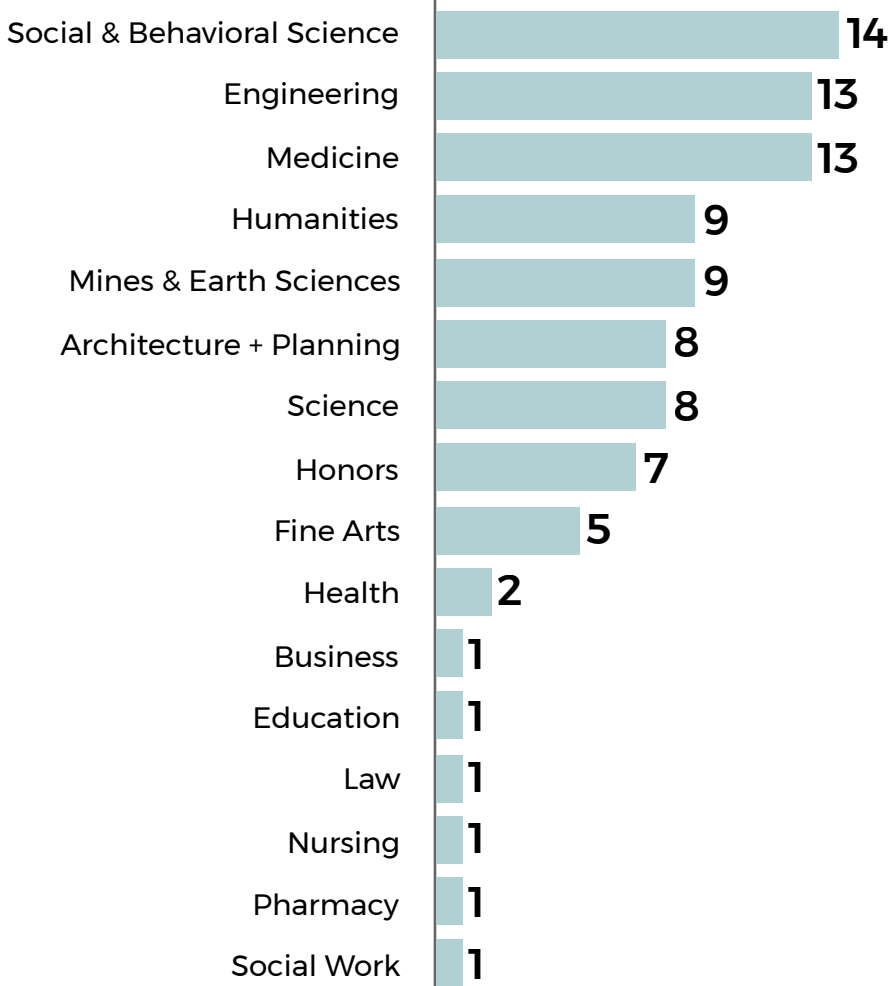


TRAVEL GRANTS

Funding from the Travel Grant program (maximum \$500) might cover expenses for future airfare, lodging, conference registration, or gas/mileage for data collection or conference attendance.

NUMBER OF SMALL & TRAVEL GRANTS

BY COLLEGE/SCHOOL OF THE STUDENT'S FACULTY MENTOR



This opportunity to perform research has been amazing. It has motivated me to continue in research no matter what field I pursue. It has helped me to think critically in all aspects of my education.

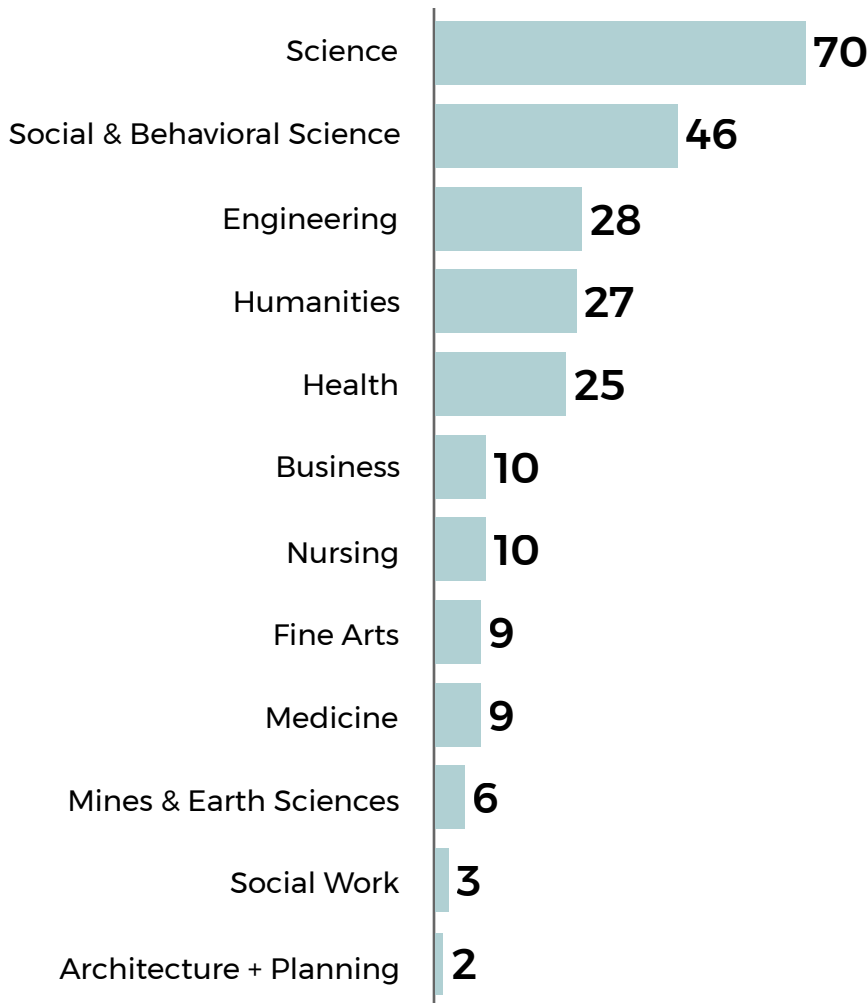


UNDERGRADUATE RESEARCH ADVISING

We provide comprehensive advising for students throughout the entire undergraduate research process. Advising is intended to provide a supportive environment for the student to become involved with research and to prepare the student for and guide the student through the many processes that undergraduate research will include, promoting a deeply engaged and high-quality research experience. With our support, the student will be prepared to pursue further research opportunities and careers.

Stephanie has involved so many students ... in research all over campus in the time that she has worked in the Office of Undergraduate Research. She is deeply concerned for the well being and education experience undergraduates are receiving on our campus.

NUMBER OF ADVISING APPOINTMENTS BY COLLEGE/SCHOOL OF THE STUDENT'S MAJOR



UNDERGRADUATE RESEARCH EDUCATION SERIES (URES)

We offer educational lectures, panels, and workshops on topics of interest to undergraduate student researchers and their faculty mentors. These events are open to all and are designed with undergraduate students in mind.

Events in the Undergraduate Research Education Series cover topics such as:

- Asking for Letters of Recommendation
- Creating Effective Research Posters
- Data Management
- Discipline-Specific Writing
- Doing Library Research
- How to Get Good Mentorship
- How to Read a Research Article
- How to Translate Your Research into a Resume
- How to Write a Personal Statement
- Institutional Review Board
- Leveraging Your Research Experience in Industry
- Preparing for Graduate School
- Preparing for Medical School
- Public Speaking
- Research Resources
- Responsible Conduct of Research
- Women in Research
- Writing an Abstract

UNDERGRADUATE RESEARCH EDUCATION SERIES STATISTICS 2016-17

Summer 2016	239	(10 events)
Fall 2016	550	(14 events)
Spring 2017	421	(14 events)
	1210	TOTAL ATTENDEES

RESEARCH EDUCATION PARTNERS

Through our Undergraduate Research Education Series, we have established a number of partnerships throughout campus.

Our partners include:

- Bennion Center
- Career Services
- College of Fine Arts
- Department of Anesthesiology
- Department of Bioengineering
- Department of Biology
- Department of Chemistry
- Department of Materials Science & Engineering
- Department of Nephrology
- Department of Philosophy
- Department of Psychology
- Department of Theater
- Graduate School
- Honors College
- Institutional Review Board
- Lassonde Institute
- Learning Abroad
- Marriott Library
- School of Medicine

OUTSTANDING UNDERGRADUATE STUDENT RESEARCHER AWARDS

In 2015, we introduced the Outstanding Undergraduate Researcher Award. We are delighted to recognize an outstanding undergraduate researcher from each college/school at the University of Utah. Faculty mentors are invited to nominate students and awardees are selected by committee. The criteria for the Outstanding Undergraduate Researcher Award are:

- Record of sustained commitment to developing research skills and knowledge under the supervision of a faculty mentor
- Evidence of independent and critical thinking
- Active participation in research-related activities on campus
- Positive contributions to the research culture of the Department, College, and University



2017 AWARDEES

Sara Ference (Prof. Elpitha Tsoutsounakis)
Architecture + Planning

Heidi Qin (Prof. Dolores Delgado Bernal)
Cultural and Social Transformation

Carol Castañeda (Prof. Mary Burbank)
Education

Benjamin Gilmore (Prof. Taylor Sparks)
Engineering

Ali Mitchell (Prof. Monty Paret)
Fine Arts

Shantae George (Prof. Heather Hayes)
Health

Samantha Duzy (Prof. Michael Gills)
Honors College

Eve Olson (Prof. Rachel Hayes-Harb)
Humanities

Caroline Wang (Prof. Catherine Loc-Carillo)
Medicine

Nicholas Thiros (Prof. Diego Fernandez)
Mines & Earth Sciences

Kyle McDougle (Prof. Lauren Clark)
Nursing

Annwin Chen (Prof. Amy Barrios)
Pharmacy

Amanda Bischoff (Prof. Matthew Sigman)
Science

Kai Sin (Prof. Aikio Kamimura)
Social & Behavioral Sciences

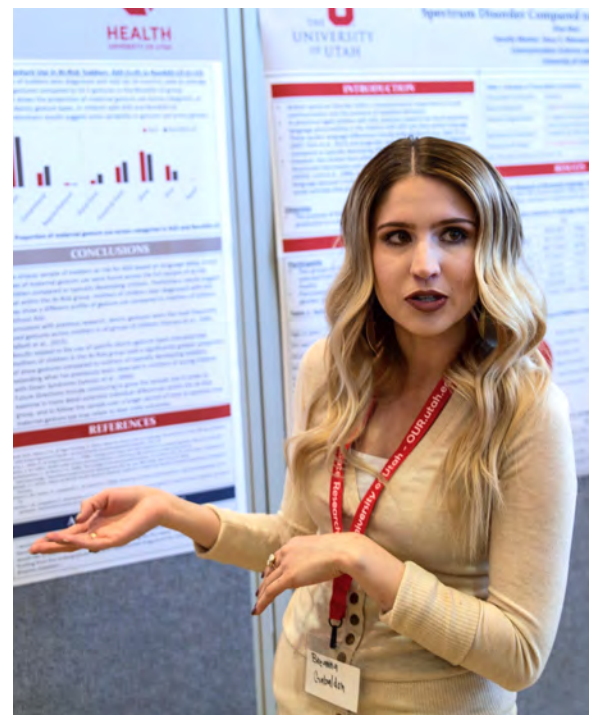
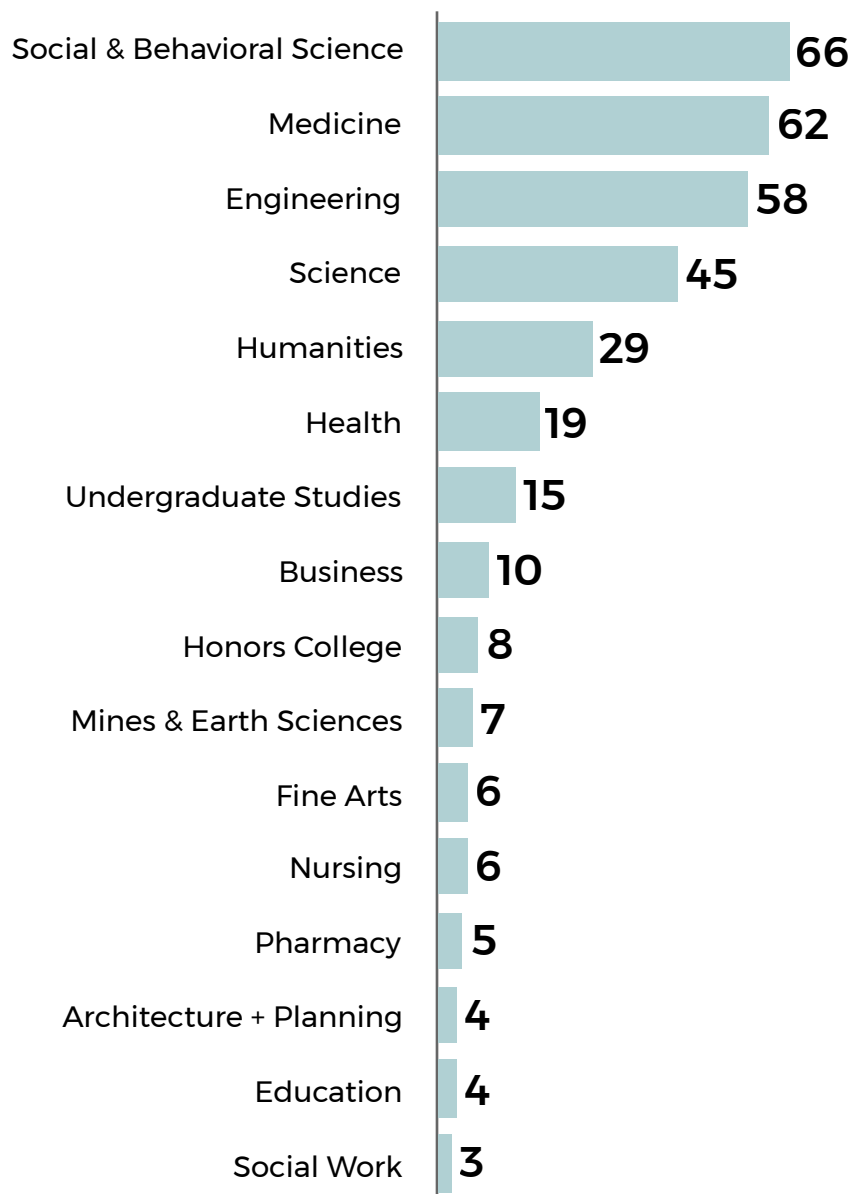
Rose Gomez (Prof. Jason Castillo)
Social Work

UNDERGRADUATE RESEARCH SYMPOSIUM (URS)

The Undergraduate Research Symposium (URS) provides an opportunity for students to present their work in a scholarly setting to students, faculty and other members of the University of Utah community. Undergraduate students from all disciplines are invited to present their research and creative work.

The Office of Undergraduate Research hosted the 14th Annual URS on Tuesday, April 4, 2017 in the Union Building.

NUMBER OF PRESENTATIONS BY COLLEGE/ SCHOOL OF THE STUDENT'S FACULTY MENTOR



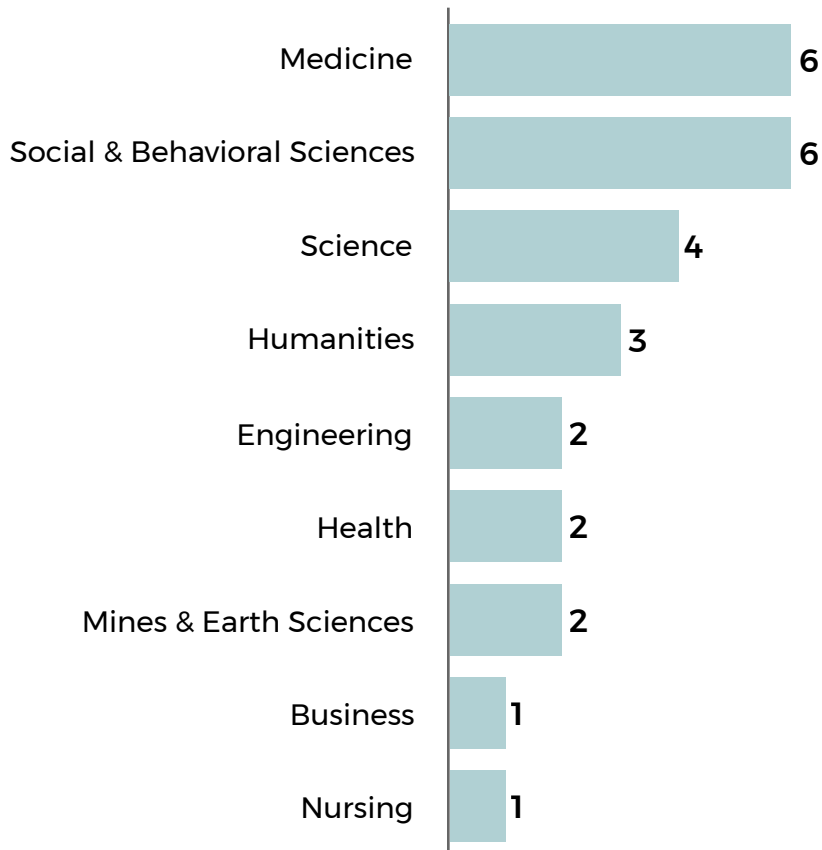
The undergraduate research experience has helped me realize that I am passionate about science and has given me critical skills like poster presentations, collaboration, writing funding applications, and presenting to the public.

RESEARCH ON CAPITOL HILL (ROCH)

The Office of the Vice President for Research, the Office of Government Relations and the Office of Undergraduate Research select students each year to exhibit their work via posters to Utah State legislators. This event demonstrates the importance of undergraduate research and creative work from the two Research I universities in this state: University of Utah and Utah State University.

The 17th Annual Research on Capitol Hill (ROCH) took place on Tuesday, January 24, 2017 in the rotunda of the Utah State Capitol.

NUMBER OF PRESENTATIONS BY COLLEGE/ SCHOOL OF THE STUDENT'S FACULTY MENTOR



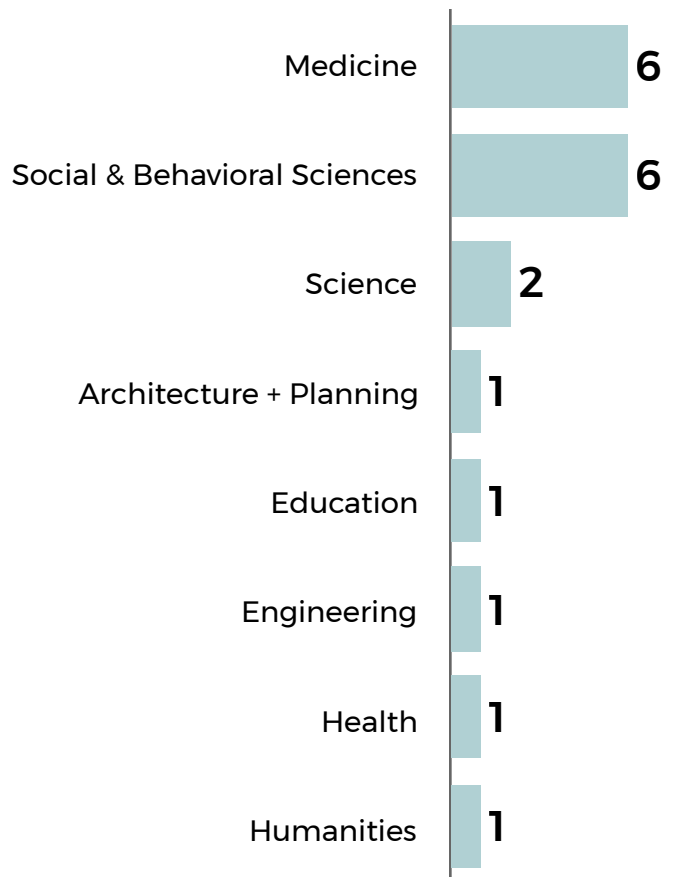
Thank you for letting me be a part of this amazing experience! It was invigorating to speak with legislators and government personnel as well as to meet other research students and learn about their projects!

UTAH CONFERENCE ON UNDERGRADUATE RESEARCH (UCUR) & NATIONAL CONFERENCE ON UNDERGRADUATE RESEARCH (NCUR)

Each year, the Office of Undergraduate Research facilitates attendance at UCUR and NCUR by organizing abstract submissions and supporting travel to the conferences. These conferences provide an opportunity for students to present their work to peers throughout the state and country.

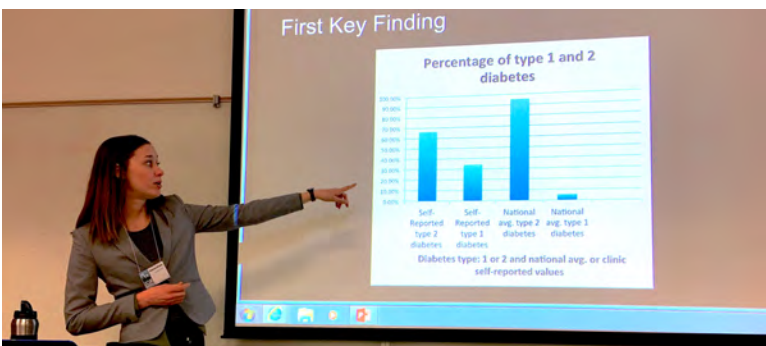
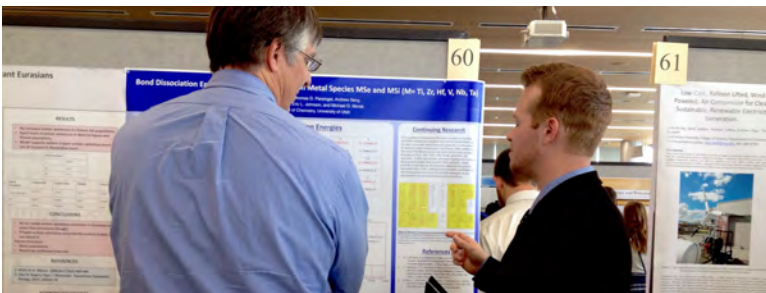


NUMBER OF NCUR PRESENTATIONS BY COLLEGE/ SCHOOL OF THE STUDENT'S FACULTY MENTOR



CONFERENCE ATTENDANCE 2017

37	UCUR PRESENTERS
22	NCUR PRESENTERS



MONSON ESSAY PRIZE

The Charles H. Monson Essay Prize honors Charles H. Monson Jr., who was a distinguished member of the University Philosophy Department from 1958 to 1974. Professor Monson earned his Bachelor's and Master's degrees from the University of Utah and received his Ph.D. from Cornell University. During his years at the University of Utah, he served as chair of the Philosophy Department and Associate Vice President for Academic Affairs. He received the University's Distinguished Teaching Award in 1970. In his honor, an annual prize is awarded to an undergraduate student who writes an outstanding essay on a subject having to do with social change.

2017 RECIPIENT

Kai Sin (Prof. Akiko Kamimura)

Health and well-being of women migrating from Muslim-dominated countries to the United States



My Monson Prize project aims to examine the health and well-being of women migrating from Muslim-dominated countries to the U.S. The information from this study will be useful to improve access to health care services and health outcomes of women from Muslim-dominated countries. This study in particular focused on self-reported health status including depression, physical functioning and general health, and experiences in health care. This project has been helping me to prepare for graduate education in health promotion and education.

— Kai Sin

2017 Monson Essay Prize Winner

SUMMER PROGRAM FOR UNDERGRADUATE RESEARCH (SPUR)

Generously funded by the Office of the Vice President for Research, SPUR provides undergraduate researchers with an intensive 10-week research experience under the mentorship of a University of Utah faculty member.

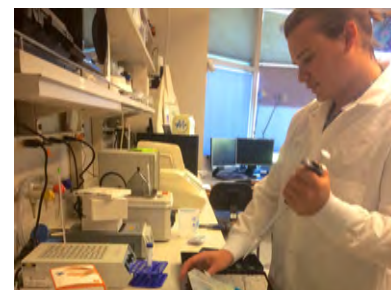
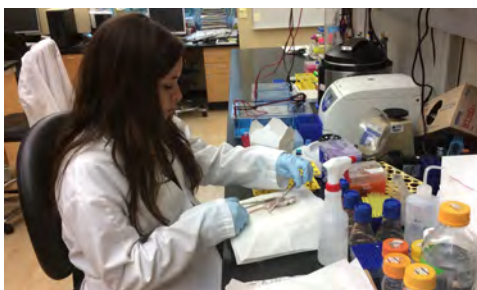
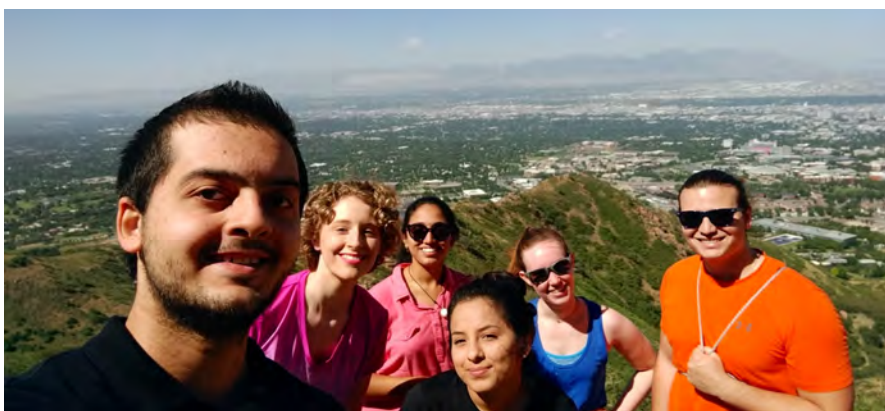
In addition to their intensive research experience, students will attend summer URES events, submit to the *Undergraduate Research Journal*, and present at the inaugural Summer Symposium.



FIRST COHORT

Our first cohort of 23 students includes students from the following institutions:

- Belmont University
- BMS College of Engineering
- Brigham Young University
- Rice University
- Salt Lake Community College
- Southern Utah University
- University of Puerto Rico-Mayaguez Campus
- University of South Dakota
- University of Texas Rio Grande Valley
- University of Utah
- Vassar College
- Waynesburg University
- Westminster College



SUMMER PROGRAM PARTNERS

- Physics & Astronomy REU
- Chemistry REU
- Materials Research Science & Engineering Centers (MRSEC) REU
- Native American Summer Research Internship (NARI)

UNDERGRADUATE RESEARCH SCHOLAR DESIGNATION (URSD)

The Undergraduate Research Scholar Designation (URSD) recognizes a student's commitment to their development as a researcher during their undergraduate career. The URSD appears in the awards section of the transcripts of graduating students. URSD recipients receive a white research cord from the Office of Undergraduate Research to wear at convocation and commencement.



URSD STATISTICS 2016-17

Summer 2016	8
Fall 2016	14
Spring 2017	115
TOTAL RECIPIENTS	137



I want to thank the University of Utah for having a program like this. It was one of the most impactful events that occurred in my undergraduate career.

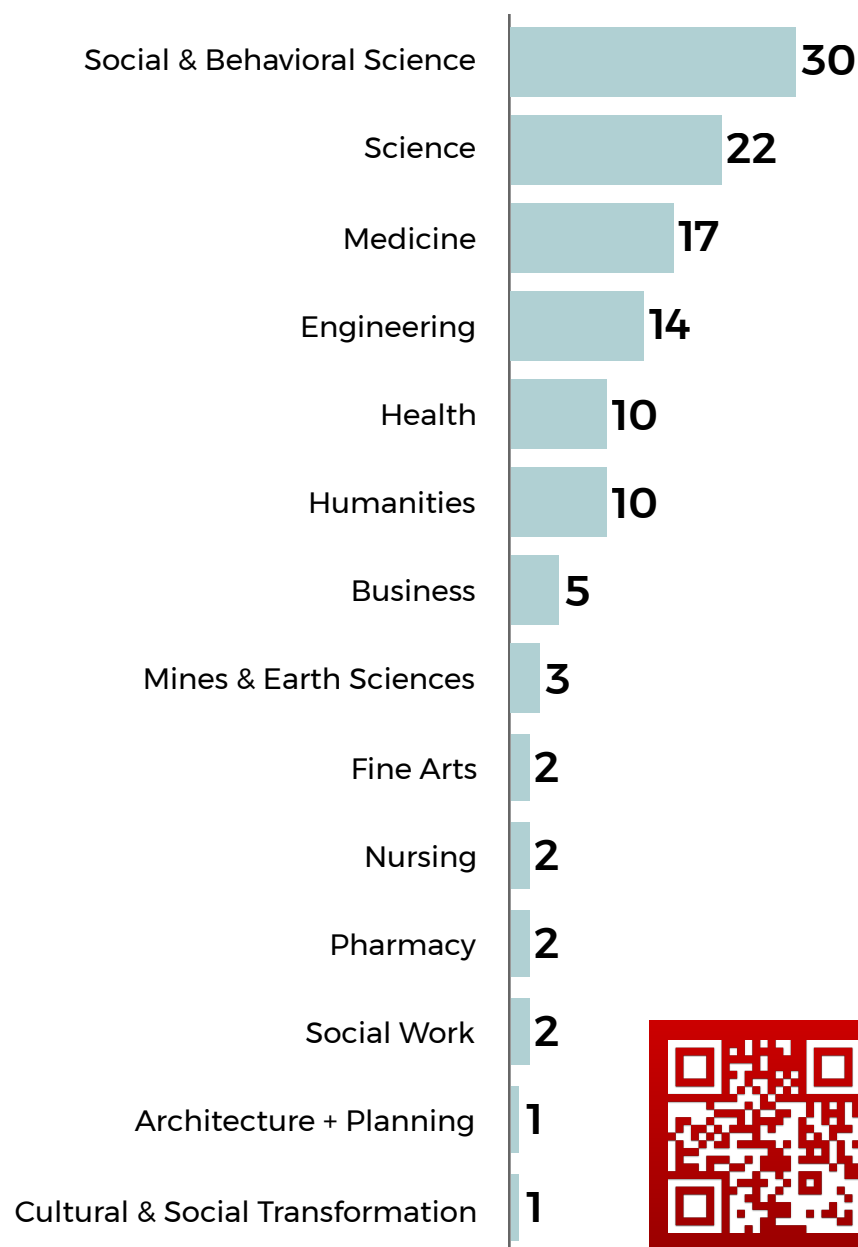


UNDERGRADUATE RESEARCH JOURNAL (URJ)

The *Undergraduate Research Journal's* primary mission is to make more visible the rich and diverse student contributions to research and creative work at the University of Utah. All undergraduate students involved in research at the University of Utah are strongly encouraged to submit summaries of their work for publication in this journal.

Starting in 2015, the Journal is published online thanks to a partnership with the Marriott Library.

NUMBER OF SUBMISSIONS BY COLLEGE/ SCHOOL OF THE STUDENT'S FACULTY MENTOR



READ THE JOURNAL ONLINE AT
our.utah.edu/urj2017

UNDERGRADUATE RESEARCH LEADERS

In 2015, we introduced the Undergraduate Research Leaders program. Each year, we select a small cohort of students to serve as ambassadors for our office.

The Undergraduate Research Leaders assist the office and promote undergraduate student research through a variety of activities:

- Office outreach on campus
- Student recruitment
- Student engagement
- Peer advising
- Program development (education programming and community building)
- Small and travel grant reviews



The professional development that this program offered was one of its strongest attributes in my opinion. I learned about a working environment and about where I could [improve] in the future, like with public speaking. Developing a relationship with the leaders was also a good experience.

OUTREACH

We engage in many student outreach activities throughout the year with the goal of increasing participation in undergraduate research. Our student outreach activities include tabling, information sessions, in-class presentations, and presentations to student organizations. Through our outreach activities, we hope to make students more aware of the multitude of research opportunities available to them, the benefits of participating in undergraduate research, and help them get started finding a fulfilling research experience. In Spring 2017, we reached more than 600 students at 25 outreach events.

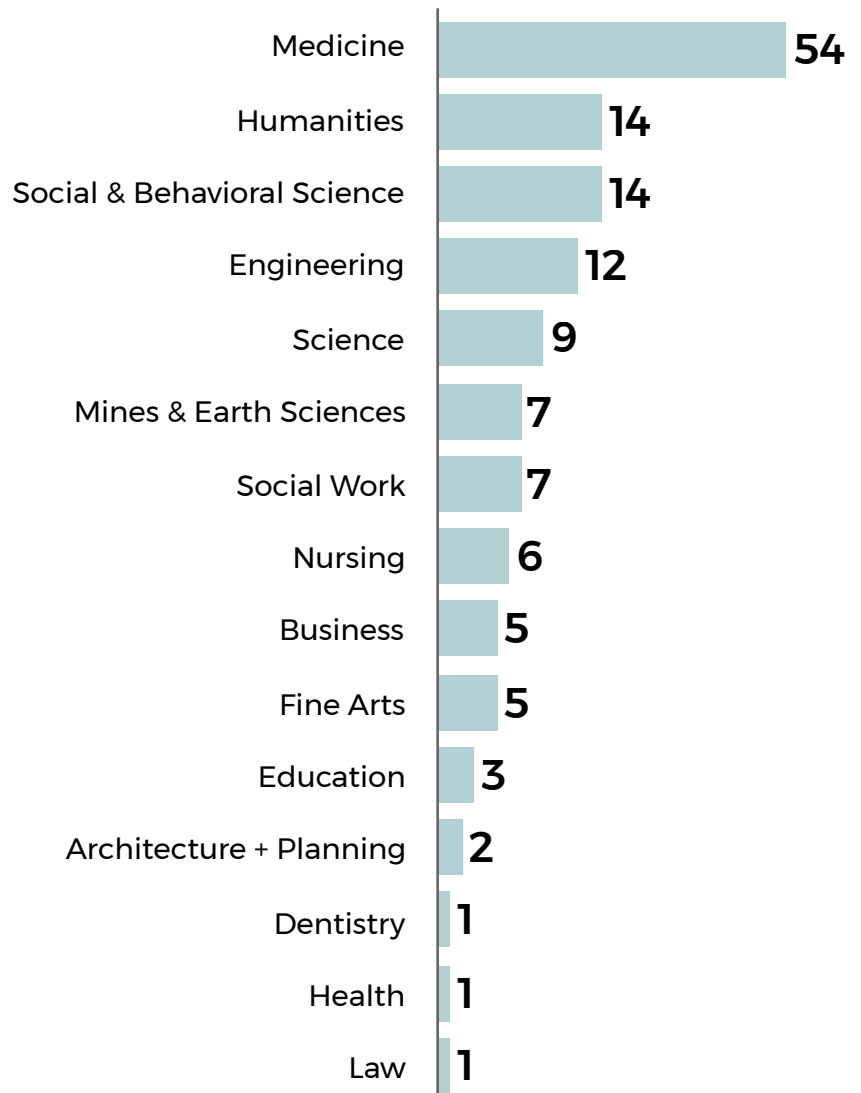
We also maintain the online Research Opportunities Database, which informs students of ways in which they can get involved in undergraduate research at the U.



CAMPUS OUTREACH PARTNERS

- Anthropology
- Architecture + Planning
- BlockU
- Chemistry
- Communication
- Engineering
- Honors College
- Innovation Scholars
- Learning Abroad
- Linguistics
- New and Transfer Student Orientation
- Pre-Med
- Psychology
- Salt Lake Center for Science Education
- Social Work

NUMBER OF RESEARCH OPPORTUNITY POSTINGS BY COLLEGE/ SCHOOL OF THE FACULTY MENTOR



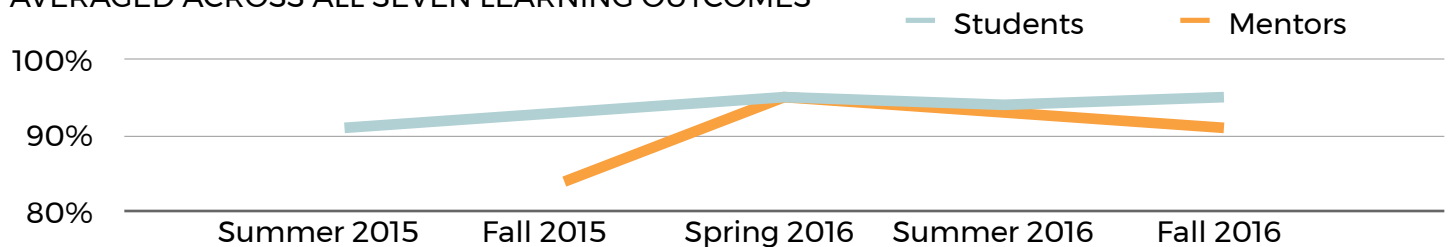
UNDERGRADUATE RESEARCH LEARNING OUTCOMES ASSESSMENT

Each semester, all UROP scholars and their faculty mentors are invited to complete an online learning outcomes assessment. They are asked to indicate their level of agreement to statements relating to the Office of Undergraduate Research Learning Outcomes:

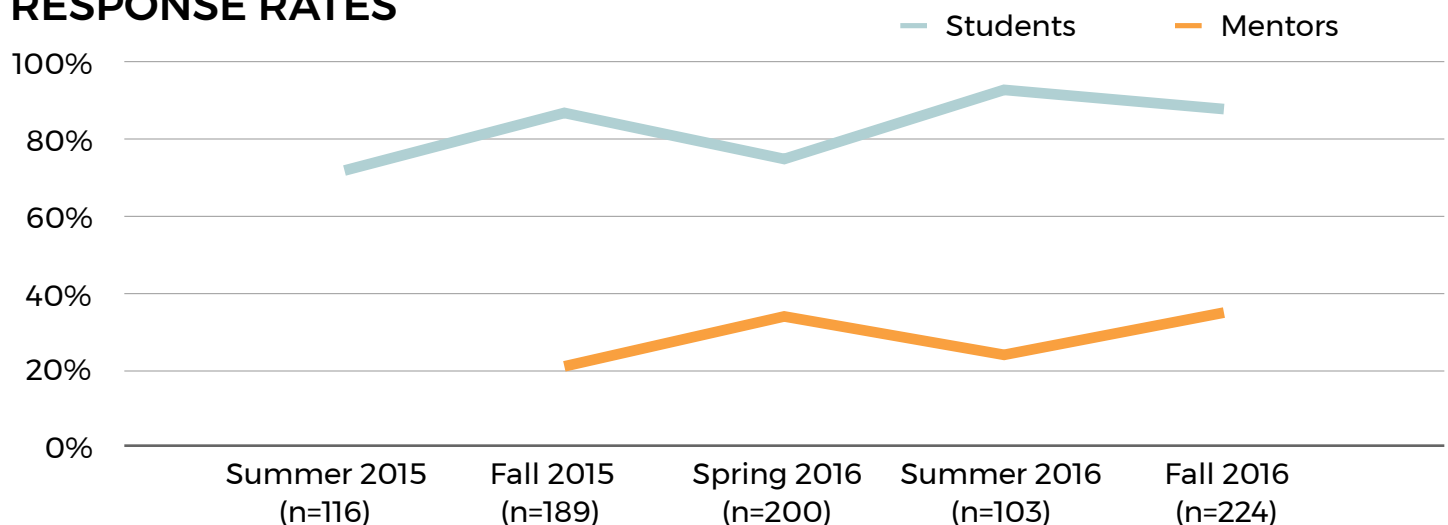
- Identify and utilize relevant previous work that supports their research
- Articulate a timely and important research question or creative objective
- Identify and utilize appropriate methodologies to address the research question or creative objective
- Meet the relevant field's standards for the responsible conduct of research and effectively navigate challenges that arise in the research process
- Work collaboratively with other researchers, demonstrating effective communication and problem-solving skills
- Present the research effectively in a conference setting and a written publication
- Reflect constructively on their research experience, identifying what was learned, personal strengths and opportunities for growth, and how the experience informs their future educational and career goals

PERCENT "AGREE" AND "STRONGLY AGREE" RESPONSES

AVERAGED ACROSS ALL SEVEN LEARNING OUTCOMES



RESPONSE RATES



GOALS FOR 2017-18

The Office of Undergraduate Research has made substantial progress in “scaling up” over the course of the 2016-2017 academic year. We have:

- **Launched the Undergraduate Research Mentor Development Program.** The purpose of the Undergraduate Research Mentor Development Program is to prepare graduate students and postdoctoral scholars to serve as high-quality research mentors to undergraduate students, increasing the pool of available research mentors. In Spring 2017, our first cohort of 13 scholars successfully completed the program. Professor Christie Toth will be facilitating the program in Fall 2017 and Spring 2018.
- **Launched the Summer Program for Undergraduate Research (SPUR).** Generously funded by the Office of the Vice President for Research, SPUR provides undergraduate researchers with an intensive 10-week research experience under the mentorship of a University of Utah faculty member. There is great potential for “scaling up” in the context of SPUR—in Summer 2017, we already have two University of Utah faculty members leveraging the infrastructure of SPUR but providing their own funding. In this way, SPUR’s capacity in terms of numbers of students served is not limited to funding available from the Office of Undergraduate Research, but rather increases as University of Utah faculty invest their own funds. In Summer 2017, our first cohort of 23 SPUR students includes 7 University of Utah students.

Our goal for academic year 2017-2018 is to continue these efforts. In particular, we plan to:

- **Increase the number of graduate students, postdoctoral scholars, and faculty we can serve in the Undergraduate Research Mentor Development Program.** Response to the program has been overwhelming (we currently have 70+ individuals on the waiting list). We are limited only by the number of qualified facilitators and funding for facilitator stipends and will work over the coming year to increase both.
- **Continue and expand the Summer Undergraduate Research Program Partnership we have established** with the Physics & Astronomy Research Experience for Undergraduates (REU), the Chemistry REU, Materials Research Science & Engineering Centers (MRSEC) REU, and the Native American Summer Research Internship (NARI). This year three faculty members used their own funds to allow students of their own choosing to participate in SPUR. We plan to increase awareness across campus in SPUR and to encourage faculty to take advantage of the infrastructure we provide to increase the numbers of students participating and the impact of SPUR throughout campus.