

# Office of Undergraduate Research

Annual Report 2015-2016



Rachel Hayes-Harb  
*Director*

Stephanie Shiver  
*Undergraduate Research Advisor*

Janet Opel  
*Administrative Manager*

Cindy Greaves  
*Program Coordinator*



# Table of Contents

2015-2016 at a Glance .....	2
Why Undergraduate Research? .....	3
Contributions to the Common Good .....	4
Summary of Accomplishments 2015-2016 .....	5
Undergraduate Research Opportunities Program (UROP) ....	6
Special UROP Awards .....	7
Small Grants & Travel Grants .....	8
Undergraduate Research Advising .....	9
Undergraduate Research Education Series .....	10
Outstanding Undergraduate Student Researcher Awards ....	11
Undergraduate Research Symposium .....	12
Research on Capitol Hill .....	13
Utah Conference on Undergraduate Research (UCUR) & National Conference on Undergraduate Research (NCUR) ..	14
Monson Essay Prize .....	15
Undergraduate Research Scholar Designation .....	16
Undergraduate Research Journal .....	17
Undergraduate Research Leaders .....	18
Undergraduate Research Learning Outcomes Assessment ...	19
Goals for AY 2016-2017 .....	20



# AY 2015-2016 Statistics at a Glance

## UROP Award Statistics 2015-2016

Fall 2015: 189 (227 applications)  
Spring 2016: 200 (242 applications)  
Summer 2016: 103 (125 applications)

## Research Opportunities

Currently 112 Opportunities Posted

## URS 2016 Statistics

351 presentations (82 Oral, 269 Posters)

## NCUR 2016 Statistics

45 University of Utah student presenters

## UCUR 2016 Statistics

Hosted by the University of Utah -  
February 19, 2016  
122 University of Utah presenters

## Undergraduate Research Journal Statistics 2016 Edition

117 student submissions

## Grant Statistics 2015-2016

49 Travel Grant Awards  
36 Small Grant Awards  
(Mar. 2015 – Feb. 2016)

## Undergraduate Research Education Series Statistics

**1028 attendees during AY 2015-2016**  
Summer 2015: 8 events; 263 attendees  
Fall 2015: 13 events; 408 attendees  
Spring 2016: 12 events; 357 attendees

## Advising Statistics 2015-2016

322 advising appointments  
(Mar. 2015 – Feb. 2016)

## ROCH 2016 Statistics

24 University of Utah student presenters  
11 UofU colleges/schools represented

## URSD Statistics 2015-2016

Summer 2015: 19  
Fall 2015: 13  
Spring 2016: 125



# Why Undergraduate Research?

A thriving undergraduate student 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.

A thriving undergraduate student research culture benefits 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.

A thriving undergraduate research culture benefits our community and our society in general.

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 and our society.

*My undergraduate research experience has been a tremendous opportunity for growth. I am amazed how much I have learned.*

- UROP Scholar

# 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.**

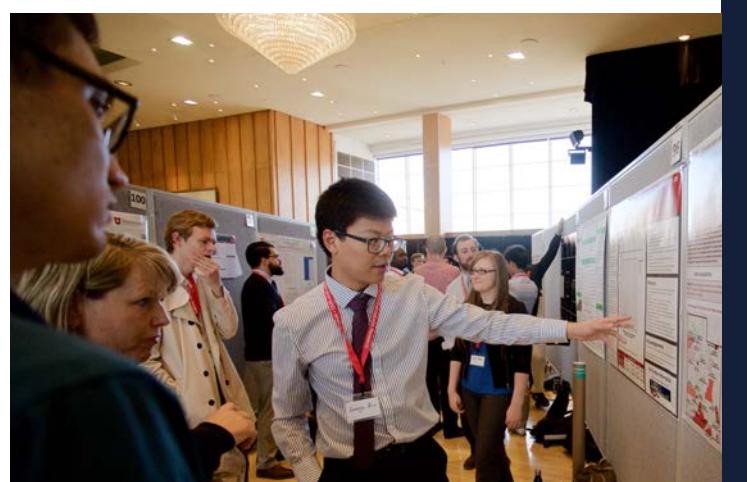
We are responsible for the Undergraduate Research Living and Learning Community. The Living and Learning Community helps initiate the feeling of belonging to the scholarly community by providing incoming students with a structured living environment and additional opportunities and resources to explore research at the University. It helps support students' self-identification as interested and 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 at least one 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 mentoring 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.





I have gained many experiences and skills that will follow me into my future. I have become a better person as a whole through teamwork, communication, and hard work and plan to continue these qualities.

- UROP Scholar



**Elaborated undergraduate research learning objectives.** We established a set of learning outcomes for undergraduate research that are common to all traditions of research on the University of Utah campus.

**Began to track student achievement of undergraduate research learning objectives.** We collected student self-report and faculty assessment data at the end of Summer 2015, Fall 2015, and Spring 2016 semesters. Assessment reports are publicly available on our website; OUR.utah.edu.

**Put undergraduate research posters on display at the Marriott Library.** We began a partnership with the Marriott Library to display students' research posters beyond their original use at a conference or other event. These are located on the hallway on the first floor just inside the west entrance.

# Summary of Accomplishments 2015-2016

**Launched the Undergraduate Research Leaders Program.** We introduced the Undergraduate Research Leaders program, designed to make research more accessible to students around campus by putting a student face to it and to help already successful undergraduate researchers continue to develop their professional and leadership skills.

**Hosted the 2016 Utah Conference on Undergraduate Research.** On February 19, 2016, we hosted UCUR 2016 in the Olpin Union Building. There were 157 oral presentations, 236 posters, and three exhibits / performances.

**Expanded the reach of our programs to the Asia Campus.** For the first time, students on the University of Utah's Asia Campus participated in our programs, including the Undergraduate Research Opportunities Program (UROP).

# Undergraduate Research Opportunities Program (UROP)



Program (UROP) provides undergraduate students 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/hour for up to 120 hours of work during the semester.

*My UROP experience opened so many doors for me that I would not have known about without the program. I appreciate all that I learned through this experience and know that it will have a lasting impact on my future career.*

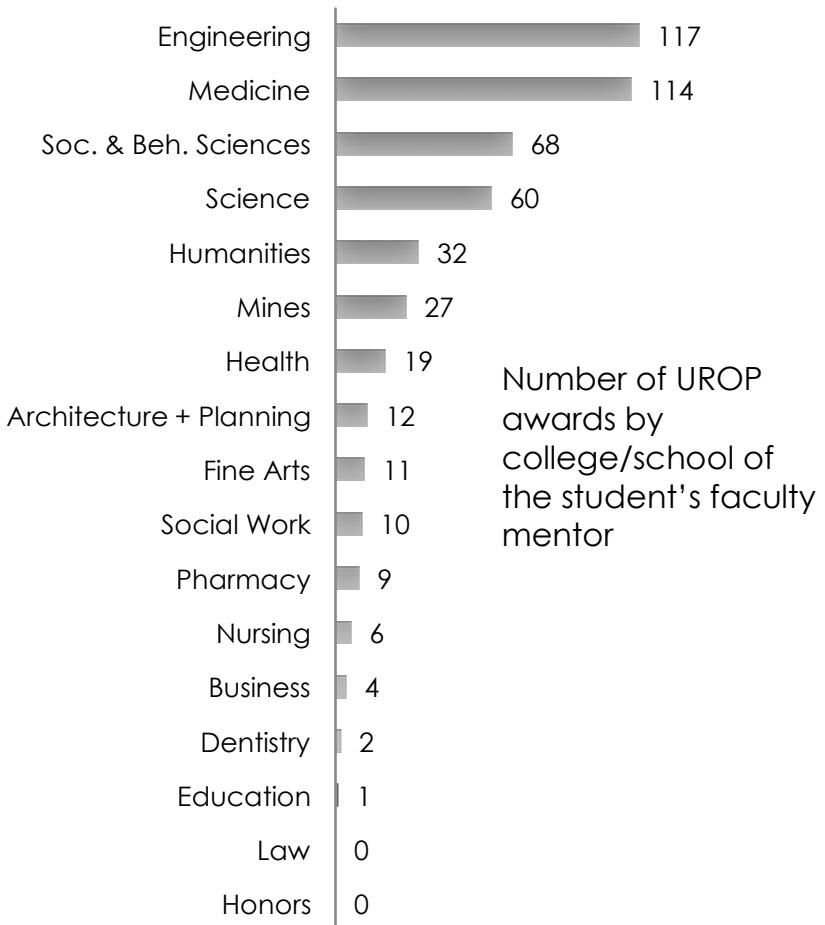
- UROP Scholar

## UROP Award Statistics 2015-2016

Fall 2015: 189 (227 applications)

Spring 2016: 200 (242 applications)

Summer 2016: 103 (125 applications)



# Special UROP Scholar Awards

## Dee Foundation UROP Scholars

The Lawrence T. Dee and Janet T. Dee Foundation is dedicated to furthering the growth and well-being of the people of northern Utah.

**Cole Richards** (*Prof. Keith Koper*) – Physical Mineral Characteristics of Fault Zones as a Function of Distance from the Core

**Colton Leavitt** (*Prof. Sujee Jeyapalina*) – The Inherent Properties of Fluorohydroxyapatite: Decreasing Downgrowth and Infection in Percutaneous Intraosseous Implants

**William Nguyen** (*Prof. Milind Deo*) – Flow in Nanoporous Rocks

**Alberto Martinez** (*Prof. Milind Deo*) – Effect of Nanoporous Materials on Saturation Pressure in Shale Reservoirs

## Chevron Foundation UROP Scholars

Chevron has partnered with the Office of Undergraduate Research to support female students working on STEM-specific projects.

**LeAnn Lam** (*Prof. Robert Bowles*) – CRISPR Genome Editing of Adipose-Derived Stem Cells for Controlled Extracellular Matrix Deposition in Tissue Engineered Intervertebral Disc

**Emily Dennis** (*Prof. Srividya Bhashara*) – Effect of HDAC Inhibition on Genome Stability

**LeAundra Jeffs** (*Prof. William Brazelton*) – Comparative Metagenomics of Serpentization Powered Microbes

**Christina Hyer** (*Prof. Susan Bock*) – Influenza Vaccine Virus-Like Particle (VLP) Production in *Trichoplusia Ni*

**Deanne Yugawa** (*Prof. Charles Murtaugh*) – Determining the Effect of Sox9 Deletion in PTF1A Knockouts

## Francis Family Foundation UROP Scholars

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

**Ali Mitchell** (*Prof. Alison Denyer & Prof. Paul Monty Paret*) – Art, Ecology and the Politics of Land Use

**Ciria Alvarez** (*Prof. Kim Hackford-Peer*) – Dream Defenders-An analysis of Federal, State and Institutional Policy affecting Undocumented Students

**Margaret Carlson** (*Prof. Akiko Kamimura*) – Perceptions of Violence Against Women Among College Students in the US, Japan, India, Vietnam, and China

## Parent Fund UROP Scholars

The Parent Fund is sustained by parents and supports student-centered programs and initiatives. The Parent Fund plays an integral role in the University of Utah's ability to provide students with exceptional opportunities inside and outside the classroom. Each year, depending on funding, a first-semester UROP student is selected to receive the Parent Fund UROP Award.

**Christie Morgan** (*Prof. Lindsay Gezinski*) – Is There a Sex Trafficking Problem in Salt Lake County?

**Shaswat Chapagain** (*Prof. Ravi Ranjan*) – Relationship of Catheter Contact Force with Acute and Final Radiofrequency Lesion Size

**Jenny Le** (*Prof. Pinar Bayrak-Toydemir*) – Autism spectrum disorder: The development of a comprehensive approach for the molecular diagnosis of autism



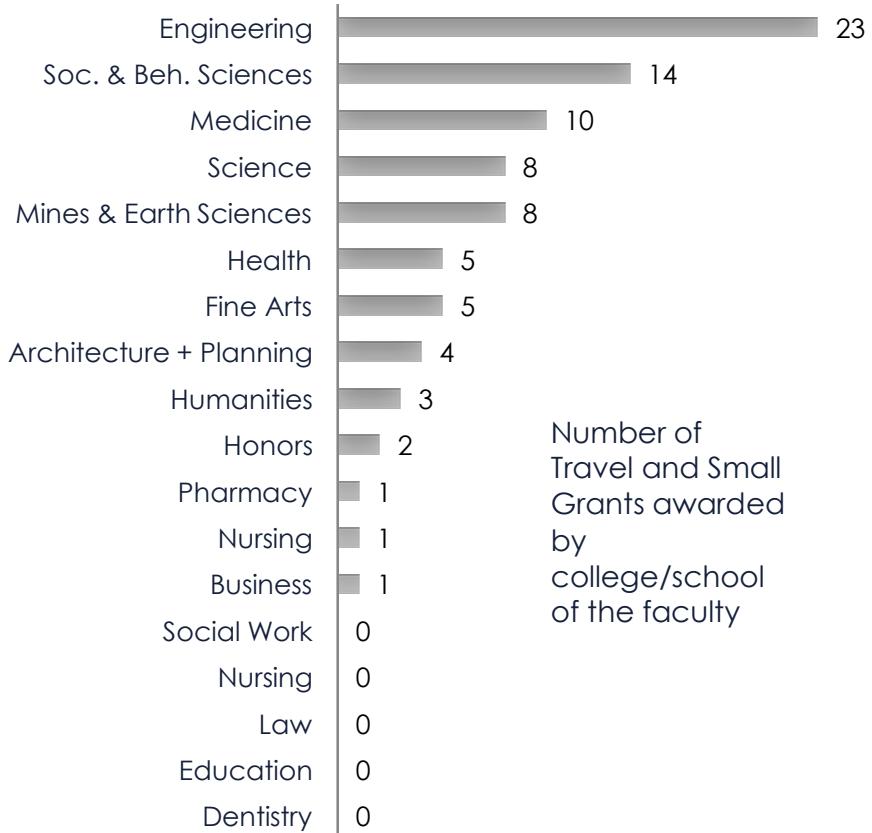
# Small Grants & Travel Grants

## Grant Statistics 2015-2016

49 Travel Grant Awards

36 Small Grant Awards

(Mar. 2015 – Feb. 2016)



## Small Grants

Funding from the small grant program (max \$200) can help with future purchases of: research supplies, special training fees, or other research costs related to the student's original work.

## Travel Grants

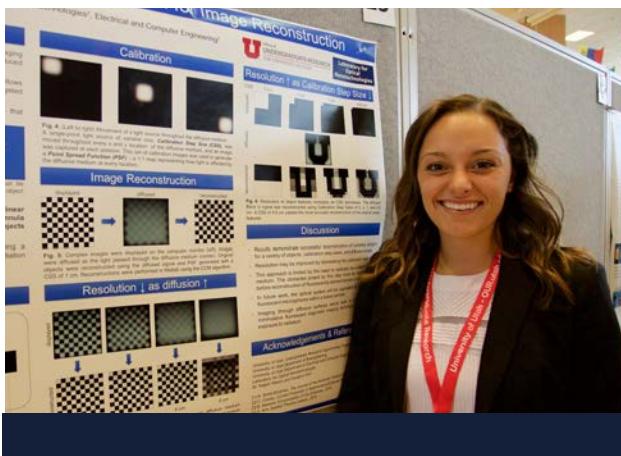
Funding from the travel grant program (max \$500) might cover expenses for future: airfare, lodging, conference registration, gas/mileage.



*My research experience has helped my undergraduate experience become real and applicable. It has tied into classes I have taken to make them much more purposeful and in the end easier to understand and have a passion for. At the same time it has shown me the difficulties and rewarding moments research can bring.*

- UROP Scholar

UROP Scholar

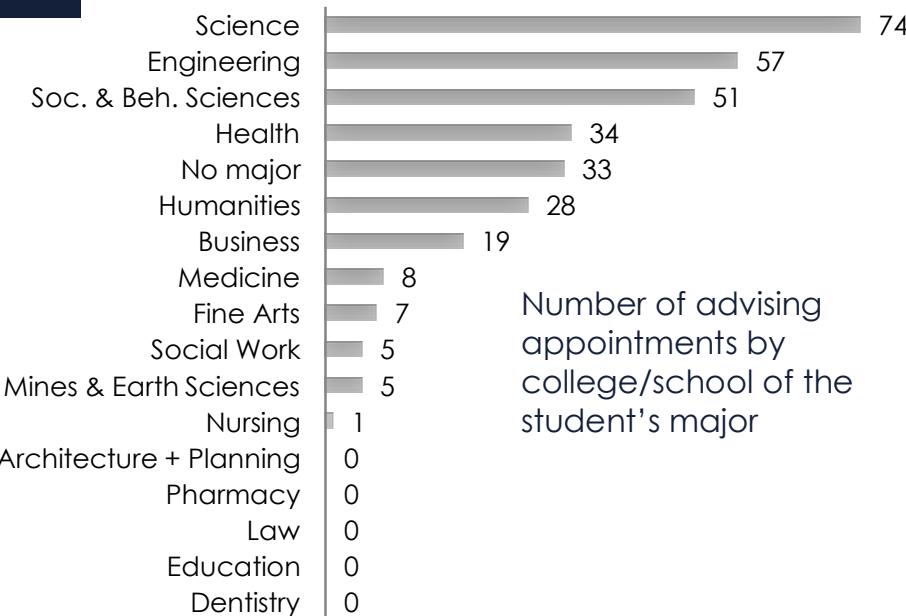


We provide comprehensive advising for students throughout the entire undergraduate research process. Advising is intended to provide a supportive environment for the student to become involved with research and to prepare the student for and guide the student through the many processes that undergraduate 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/careers.

# Undergraduate Research Advising

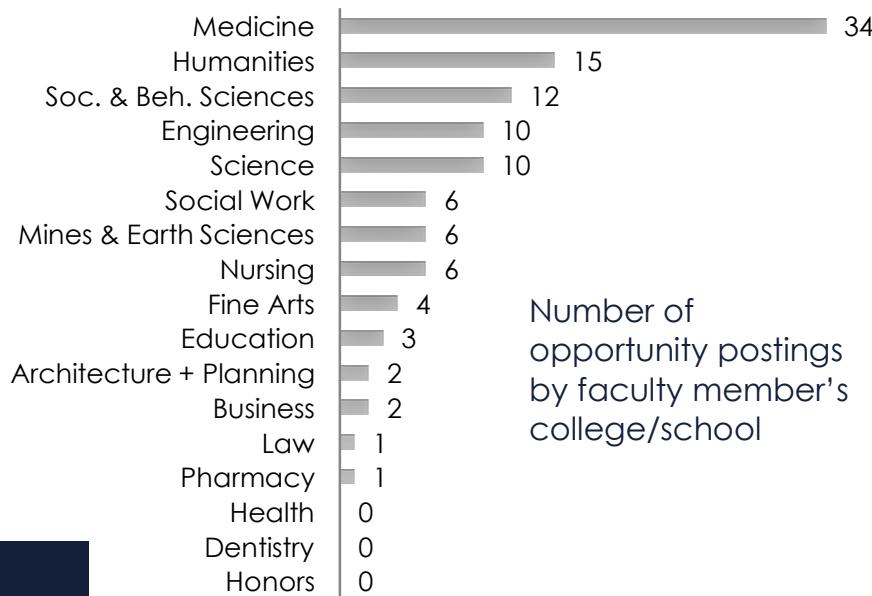
## Advising Statistics 2015-2016

322 advising appointments  
(Mar. 2015 – Feb. 2016)



## Research Opportunity Postings

Currently 112 Opportunities Posted



We offer educational events 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:

- human subjects research ethics
- the Institutional Review Board
- writing abstracts
- creating effective posters
- community-based research
- data management
- distinguished scholarships
- public speaking
- writing a personal statement
- applying to medical school
- asking for letters of recommendation
- discipline-specific writing
- academic communication
- how to read a research

# Undergraduate Research Education Series

## Undergraduate Research Education Series Statistics

### 1028 attendees during AY 2015-2016

Summer 2015: 8 events; 263 attendees

Fall 2015: 13 events; 408 attendees

Spring 2016: 12 events; 357 attendees

## Research Education Partnerships

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

throughout campus. Our partners include:

- Bennion Center
- Department of Communication
- Department of Linguistics
- Department of Material Science & Engineering
- Department of Nephrology
- Department of Philosophy
- Department of Psychology
- Department of Theater
- Department of Writing & Rhetoric
- Graduate School
- Honors College
- Lassonde Institute
- Marriott Library
- School of Medicine
- Spencer Eccles Health Library

*I think my undergraduate research experience taught me how to think critically. I believe these critical thinking skills will be helpful for me in any of my future goals. It has introduced me to what it takes to conduct academic research and how that could be a potential career path.*

- UROP Scholar



In 2015, we introduced the Outstanding Undergraduate Researcher Award, recognizing an outstanding undergraduate researcher from each college/school at the U. The criteria for the 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.

# Outstanding Undergraduate Student Researcher Awards

## 2016 Awardees

### **Architecture + Planning**

Michael Hoehn – *Prof. Erin Carragher*

### **Dentistry**

Peter Curtis – *Prof. Christopher German*

### **Education**

Mercedes Jorgensen – *Prof. Lauren Liang*

### **Engineering**

Kristina Lundgren – *Prof. Taylor Sparks*

### **Fine Arts**

Cynthia Chen – *Prof. Catherine Mayes & Jane Hatter*

### **Health**

Cecilia Cardozo – *Prof. Stacy Manwaring*

### **Honors**

Julie Imig – *Prof. Inese Ivans*

### **Humanities**

Hillary Hermansen – *Prof. Christopher Lewis*

### **Medicine**

Kathryn Lami – *Prof. Sihem Boudina*

### **Mines & Earth Sciences**

Benjamin White – *Prof. Jeffrey Moore*

### **Nursing**

Christina Triptow – *Prof. Katherine P. Supiano*

### **Pharmacy**

Seychelle Marcus – *Prof. Christopher Reilly*

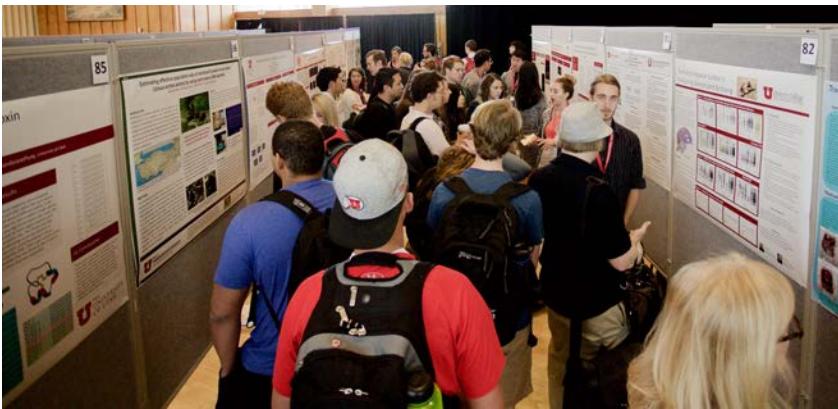
### **Science**

Ethan Lake – *Profs. Oleg Starykh, Yong-Shi Wu & Zheng Zheng*

### **Social & Behavioral Sciences**

Brianna Bartholomew – *Profs. Elizabeth Cashdan & Leslie A. Knapp*

# Undergraduate Research Symposium

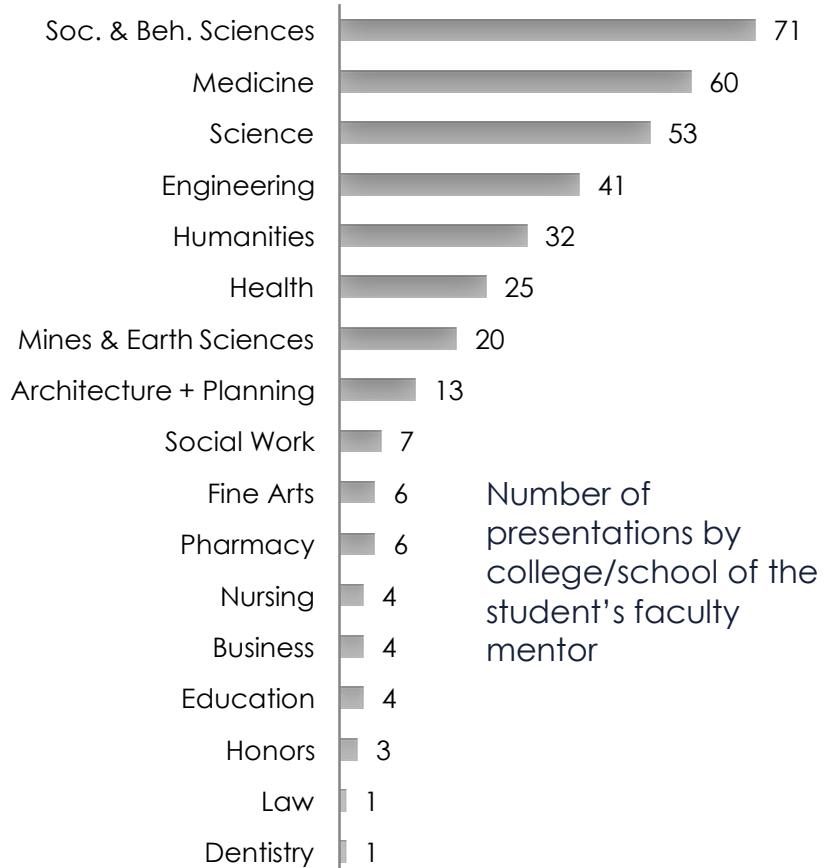


The Office of Undergraduate Research hosted the Undergraduate Research Symposium on April 12, 2016 in the Olpin Union Building.

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

## URS 2016 Statistics

351 presentations (82 Oral, 269 Posters)



*I thoroughly enjoyed the presenting process. Not only did it give my lab motivation to complete a particular project in time, but it also was a nice way to show all of the hard work I've been doing to others as well as to build new resources. It helped out with a lot of bioengineering classes to be able to invest in one project and then present it.*

- UROP Scholar

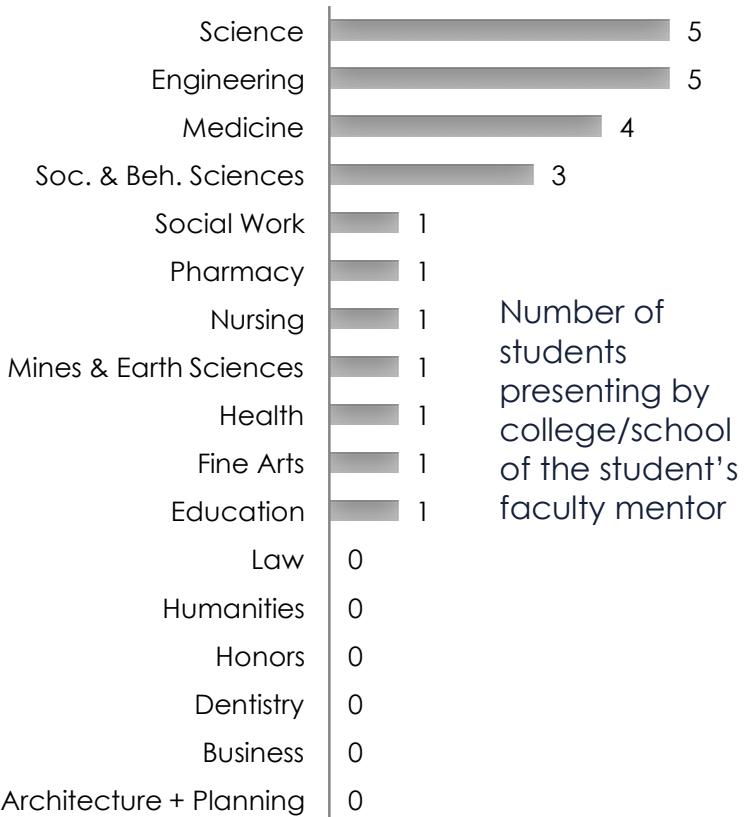
# Research on Capitol Hill



The Office of the Vice President for Research, the Office of Government Relations and The Office of Undergraduate Research selects students each year to exhibit their work via posters to Utah State legislators. This event demonstrates the importance of undergraduate research and creative work at Utah's Research I institutions.

## ROCH 2016 Statistics

24 University of Utah student presenters  
11 UofU colleges/schools represented





# 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.

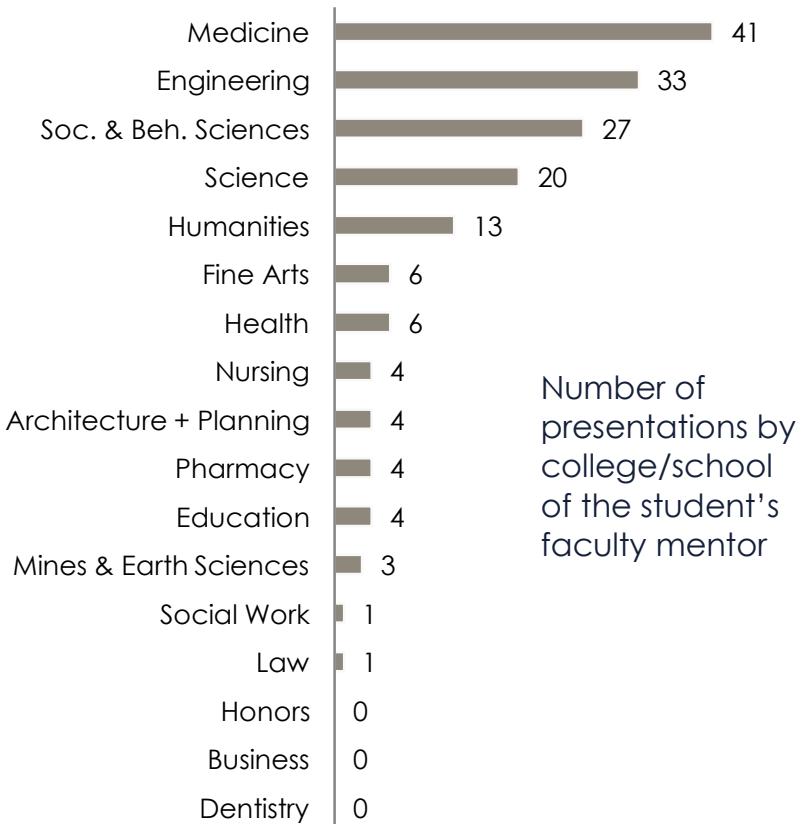


## UCUR 2016 Statistics

Hosted by the University of Utah - February 19, 2016  
122 University of Utah student presenters

## NCUR 2016 Statistics

45 University of Utah student 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, 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 who writes an outstanding essay on a subject having to do with social change.

## 2016 Recipient

**Kyle Criddle- Prof. Leslie Francis**

### **Feasibility of the Lake Powell Pipeline Development Act and Proposed Water Conservation Alternative**

In 2006, after four years of drought, the Utah Legislature was tasked with addressing the increasingly limited water supplies throughout the state. At first, state agencies decided the construction of a pipeline from Lake Powell to Washington and Kane counties would meet the water needs of a growing population in southwestern Utah. However appealing the solution first appeared on paper; many in the academic and scientific community are now skeptical of the feasibility of the project as well as its economic and ecological impacts. In addition, alternative measures to meet future water needs

are numerous, inexpensive, and feasible, which calls the proposed policy into question—especially in a fiscally conservative state such as Utah. Using current data projections, legislative audits, and a range of reports, this paper aims to determine the economic and ecological feasibility of the Lake Powell Pipeline Project. Furthermore, this paper will review the strengths and weaknesses of three alternative policies: instream flows, rainwater harvesting, and agricultural water conversion. Based on a comparison of these various policies, this paper will then conclude with suggestions for the best outcome for the state of Utah.



# Undergraduate Research Scholar Designation (URSD)

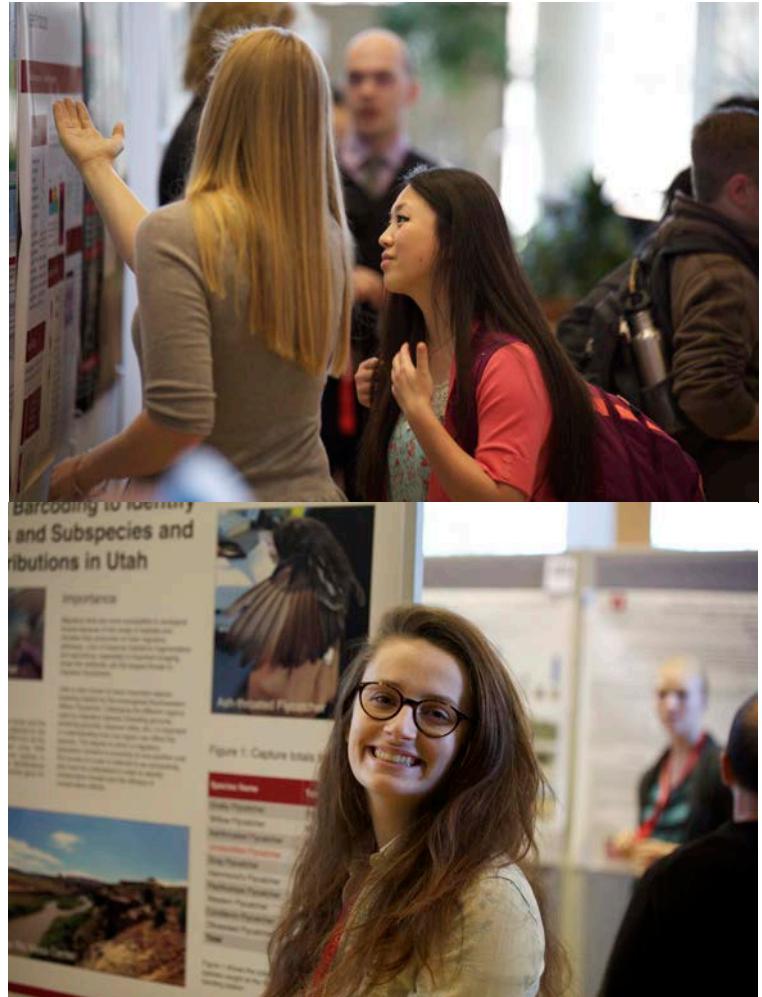
## URSD Statistics 2015-2016

Summer 2015: 19

Fall 2015: 13

Spring 2016: 125

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 awardees receive a white research cord from the Office of Undergraduate Research to wear at convocation and commencement.



# Undergraduate Research Journal



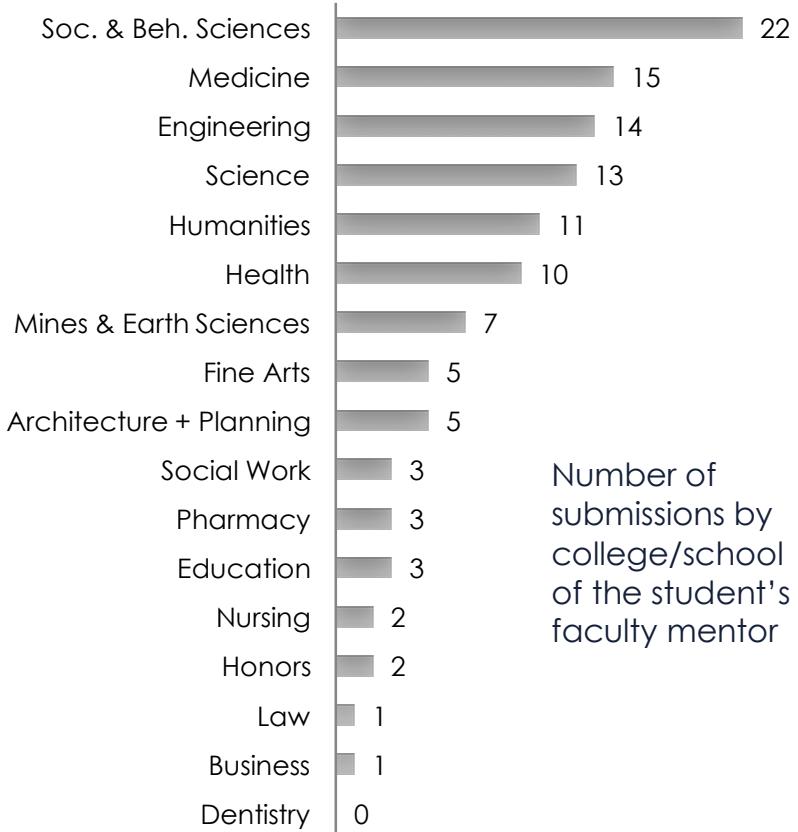
The journal's primary mission is to make more visible the rich and diverse student contributions to research and creative work at the University of Utah. All undergraduate students involved in research at the University of Utah are strongly encouraged to submit one-page summaries of their work for publication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

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

## Undergraduate Research Journal

### Statistics 2016 Edition

117 student submissions



*I plan to go to graduate school after I complete my undergraduate degree, so gaining lab experience was extremely valuable. This program also connected me to a wealth of resources and opportunities across campus.*

- UROP Scholar



In 2015-2016 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
- Travel & Small Grant Reviews

*I really loved the setup of the program. I thought that the flexibility of our work made it a great addition to my undergraduate experience. I also felt I was given sufficient responsibility during this leadership experience learn and grow. I particularly enjoyed the LLC activity and the opportunity to lead a URES session. There are not many venues to learn to present at this level, and this was an important opportunity for me.*

- Undergraduate Research Leader

# Undergraduate Research Leaders

## Meet the 2015-2016 Undergraduate Research Leaders

### Scott Anjeweirden

Biomedical engineering major



### Nandini Deo

Health, society & policy and international studies major; minors in sociology, anthropology and integrative human biology



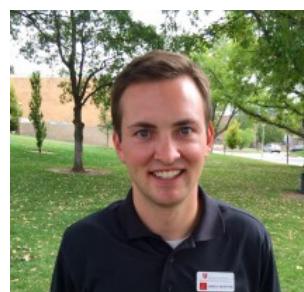
### Jiayue Feng

Chemistry major; minor in math



### James Newton

Biomedical engineering; minors in pediatric clinical research and chemistry



# Undergraduate Research Learning Outcomes Assessment



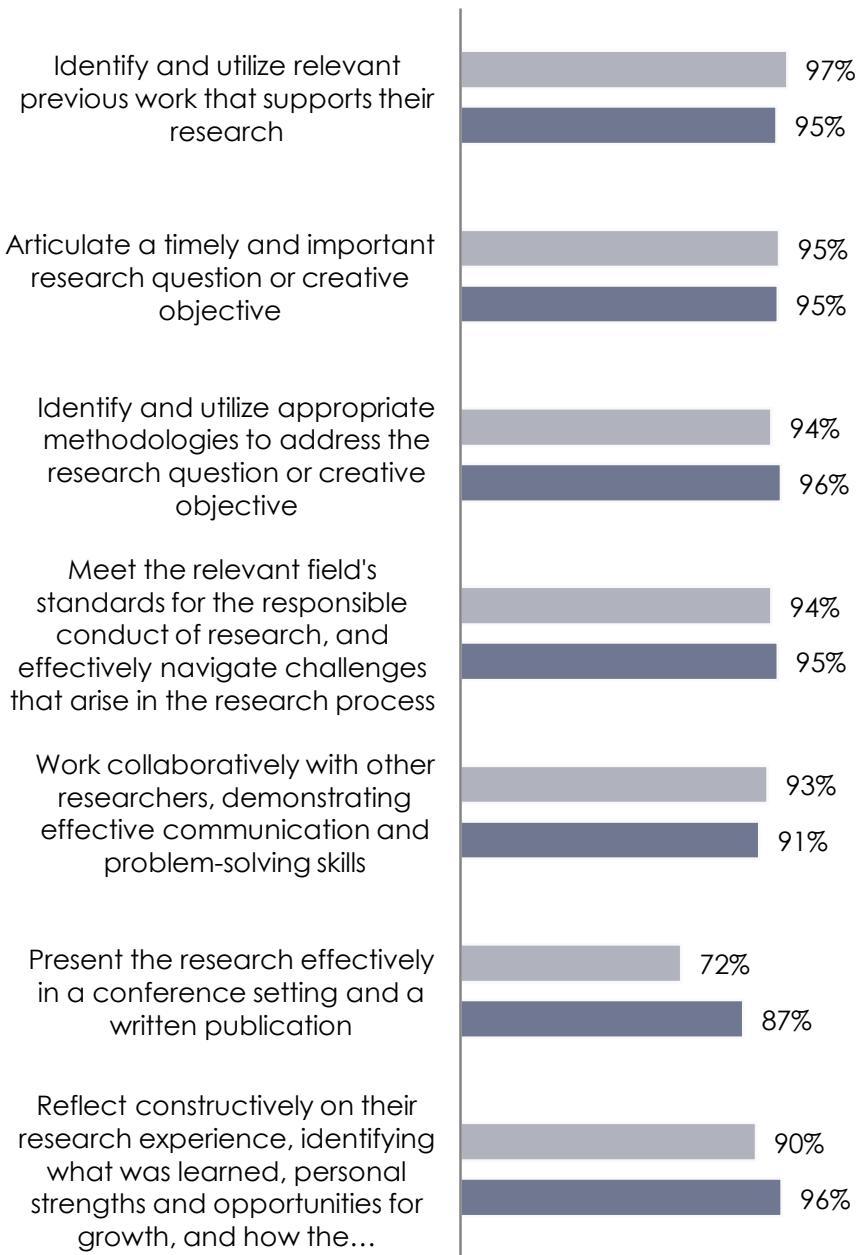
One of our primary goals for FY 2016 was to develop a high-quality process for learning outcomes assessment. We started in this endeavor by identifying undergraduate research learning outcomes that are common to all research traditions on the University of Utah campus.

All UROP students and their faculty mentors were invited to complete an online learning outcomes assessment. Response rates were 81% for students and 22% for faculty mentors.

For each learning outcome individually, students were asked to respond "Strongly Disagree", "Disagree", "Agree", or "Strongly Agree" to the prompt: "In my opinion, my undergraduate research experience has helped me to...[learning outcome]". Faculty were asked to respond using the same four response options to the prompt: "Through participation in UROP this semester under your mentorship, the student has learned to...[learning outcome]".

## UROP Learning Outcomes (Summer 2015, Fall 2015 & Spring 2016)

■ Faculty Mentor (n=108) ■ Student (n=397)



# Goal for 2016-2017

## Scaling Up

Increasing undergraduate research  
mentoring capacity on campus  
*Developing at termes*

We are working with others in Undergraduate Research Mentor Development Program to prepare University of Utah graduate students and postdoctoral personnel to become high-quality research mentors for undergraduate students. The Program aims to develop learning outcomes, and to focus on among a variety of stakeholders on behalf of campus, including the Office of Undergraduate Research (OUR) and the Graduate School, in addition to graduate programs throughout campus.



The interest of the OUR is to increase the capacity of the University of Utah to provide trained and qualified mentors for undergraduate student researchers. Due to our commitment to providing **high-quality research mentors for undergraduate students**, currently only University of Utah faculty may serve as the official mentors for the purposes of our funding programs. We regularly receive requests to allow graduate students and postdoctoral personnel to be permitted to serve as mentors for these programs, and seek a way to allow enthusiastic and well-trained graduate students and postdoctoral personnel to do so.

Donec eget sem rutrum eros  
aliquet egestas. Maecenas  
The Graduate School has generously funded a University  
sollicitudin dui eget tellus. Sed  
Teaching Assistant who will be responsible for developing  
fermentum dui vitae diam  
the Undergraduate Research Mentor Development  
Program during 2016-2017.

In hac habitasse platea dictumst.  
Ut interdum, nulla at sagittis  
sollicitudin, eros pede vestibulum