



OFFICE OF  
**RESEARCH**  
**UtahState**University®

**2019**  
*Annual Report*



The background of the slide is a photograph of a university building. On the right side, a tall brick clock tower with a pointed roof and a small spire is visible. The tower has several arched windows and a balcony. In the foreground, there are several trees with green and some autumn-colored leaves. The sky is blue with some light clouds. A white, irregularly shaped graphic element is overlaid on the left side of the image, containing the text.

# MISSION STATEMENT

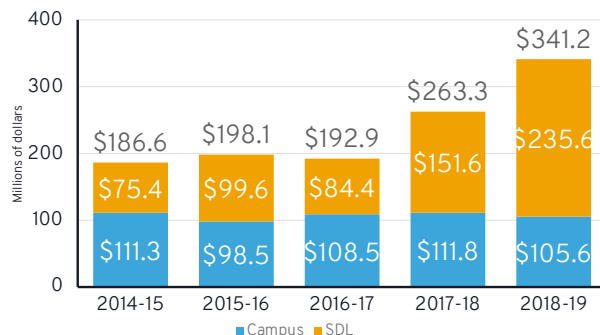
The mission of USU's Office of Research is to facilitate a culture of excellence in research, scholarship and creative activity that spans the lifecycle of faculty and students through operational training, funding and compliance support.



# Utah State University Office of Research

## 2018-19 HIGHLIGHTS

1.



### USU RECEIVES RECORD RESEARCH AWARDS

In FY19, USU strengthened its research distinction, as total USU research awards increased by nearly 30% over last year, making it the highest annual award level ever. Much of that increase is due to a doubling of contracts by the Space Dynamics Laboratory.

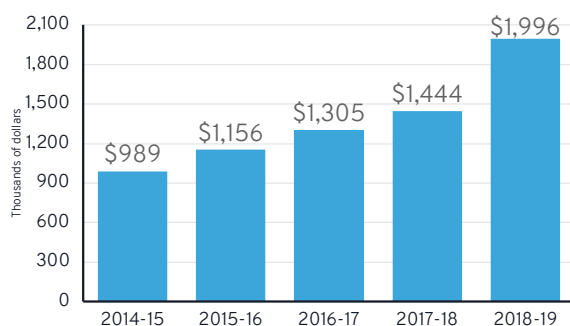
2.

### RESEARCH LANDSCAPES HIGHLIGHTS LAND, WATER, AND AIR

In an effort to develop and communicate excellence in land, water, and air research, USU created Research Landscapes, an initiative that is successfully sharing research highlights and creating relationships with Wasatch front business leaders, policy makers and other community stakeholders.



3.



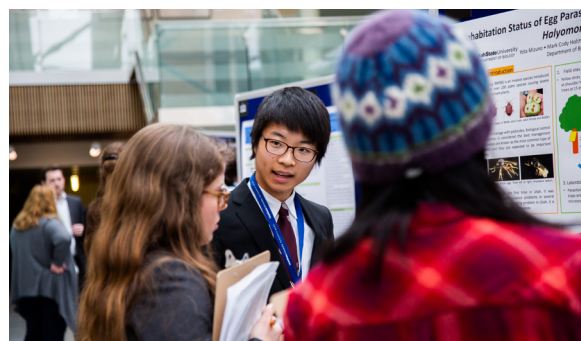
### TECHNOLOGY TRANSFER GENERATES RECORD REVENUE

USU received nearly \$2 million in intellectual property commercialization revenue, which is the highest level ever. From that revenue, nearly all of it (93%) was distributed back to inventors, departments and the university, which helps facilitate further faculty entrepreneurship.

4.

### UNDERGRADUATE RESEARCH GROWS IMPACT WITH PEAK FELLOWS PROGRAM

To further expand experiential learning opportunities, USU grew a variety of existing undergraduate research programs and introduced the new Peak Fellows summer research program, named after USU professors and benefactors David and Terry Peak.





# RESEARCH COMMUNICATIONS

## Research Landscapes

The most significant addition to the Office of Research communication efforts was the creation of the Research Landscapes series, an initiative that developed out of a directive from President Cockett to reaffirm Utah State's research leadership in the areas of land, water, and air among business and community stakeholders and decision-makers along the Wasatch Front.

The series launched in November 2018 with a luncheon at the Alta Club in downtown Salt Lake City. At the introductory luncheon, Lt. Gov. Spencer Cox addressed Utah's need for further insights and continuing research in its understanding of the land, water, and air challenges facing the state; the lieutenant governor also pointed to Utah State University's unique positioning to provide answers to those questions. President Cockett also spoke at the event, sharing the history of USU as a land-grant university and how research and the sharing of those discoveries is core to the university's identity and purpose. The presentation events, hosted at the O.C. Tanner headquarters in Salt Lake City, began in February 2019 with Dr. Randy Martin of the Civil and Environmental Engineering department sharing research about the state's air quality concerns. Later, in June 2019, Dr. Michelle Baker of the Department of Biology discussed relevant research in regards to Utah's water quantity and water quality.



Utah Lt. Gov. Spencer Cox spoke at the introductory luncheon for Research Landscapes. The new initiative, launched during FY19, showcases to a Wasatch Front audience Utah State University's research leadership in the areas of land, water, and air.







The Research Landscapes initiative is designed to build connections between Utah State University researchers and business leaders, community decision-makers, and other stakeholders along the Wasatch Front. The events provide a unique level of access to the researchers that allows for one-on-one conversations and discussions.





## Training for Research Faculty

Training for Research Faculty is a workshop series that features training on topics of special interest to USU researchers, helping to enhance individual capacity development of USU faculty. Based on feedback received the previous year, streaming broadcasts of the presentations were offered in FY19, as well as online preservation of the video recordings of each workshop. Similar to past years, workshop topics were selected based on feedback from interested faculty. In 2018-19, two workshops were offered: the first event presented a panel of multi-discipline faculty members with experience in graduate mentoring to share advice on creating a positive lab culture for new students; in the second event, a faculty panel discussed their experiences in applying for NSF CAREER grants and the lessons they learned to help applications stand out from the crowd.

### Sunrise Session

The Office of Research continued Sunrise Sessions, its long-running Salt Lake City-based research presentation event series, in FY19. Sponsored by Regence BlueCross BlueShield and hosted at the Little America Hotel near downtown SLC, the presentations bring in nearly 120 attendees per session and are digitally archived at [sunrise.usu.edu](http://sunrise.usu.edu). Attendees at the 2018-19 series learned from four Utah State University researchers: Dr. Abby Benninghoff, of the Animal, Dairy and Veterinary Sciences Department, shared her findings on the use of functional foods to fight cancer; Dr.



**Sunrise Sessions, sponsored by Regence BlueCross BlueShield and hosted at the Little America hotel in Salt Lake City, provides a platform for USU researchers to share the latest findings in their fields.**

Joseph Wilson, of the Biology Department, discussed the incredible diversity of the bee population in the Beehive State; Dr. Michael Twohig, a licensed psychologist and professor in the Psychology Department, presented his latest research findings on new therapy methods; and Dr. Peter Howe, of the Department of Environment and Society, shared his findings regarding how Americans view climate change and the surprising consensus about how to approach the problem.

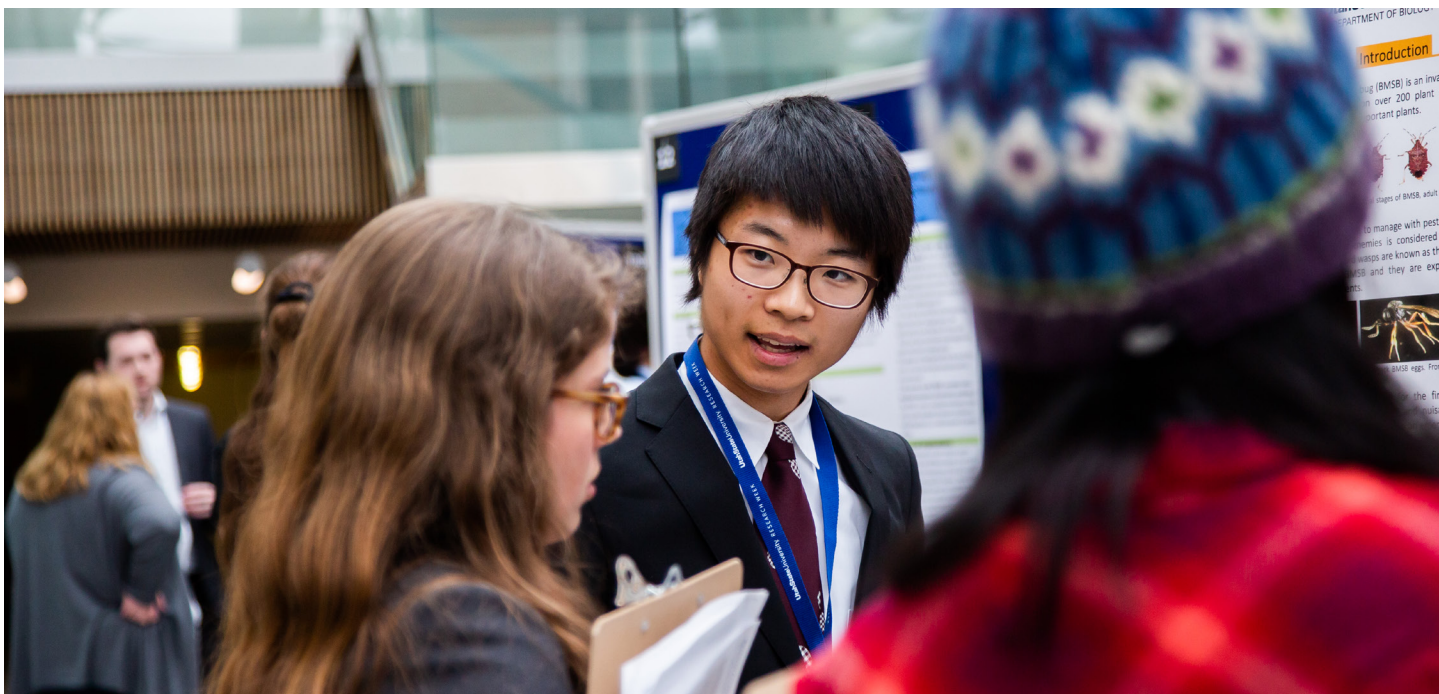


## Research Week

The 15th Annual Research Week, hosted in the Merrill-Cazier library in April 2019, showcased the accomplishments and successes of faculty and student research at Utah State. At the presentation of the D. Wynne Thorne Career Research Award, attendees were honored to hear from Dr. Joyce Kinkead, the 2018 recipient, and celebrated Dr. Charles Hawkins, of the Department of Watershed Sciences, the 2019 honoree. The Student Research Symposium was the most visible portion of Research Week, with dozens of concurrent oral and poster presentations throughout the library; in total, more than 400 students participated in the two-day symposium.







The 2019 Student Research Symposium, hosted during Research Week, gave Utah State University graduate and undergraduate researchers the opportunity to share their research through oral and poster presentations, as well as through musical performances and art displays. More than 400 students participated in the event.





# Division Reports





# INSTITUTIONAL ANIMAL CARE AND USE COMMITTEE

AAALAC International is the primary non-governmental organization that accredits laboratory animal care programs and facilities seeking to provide excellent animal care in support of research. In March of 2019, the Laboratory Animal Research Center and the Institutional Animal Care and Use Committee participated in a triennial site visit by AAALAC International.

At the completion of the site visit, the University animal care program was recommended to continue full accreditation, extending the

continuous accreditation of the program at Utah State University since 1985.

The LARC has supported the ongoing remodeling of the Biology building by providing housing space for animals previously held within Biology, and by providing guidance to the design team leading the remodel of animal housing space in the newly remodeled building.

The IACUC continues to provide oversight of all animal-related activities on campus by conducting regular inspections of all animal handling areas.





# SPONSORED PROGRAMS

The Sponsored Programs Office (SPO) at Utah State University is responsible for reviewing and approving proposals to federal and state agencies, foundations, and other public and private sources, and interpreting, negotiating and accepting contracts and grants for proposals that are awarded. In FY2019, Sponsored Programs divided into two teams to improve efficiencies with current resources, increase specialization, and provide greater support to campus researchers.

## Staffing

The pre-award team works directly with faculty and campus support staff to assist with Kuali, review proposals for compliance, endorse final proposals, and submit proposals to sponsors. Kellie Hedin was promoted to SPO associate director and manages the pre-award team, which consists of three grant and contract officers (GCOs): Katie Dana, Narayne Rougeau, and Jen Smith.

The award management team is responsible for negotiating, approving, and finalizing contract and grants on behalf of USU. Devin Hansen was promoted to SPO associate director and leads the award management team, which consists of one Sr. GCO (Nan Buxton), two GCOs (Logan Hager and Maren Redd), and one grant and contract

administrator (GCA) (Sam Coster). In FY2019, the award management team processed 1,043 award actions totaling \$105.6 million

In FY2019, subaward activities were consolidated to the GCA, and closeout verifications were assigned to the SPO administrative assistant, Kim Velasquez.





## Award

In FY019, federal funding made up the largest portion of total campus funding received at \$54.2million (51%), followed by State of Utah funding at \$20.9 million (20%), and private funding at \$16.7 million (16%).

Campus awards are evenly split between other sponsored activities (47%) and research (47%), with instruction and training making up the remaining difference (6%).

The Emma Eccles Jones College of Education and Human Services led all campus units in award funding (\$39.2 million), as well as in the number of award actions (217).

## Proposals

In FY2019, the preaward GCOs submitted 1,146 proposals, or about 382 proposals per preaward GCO. The preaward team met individually with over 75 faculty researchers, and provided over 50 trainings focused on Kuali and preaward activities. Sixty-five percent of campus

proposals are classified as research, 31% are classified as other sponsored activities, 3% are classified as instruction and training, and 1% are classified as fellowships.

The Emma Eccles Jones College of Education and Human Services lead all campus units in proposal funding (\$74.5 million), while the College of Engineering submitted the most proposals (244).

## Kuali

Kuali is the campus research contract and grant system of record. Kuali provides USU departments and colleges with reports on contract and grant proposals and awards administered within the unit. In FY2019, 163 proposals were submitted via the S2S functionality in Kuali, which facilitates submission of federal proposals created in Kuali to grants.gov. The information and attachments provided in the Kuali proposal record populate the necessary forms and validate just like a live grant.



# RESEARCH DEVELOPMENT

## GrantForward

In FY2019, the Research Development Division brought to campus the GrantForward funding search and grant recommendation service (<https://research.usu.edu/rd/grantforward/>). GrantForward replaced the Funding Finder database, which had been in use since 2013.

GrantForward uses specialized data-crawling technology to constantly add to and update an extensive database of sponsors, pre-solicitations, funding opportunities, and funded awards. The database covers more than 13,000 main sponsors and over 40,000 funding

opportunities. Every grant opportunity is thoroughly analyzed and verified by a team of specialists to ensure accuracy. The search algorithm and adaptive search filters prevent users from wasting time sifting through grants that aren't relevant to them and their research. By building a researcher profile, users can receive grant recommendations related to their field and research interests. GrantForward puts a strong emphasis on education and training through monthly webinars, topical tutorials, focused QuickTips, and its YouTube channel, meaning help is available anytime from anywhere.





GrantForward is available to all USU faculty, staff, and students. Access to the system is obtained by logging in with a usu.edu or aggiemail.usu.edu email address.

## **RD Staff**

The Research Development Division team consists of a director, a part-time program assistant, and six proposal development specialists (Agriculture, Education, Engineering, Extension [2], and Science).

The proposal development specialists are valuable and relied upon allies, aiding faculty in the search for external funding and the development of competitive proposals, coordinating with Sponsored Programs on the internal submission and review process, and helping faculty grow into more effective proposal writers.

## **Grantsmanship Training Program**

### **Faculty**

The general grant writing seminar tailored to faculty was offered once in FY2019, during the fall semester. The event was attended by 67 faculty and research support staff.

### **Graduate Students**

The grant writing seminar tailored to graduate students was offered once in FY2019, also during the fall semester, with more than 100 graduate students and/or postdocs participating. This was the second highest attendance in the eight years this seminar has been offered (highest attendance was the first year).

All seminars were presented by AtKisson Training Group (<https://atg.consulting/>). The Office of Research covered seminar expenses for participants, including material costs, lunch, and breaks.

## **Proposal Writing Institute**

The Proposal Writing Institute completed training its eleventh cohort in FY2019. Fifteen faculty members were selected via a competitive application process to participate in this four-week, intensive proposal writing training opportunity.

Including this most recent cohort, the Proposal Writing Institute has trained 141 faculty. As a result of the proposals worked on during the Proposal Writing Institute over the past eleven years, faculty participants have been awarded \$12.9 million in external awards.

## **Seed Grant Program**

In FY2019, the Office of Research seed grant program received 42 applications and funded 17 awards through its biannual competition cycles, with 34 applications and 13 awards through the Research Catalyst (RC) program, and eight applications and four awards through the Seed Program to Advance Research Collaborations (SPARC). No applications were received to the Grant-Writing Experience through Mentorship program.

## **Capital Equipment Grant Program**

After taking a hiatus in FY2018 due to budget constraints, the capital equipment grant program accepted 23 applications and funded 13 awards in FY2019.



# INTEGRITY AND COMPLIANCE

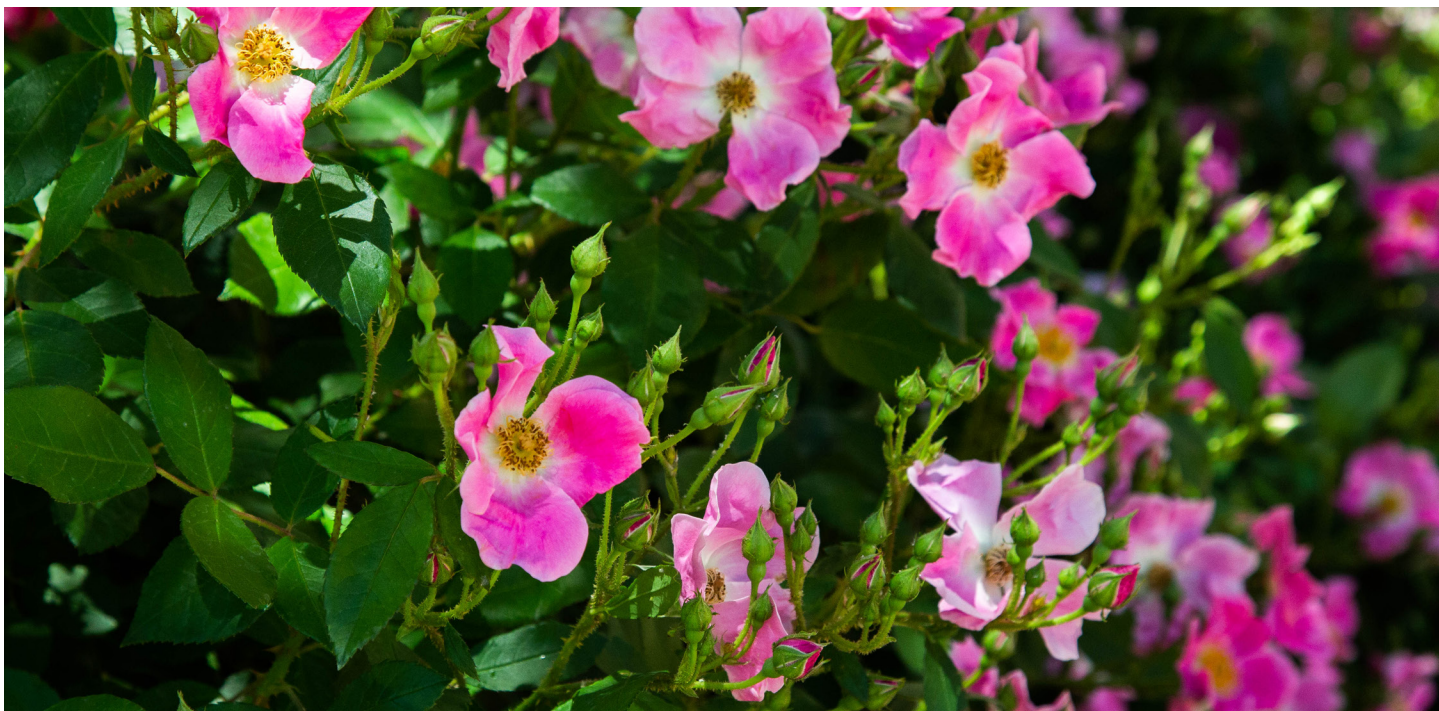
The Division of Research Integrity and Compliance (DRIC) has been working to improve the processes for responsible conduct of research (RCR) training, conflict of interest (COI) and export compliance with the goal of reducing burden on faculty and students while maintaining compliance with federal, state, and local regulations as well as institutional and agency policies.

## Responsible Conduct of Research (RCR) Training

As of Spring 2019, the DRIC only tracks the RCR training requirements for individuals who are funded by the National Institute of Health (NIH), National Science Foundation (NSF), and the National Institute of Food and

Agriculture (USDA-NIFA). The majority of those that must complete required training can do so via the CITI program. NSF and USDA-NIFA allow this online training. This includes researchers, staff, and students. NIH only allows undergraduates to complete the training online, whereas all graduate students and postdocs are required to attend the training in person.

In Fall 2018, an ARGOS report was created to identify those individuals who have been hired and paid by these three funding agencies. The DRIC, in collaboration with the researchers, reach out to these individuals to notify them of the training requirement. These efforts have resulted in an overall institutional compliance rate of 66%.





## Conflict of Interest

All faculty and staff with role statements which include a research component are required to complete an annual conflict of interest disclosure. Additionally, as researchers submit funding proposals, they are required to complete a project-specific disclosure. These disclosures are submitted via Kuali, which includes much of the proposal information to avoid duplication. These project-specific disclosures must be completed before the proposals are submitted, as many of the funding agencies require them at the time of submission. The disclosure form has been streamlined for brevity and clarity. In collaboration with the deans and associate deans, the overall institutional compliance rate has risen from 35% to 81%.

## Export Compliance

Universities are diverse places that encourage collaborative environments, which results in many avenues for exports. Export compliance becomes a concern when researchers and staff work on projects that are considered controlled or have publication restrictions that include foreign persons or foreign collaborators. Researchers have the primary compliance responsibility regarding export control laws and regulations. An export is the transfer of

sensitive equipment, commodities, technology, information, technical data, software or services to: (a) Anyone outside the U.S. including a U.S. citizen; (b) A "foreign national" whether in the U.S. or abroad; or (c) A foreign embassy or affiliate. Most researchers and staff are not aware of these restrictions.

In order to take steps to safeguard our faculty who have projects that are considered controlled by the federal government, Utah State University has been registered with the Department of Commerce and the State Department with Dr. Lisa Berreau, interim vice president for research, as USU's Empowered Official. Additionally, the DRIC has purchased software that can conduct restricted party screening on individuals and organizations with whom researchers may conduct business. The software will also assist in the identification of materials that require a license or exemptions, improving the overall efficiency in identifying if a license is required. Additionally, a ServiceNow form for export compliance review and approval routing has been created to facilitate the process and lessen the burden on researchers. In collaboration with the Offices of Risk Management and Global Engagement, we are working to assist researchers with international travel processes which may require export licenses.



# ENVIRONMENTAL HEALTH AND SAFETY

## Administration

The Environmental Health and Safety (EH&S) office has had a successful year with an excellent team of professionals. The search for a new safety professional at the USU Eastern campus was exceptionally fruitful, identifying Logan Bollough, who assumed the responsibility for USU campuses in eastern Utah, including Price, Uintah Basin, Blanding and Moab.

The Safety Committee for Regional Campuses was restructured to better support branch campuses and regional learning centers. David Vernon, associate VP over the Salt Lake campus, accepted the appointment as chair of the committee with six members representing each geographical region within the state, including Greg Dart, associate VP of USU Eastern and Logan Bollough of EH&S.

## Chemical Hygiene

The EH&S office went live with the hybrid online/face-to-face training program for initial laboratory safety in January of 2019. Over the past six months, 147 new researchers have taken the course. This course has significantly reduced EH&S staff time commitments for training, but

the EH&S office still provided training for 658 students in seven different courses dedicated to the safe handling of chemicals.

The EH&S office responded to 15 emergency indoor air quality issues involving natural gas leaks, construction exhaust, building HVAC failures, chemical releases, and sewer gas. Three long-term exposure assessments of ventilation systems in laboratories, classrooms and arts studios were conducted to determine if corrective action or personal protective equipment (PPE) was warranted.

## Biological Safety

EH&S office personnel assisted auditors from the United States Department of Agriculture and the Centers for Disease Control in the inspection of all select agent areas and BSL 2/3 laboratories on two separate occasions. Routine audits are conducted to assure compliance with all required and prudent laboratory practices.

The EH&S office has been working in conjunction with USU Facilities to explore the possibility of a much needed upgrade to the ventilation system in the select



agents laboratory (P3) in the Laboratory Animal Research Center. We were able to secure \$200 thousand from the state building fund to initiate the design and engineering for the project. In the coming years, additional funds will be requested to implement the proposed changes.

## Industrial Hygiene

EH&S personnel aided the Athletics Department in procuring UL-approved “flame towers,” safe to operate and providing a good show. A State of Utah registered fireworks professional was identified and contracted to inspect the system and to conduct all home-game performances. EH&S personnel provided leak detection and system readiness checks prior to each home-game performance, and all dress rehearsals.

The EH&S office teamed with USU’s Fire Marshal to meet with the Athletics Department, Student Services, and the president’s council to explain the hazards associated with “corn starch white out” activities. Explosions from these types of activities have resulted in loss of life and damage to buildings and equipment at other institutions. Student Services, in conjunction with the Athletics Department, has agreed to have EH&S and the Fire Marshall review and approve all new and proposed activities for potential hazards prior to all future events.





## Occupational Safety

In FY19, the EH&S office investigated 26 laboratory accidents and 52 accidents occurring in field activities including farms, research, and the Utah Conservation Corps. An additional 127 minor accidents, where injured employees simply needed to be reminded of safety protocols already in place, from all facets of USU activities, were also reviewed.

## Hazardous Waste

EH&S personnel were instrumental in preparing the biology building (BNR) for the FY20 remodel. Over a three-month period the entire EH&S staff worked with researchers, laboratory personnel and students to catalog all chemicals to determine which would be discarded and which would be moved to a new home. Each container of chemicals was removed from its storage location within BNR and prepared for transport in compliance with all applicable Department of Transportation (DOT) requirements.

Chemicals were either sent for disposal or transported to a permanent home in the new life sciences building or temporary lab space. Following the safe transport of chemicals to their designated new home, EH&S personnel worked with laboratory personnel to unpack each chemical to assure it was

not damaged during transport. In total, 24 research groups and all teaching labs in the Biology Department were moved without incident or delay to the starting of the BNR remodel project.

## Radiation

Eighty-seven inspections of radioactive material areas on campus were conducted in FY19, for the safe use of dispensable isotopes. All of the 42 existing research personnel working in these areas received annual refresher training, and 27 new investigators received the initial training.

## Phase I Site Assessments

The EH&S office investigated four properties that were purchased or donated to the university for environmental liability. The largest site was a 110-acre property donation in Herriman, Utah that will be used as the Salt Lake center for agriculture outreach and research. The site will also serve the south end of the Salt Lake Valley as a regional campus for all eight colleges. The site was historically used as a dry farm that was, unfortunately, heavily contaminated by Kennecott Mining operations and mine tailings.

Contamination from wind erosion and storm water on-flow deposited elevated levels of the heavy metals lead and arsenic. The results from that site



posed a significant environmental liability, and they were presented to the College of Agriculture and Applied Sciences and the President's Executive Committee in a presentation in June. The property was subsequently forwarded to an outside contractor to conduct a Phase II site evaluation to determine the actual levels of lead and arsenic. The Phase I and Phase II results will be used to determine if development of a branch campus will pose any threat to persons farming, conducting research or attending classes.

## Air Quality

The EH&S office compiled the annual emission inventory for priority pollutants (NO<sub>x</sub>, SO<sub>x</sub>, particulates, CO, and VOCs) released by university activities. The report listed a 13% decrease from FY18, indicating a mild winter and effective pollution reduction measures.

## Emergency Response

EH&S personnel responded to and contained numerous small spills across campus, including acrylamide in the chemistry building and a bourbon spill in USTAR 620. "Midnight Dumping" has become an increasing problem on campus in FY19, with



three drums of an unknown chemical being discovered behind the Skaggs building and a box of old paint appearing on the RACC dock. USU Police were contacted on both occasions, but they said there was little hope in discovering the responsible parties, due to the open nature of USU campus.



# INSTITUTIONAL REVIEW BOARD

## Regulatory Updates

January 21, 2019 marked the implementation date for a long-awaited overhaul of the regulations governing research with human participants.

The updated Federal Policy for the Protection of Human Subjects substantially broadened the categories of exempt research, brought identifiable biospecimens under the purview of the federal rule, updated requirements for documenting informed consent, and removed the need for annual approval of newly expedited research projects. In conjunction with the implementation date, the USU IRB created many educative resources, held several trainings, and updated forms and templates relating to the new rule (the “Revised Common Rule”).

Another change under the Revised Common Rule that comes into effect in 2020 regards single IRB review. Utah State University was one of the earliest adopters of SMART IRB, an online reliance system that permits institutions to keep track of Single IRB agreements in a shared electronic portal. SMART IRB has now grown to include over 600 institutions. Updated paper-based reliance agreements are still available for investigators working with colleagues whose institutions have not adopted SMART IRB.

## Policy Revisions

USU’s Policy 584, the institutional policy on research involving human participants, was updated following implementation of the Revised Common Rule. In addition to making substantial updates regarding federal requirements, IRB staff took the opportunity to remove several items from its purview. Most notably, faculty no longer need to seek IRB review of classroom-based activities that do not meet the definition of “research” within the federal regulations. While this only decreases IRB submissions by approximately 3%, the IRB hopes that this deregulatory effort permits faculty to get a smoother start to the semester.

## Increased IRB Capacity

To meet the increased demand for convened IRB reviews, the board began meeting twice per month in the spring 2019 semester. The IRB had a record high 22 protocols needing initial, continuing, and amendment review by the convened IRB. The twice-monthly meetings permit research proposed to the board to move along more quickly, while still receiving high-quality reviews. Additionally, incentive payments for community members approved last fiscal year by President Cockett have assisted the IRB in achieving quorum more consistently.



# TECHNOLOGY TRANSFER SERVICES

Technology Transfer Services does our best to look into the future and identify the best technologies to protect and commercialize. We are often amazed at what the future brings. We saw good successes in FY19 and credit USU's innovative and supportive faculty for this success.

USU received a record \$1,995,875 in Intellectual Property commercialization revenue, of which \$1,870,976 (93%) was distributed back to inventors, departments and the university. Of disappointing note, in FY19 the licensed patent for a method of producing textured whey protein expired. As a result, USU will no longer receive royalties from our long-time licensee. Our ongoing challenge is to replace this revenue with other successful commercialization opportunities.

TTS continues to support our faculty by assisting in the negotiation, execution and tracking of research, development and commercialization-related agreements. In FY19 TTS assisted with two inter-institutional Agreements, three Joint Research agreements, 16 material transfer agreements, 33 non-disclosure agreements and 30 license agreements.

USU faculty disclosed 33 new inventions to TTS in FY19. We were pleased to receive these disclosures, but disappointed the

number of disclosures are trending down since the peak in FY10. We feel one factor in this downward trend is the smallness of our team; we are limited in our ability to be more visible and interact with our faculty and researchers as much as we would like. We hope to right size our team in the future and would expect to see the number of invention disclosures increase. Encouragingly, TTS received nine disclosures from faculty who had not previously disclosed an invention. We are excited to interact and serve all of our faculty, especially our new faculty.

An important part of our service to the university community is the protection of IP. In FY19, TTS filed six provisional patent applications, 19 non-provisional patent applications and filed trademark protection for 17 new trademarks. The end goal of a patent application is for the US Patent and Trademark Office (USPTO) to issue the patent. This is a multi-year and expensive process. In FY19 the USPTO issued patents for 15 USU innovations.

The TTS team is small, but we are dedicated to providing the support and services to protect and promote the commercialization of USU's innovative discoveries and technologies. Being a small team, TTS will, out of necessity, focus our time and efforts on the most impactful opportunities and tasks.



# UNDERGRADUATE AND GRADUATE STUDENT RESEARCH

## Overview

The high level of student engagement in research makes USU stand out from other institutions in the state and beyond.

In 2019, the excellence of our undergraduate research programs received national recognition when we were selected as a finalist for the Council on Undergraduate Research's Campus-Wide Award for Undergraduate Research Accomplishments (AURA).

This year also saw the return of the Presidential Doctoral Research Fellows (PDRF) program, designed to attract and support top-tier PhD students across the disciplines.

Our Undergraduate Research Fellows (URF) program continued to build on its history of student success with two Goldwater Scholarships, five primary-authored articles in peer-reviewed professional journals, and dozens of poster and oral presentations at national and international conferences.

Seventy-five undergraduates were awarded \$1,000 scholarships plus research funding for their independent research and creative projects through the Undergraduate Research and Creative Opportunities (URCO) grant program,

now in its 44th year. And new initiatives for increasing access to and inclusion in student research, including Research Opportunities for Work Study (ROWS), got off the ground.

Finally, the summer of 2019 saw the inauguration of the Peak Summer Research Fellows, a donor-sponsored 10-week intensive research experience for undergraduates from the Colleges of Science and Humanities and Social Sciences.





## Undergraduate Research Engagement

Undergraduates at USU participated in research and independent creative inquiry across all eight colleges, as represented by the record numbers of student posters, presentations, and performances at Research Week's Student Research Symposium in April 2019, and at the Fall Student Research Symposium in December 2019. More than 350 undergraduates and almost 100 graduate students presented at SRS over a two-day period. Every single student participant received feedback from multiple reviewers, including faculty, professional staff, and advanced graduate students, making this as much a learning experience as it is an opportunity to share work with the broadest possible public. In addition, the Fall SRS event saw a 100% jump in participation, with more than 100 undergraduate presentations.

Students from USU also presented at numerous national conferences, including the National Conference on Undergraduate Research, Utah Conference on Undergraduate Research, Research on Capitol Hill (Utah), Posters on the Hill (Washington, D.C.), American Geophysical Union, American Psychological Association, the Montreux Jazz Festival, and the Society for Applied Anthropology. We provided matching travel funds for more than 100 students.

## PDRF relaunch

The Presidential Doctoral Research Fellows program, initiated in 2014, suspended recruitment for AY 2018-2019 while we reassessed program priorities and met with stakeholders to discover how this initiative to attract and retain top PhD students at USU could be strengthened. Support for its continuation was strong from existing students in the program, PIs, department heads, and deans, so the decision was made to reopen recruitment for fall 2020.

Deans have allocated the 12 open positions to their departments and faculty, and recruitment efforts have already begun. Meanwhile, in 2019, PDRF's already in the program garnered three NSF Graduate Research Fellowships as well as predoctoral fellowships from the American Heart Association, the Ford Foundation, USDA NIFA, Utah NASA Space Consortium, the National Park Service, The Geological Society of America, Western SARE, the American Alpine Club, and others, totaling almost \$400,000 in support.

## Peak Summer Research Fellows

Dr. David Peak (Physics) and Dr. Terry Peak (Sociology), generous supporters and mentors of USU's undergraduate researchers for more than three decades, made a \$50,000 gift to the Office of Research in the winter of 2018 to support a summer research program for undergraduates in the Colleges of Science and

Humanities and Social Sciences.

We worked closely with the Peaks to develop a framework for the Peak Summer Research Fellows that would ensure that the students selected would be given an experience equivalent in rigor to the NSF's Research Experiences for Undergraduates (REU), on which we modeled the program.

Students wrote in-depth grant proposals, endorsed by their faculty mentors, and these were reviewed for their feasibility, originality, and potential to advance the students' eligibility for national scholarships and grants. Eleven students received the fellowship and ten completed the program, which immersed them in research for ten weeks during the summer of 2019 and culminated with a colloquium in September at which they presented their work to faculty and peers. The donors were pleased with the outcome, and have funded a second year for summer 2020.

## Increasing access

A continuing objective for UR at USU is to increase

awareness and participation among those student populations most likely to benefit academically and personally from UR, but least likely to know about it or to pursue these opportunities. To this end, in 2019, we launched ROWS, working closely with Career Services to identify students eligible for Federal Work Study and pair them with faculty seeking entry-level research assistants.

Through paid research assistantship experience, the 33 students in this initial cohort are learning not only the skills, but also the mindset of researchers.

Meanwhile, our work with Admissions has led to the inclusion of UR in recruitment events focused not only on our typical demographic of high-achieving high school seniors, but also on first-generation college students, LatinX students, and non-traditional students. We are also coordinating with Aggie First Scholars and the Black Student Union to get information about research opportunities to students participating in their programs.

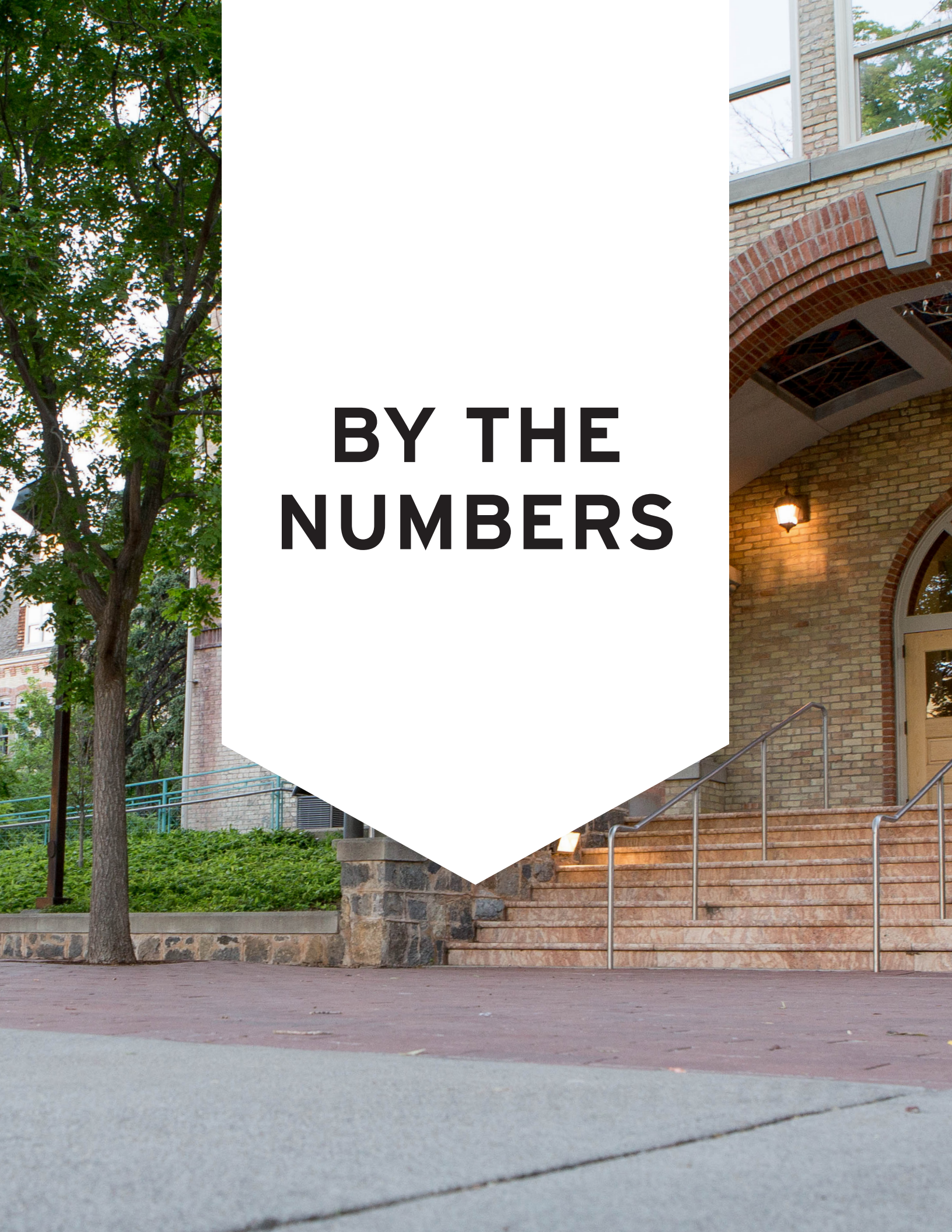


**At Research on Capitol Hill, undergraduate students from Utah State University share their research efforts and discoveries with the state's leaders at the Capitol building in Salt Lake City.**

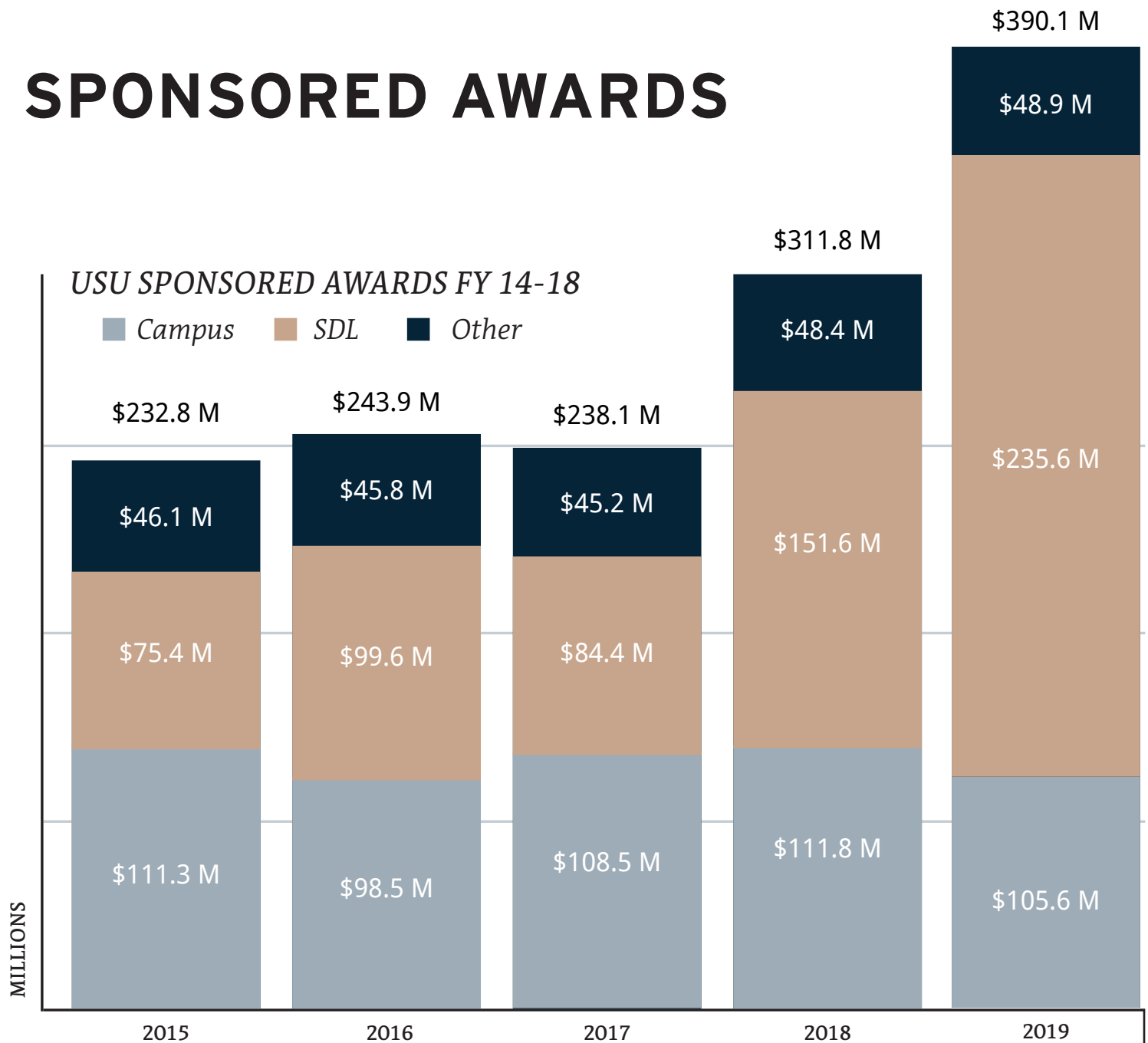




# **BY THE NUMBERS**



# SPONSORED AWARDS



## USU SPONSORED AWARDS FY 15-19

	FY15	FY16	FY17	FY18	FY19	Change over LY
<b>Campus</b>	\$111,297,272	\$98,540,187	\$108,500,244	\$111,772,405	\$105,641,440	-5%
<b>SDL</b>	\$75,352,922	\$99,581,109	\$84,372,932	\$151,558,668	\$235,596,858	55%
<b>Other</b>	\$46,144,128	\$45,812,584	\$45,241,795	\$48,448,656	\$48,897,684	1%

<b>USU Grand Total</b>	<b>\$232,794,322</b>	<b>\$243,933,880</b>	<b>\$238,114,971</b>	<b>\$311,779,729</b>	<b>\$390,135,981</b>	<b>25%</b>
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# COMPARATIVE DATA

	(\$M) Research Expenditures		Research Expenditures Ranking		Tenured Faculty		Tenure-Track Faculty	
	FY17	FY18	2017	2018	2017	2018	2017	2018
Colorado State University	338.4	375	70	65	756	743	279	310
Kansas State University	196.5	218.3	109	106	537	509	243	213
Montana State University	129.6	125.1	140	145	339	339	161	167
New Mexico State University	106.0	94.5	148	160	378	368	143	135
Oregon State University	267.1	272.4	87	87	614	626	300	272
University of Nebraska - Lincoln	302.2	308.1	77	78	761	734	319	315
University of Nevada - Reno	105.9	144.4	149	139	377	366	268	287
University of Wyoming	125.0	113.1	142	150	386	379	146	155
Washington State University	356.9	360.5	66	71	624	619	259	233
<b>Utah State University</b>	<b>187.3</b>	<b>219.4</b>	<b>116</b>	<b>105</b>	<b>488</b>	<b>484</b>	<b>233</b>	<b>236</b>

	Carnegie Ranking		FY 18	F&A Rate FY 19	Total Faculty		Expenditures per Tenured Faculty (\$K)	
	2015	2018			2017	2018	FY 17	FY 17
Colorado State University	R1	R1	52.0%	52.0%	1,035	1,053	448	505
Kansas State University	R1	R1	52.0%	52.0%	780	722	366	429
Montana State University	R2	R1	44.0%	44.0%	500	506	382	369
New Mexico State University	R2	R2	48.0%	48.0%	521	503	280	257
Oregon State University	R1	R1	47.0%	47.0%	914	898	435	435
University of Nebraska - Lincoln	R1	R1		55.5%	1,080	1,049	397	420
University of Nevada - Reno	R2	R1	44.0%	44.0%	645	653	281	395
University of Wyoming	R2	R2	44.5%	44.5%	532	534	324	298
Washington State University	R1	R1	53.0%	53.0%	883	852	572	582
<b>Utah State University</b>	<b>R2</b>	<b>R2</b>	<b>42.6%</b>	<b>45.0%</b>	<b>721</b>	<b>720</b>	<b>384</b>	<b>453</b>

# SEED GRANTS

## Seed Program to Advance Research Collaborations (SPARC)

Researcher	Dept	College	Project Title	Co-PIs	(\$) Amount
Zhongde Wang	ADVS	College of Agriculture and Applied Sciences	Developing a hamster model for inflammation in beta thalassemia and sickle cell disease	Justin Jones, Mark Richards	\$34,413.89
Kezia Manlove	WILD	College of Natural Resources	Identifying factors driving population-level mixing patterns in wildlife	Kevin Moon, David Brown	\$26,472.00
Brian Gowen	ADVS	College of Agriculture and Applied Sciences	Evaluating the utility of golden Syrian hamsters as models for preclinical development of triglyceride-modulating therapeutics to treat infections	Zhongde Wang, Michael Lefevre	\$34,996.81
Breanna Litts	ITLS	College of Education and Human Services	Cultivating connections: Designing field experiences to develop sixth graders' cultural competence	Melissa Tehee, Eric Newell	\$34,999.54

## RESEARCH CATALYST (RC) GRANTS

Researcher	Dept	College	Project Title	Co-PIs	(\$) Amount
Clark Rushing	WILD	College of Natural Resources	Combining theory and technology to understand the factors limiting populations of Lazuli buntings breeding along an elevational gradient in Cache Valley, UT		\$19,856.08
Maryellen McClain Verdoes	PSY	College of Education and Human Services	The Effects of Background Noise on Reading in Children with Autism Spectrum Disorder	Sarah Yoho Leopold	\$19,998.46
Anna Cohen	SSWA	College of Humanities and Social Sciences	Isolation and Interaction in Ancient Honduras	Juan Carlos Fernandez-Diaz	\$19,760.50
Tianbaio Liu	CHEM	College of Science	Developing Mg-Sulfur Battery Chemistry Using Advanced Electrolyte and Electrode Designs		\$20,000.00
Patrick Singleton	CEE	College of Engineering	Needs-based approaches for representing personal transportation decision-making	Antje Graul	\$20,000.00
Tal Avgar	WILD	College of Natural Resources	Coupling individual and population perspectives to enhance understanding and management of wildlife space-use patterns	Jeanette Norton	\$19,951.36
Tom Chang	CHEM	College of Science	Fast and Sensitive Detection fo Fungal Infection and Contamination		\$20,000.00
Rakesh Kaundal	PSC	College of Education and Human Services	Promoting Sustainability in Nitrogen Cycling: Artificial Intelligence to Explore Diversity of Enzymes involved with Nitrification and Mineralization in Agricultural Soils		\$19,999.60
Bonnie Waring	BIO	College of Humanities and Social Sciences	Testing new conceptual models to predict effects of nutrient deposition on the soil C sink		\$19,620.00
Ryan Jackson	CHEM	College of Education and Human Services	Determining molecular structures and activities of the Type V CRISPR effector nuclease Cms1/Cas12f		\$19,995.00



Karen Munoz	COMD	College of Natural Resources	Can eHealth coaching after early childhood hearing aid fitting improve parents coping and child outcomes?	Michael Twohig, Mechael Levin	\$19,685.72
Yu Huang	BE	College of Education and Human Services	Development of Electrically Acutated High-resolution Micro-Engineered Diffusers for Neuronal Outgrowth	David Bolton	\$20,000.00
Cristopher Warren	PSY	College of Education and Human Services	The Role of Neural Modulation and Cognition in Reactive Balance		\$19,998.27

## CAPITAL EQUIPMENT GRANT AWARDS

Researcher	Dept	College	Project Title	(\$) Amount
Steve Young	PSC	College of Agriculture and Applied Sciences	Undergroud Observation Boxes	\$20,000.00
Jennifer MacAdam	PSC	College of Agriculture and Applied Sciences	Case IH MD72 Rotary Mower with 3-point hitch	\$6,157.50
Aaron Thomas	ADVS	College of Agriculture and Applied Sciences	Automated capillary electrophoresis instrument	\$20,081.15
Irina Polejaeva	ADVS	College of Agriculture and Applied Sciences	iBright FL 1000 imaging system	\$17,502.00
Amita Kaundal	PSC	College of Agriculture and Applied Sciences	SPEX SamplePrep 2010 Geno/Grinder	\$13,019.00
Dan Murphy	Art & Design	College of Arts	Ram press	\$11,169.53
Dale Wagner	KHS	College of Education and Human Services	Air displacement plethysmograph for body composition assessment: Bod Pod GS	\$25,737.50
Wade Goodridge	Engineering Education	College of Engineering	CGX EEG Headset - Quick-8 System	\$3,262.00
Charles Miller	Biological Engineering	College of Engineering	Medium Steam Sterilizer	\$38,063.00
Bethany Neilson	CEE	College of Engineering	EXO2 Water Quality Sonde	\$11,000.00
Ryan Berke	MAE	College of Engineering	Two-color pyrometer	\$7,697.05
Janice Brahney	WS	College of Natural Resources	Sequoia LISST-Portable/XR	\$14,737.50
Nicholas Dickenson	C&B	College of Science	Primus autoclave	\$34,342.50

# FACILITIES AND ADMINISTRATION ALLOCATION (IN THOUSANDS)

<b>F&amp;A Revenue</b>	<b>FY 2019 Actuals</b>	<b>% of Total Allocation</b>
USU Eastern Revenues – 100% Returned	225.7	
30% to USU Colleges/Dept/P.I.s	3,709.1	
70% to Central F&A Pool	8,654.5	
<b>Total F&amp;A Generated</b>	<b>12,363.6</b>	
<b>Funds Available for Distribution by RGS</b>		
F&A Revenues in Central Pool (70%)	8,654.5	
Unused Prior Period Allocations Returned to Central Pool	101.8	
Carry Forward	159.6	
<b>Total F&amp;A Available for Distribution</b>	<b>8,916.0</b>	
<b>Office of Research Allocations from Central Pool (70% of Central F&amp;A pool):</b>		
<b>Office of Research Operating</b>	<b>1,725.9</b>	<b>19.6%</b>
<b>Central Administrative Support</b>		
O&M	1,217.1	
Salary & Benefits	514.264	
Information Technology	387.395	
Miscellaneous	99.501	
<b>Total Central Administrative Support</b>	<b>2,218.2</b>	<b>25.2%</b>
<b>Indirect College Support</b>		
Faculty & Staff Training	35.0	
Information Access	13.5	
Faculty Recognition/Presentation	20.0	
Reserve for Disallowance	25.0	
<b>Total Indirect College Support</b>	<b>93.5</b>	<b>1.1%</b>
<b>Core Facility Support</b>		
LARC	71.0	
Microscopy	96.1	
NMR	27.9	
Engr Pipe Building	9.5	
<b>Total Core Facility Support</b>	<b>204.4</b>	<b>2.3%</b>
<b>Direct College Support</b>		
New Faculty Startup	2,844.2	
Dean's College Allocations	378.0	
Seed Grants	378.2	
Equipment Grants	200.0	
PDRF	150.0	
Agreements/Requests	421.3	
<b>Total Direct College Support</b>	<b>4,371.7</b>	<b>49.6%</b>
<b>Direct Student Support</b>		
Undergraduate Research Fellows	100	
URCO	50	
Graduate Student Travel	50	
<b>Total Direct Student Support</b>	<b>200</b>	<b>2.3%</b>
<b>Total F&amp;A Allocations</b>	<b>8,813.65</b>	<b>100.0%</b>
<b>FY2018 (Over)/Under Allocated</b>	<b>102.35</b>	<b>1.2%</b>



# TECHNOLOGY TRANSFER FY 15-19

	<i><b>FY19</b></i>	<i><b>FY18</b></i>	<i><b>FY17</b></i>	<i><b>FY16</b></i>	<i><b>FY15</b></i>
<b>Disclosures:</b>	33	71	43	59	45
<b>First Time Faculty Disclosures:</b>	9	8	11		
<b>IP Applications:</b>					
Non-Provisional	19	15	12	13	26
Provisional	6	13	11	8	16
Trademark	17	5			2
<b>Patents Issued:</b>	15	14	14	27	17
<b>New Licenses:</b>	30	33	29		
<b>Revenue:</b>	\$1,995,875	\$1,443,674.35	\$1,783,600.00	\$1,117,014.00	\$969,769.00

