California State Polytechnic University, Pomona

Academic Program Review - Self-Study
Don B. Huntley College of Agriculture
BS, Animal Science
Options: 1. Preveterinary/Graduate School
2. Animal Science (general)
AY 2021-2022

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1. INTRODUCTION

1.1 Program Overview

The Animal and Veterinary Sciences (AVS) Department offers a four-year curriculum leading to a bachelor's degree in Animal Science with options in Pre-veterinary Science/Graduate School, and Animal Science (general). The Pre-veterinary science/Graduate School option prepares students for admission to veterinary school, related medical technical fields, and graduate study in diverse areas including animal nutrition, meat science, animal breeding, and animal physiology.
The AVS Department also offers a separate major, Animal Health Science, with different accreditation requirements. In addition, the department offers an Animal and Veterinary Science minor (33 units) for non-Animal Science majors, Equine Studies minor (18 units) which is open to any major, and a Master's degree in Agriculture with a subplan in Animal Science.

The BS Animal Science major options will be reviewed i.e., Pre-veterinary Science/Graduate School option, and Animal Science (general) option. The two minors offered in the department, Animal and Veterinary Science, and Equine Studies, are not part of this review because they are relatively new.

The department maintains 330 acres of rangeland and 100 acres of irrigated pasture. Livestock includes a breeding herd of Angus and Angus Crossbred cattle, the Kellogg Arabian horses, flocks of purebred Katahdin, Dorper, Dorset, Hampshire/Suffolk cross breed sheep, various breeds of goats, and a herd of several commercial breeds of swine (Hampshire, Yorkshire, Berkshire, York/Hampshire crosses). The location of the university provides rich opportunities for students to obtain specialized and practical educational experiences in production, management, feeding, marketing, and (until 2015) processing of animals. Cooperation of prominent local breeders, feeders, producers, marketing organizations and related animal industries offer additional opportunity for field studies.

1.2 Mission, Vision Values

The following table provides a summary of the vision, mission and values of the university, college and the BS in Animal Science program.

Table 1. Mission and Core Values

UNIVERSITY	**Mission** - We cultivate success through a diverse culture of experiential learning, discovery, and innovation.
	Vision - Cal Poly Pomona will be the model for an inclusive polytechnic university that inspires creativity and innovation, embraces local and global challenges, and transforms lives.
	Values •**Academic Excellence** – We demonstrate academic quality, relevance, and excellence through our teaching, learning, scholarship, and creative activities with student centered faculty in an evidence-based culture. •**Experiential Learning** – Our polytechnic identity fosters an integrative approach to education through collaboration, discovery, learn-by-doing, and innovation. Our approach encourages reflection, informed risk-taking, and continuous learning. •**Student Learning and Success** – We are deeply committed to educational experiences and supportive services that engage our students, enhance personal well-being and growth, provide career opportunities, and foster ethical citizenship. •**Inclusive** – Our diversity across multiple dimensions reflects and enhances our community. We are welcoming and respectful, and we value diversity. •**Community Engagement** – We nurture mutually beneficial and meaningful relationships with community partners and stakeholders. •**Social and Environmental Responsibility** – As global citizens, our individual and collective actions reflect our commitment to one another, society, and the environment.
COLLEGE OF AGRICULTURE	**Mission/Vision:** The Cal Poly Pomona College of Agriculture will be a prestigious center of knowledge known for premier graduates and innovative agricultural, food and apparel solutions.
	Values: *Polytechnic Identity*: Our college takes great pride in our polytechnic identity, realizingour unique role in higher education. Our college is committed to academic rigor and excellence in our teaching, learning, and scholarship. *"Learn by Doing"*: Our college is distinguished by our active, hands-on approach to teaching. Our college provides unique outreach and educational opportunities to our various audiences and public to inform, educate and interact.

Department of Animal Science	**Mission:** Our Department's mission is to provide state-of-the-art instructional and research programs. The Department of Animal and Veterinary Sciences (AVS) endeavors to train all AVS majors to understand and critically evaluate food animal and companion animal production, nutrition, health, and physiology. The depth and breadth of these programs will adequately prepare AVS students to compete for admission to graduate/professional schools or careers in Agriculture/Animal Science or allied industries.
	Vision: It is the vision of the Department of Animal and Veterinary Sciences to become: • An educational model for addressing the needs of diverse students who seek knowledge of theanimal sciences and their allied industries • An innovative leader in educating students of diverse ethnicities and urban backgrounds about the animal science industry • A major contributor to the discovery, development and transfer of technology. •
	Core Values: In an atmosphere of cooperation, honesty and integrity, the Department is committed to the following corevalues: • Quality education attuned to the needs of the industry • Diversity of faculty and students that reflects merit and equity • Enrollment and retention of qualified students • Adequate facilities that support quality academic programs • Professional development and scholarly activity • A collegial environment that advocates academic freedom

The mission, vision, and values of the University, Don B. Huntley College of Agriculture, and Department of Animal and Veterinary Sciences are well aligned. We work cohesively to recruit, retain, and educate students while providing them with hands-on experiences using a 'Learn by Doing' philosophy through laboratory activities, internship courses and research, thereby preserving our polytechnic identity. The university, college, and department maintain a rigorous pedagogy and scholarship environment. We generate career ready graduates with superior training. Our students are in placement at prestigious veterinary schools US-wide and internationally. Our students come from many backgrounds, and we encourage inclusiveness through participation in student clubs. Innovation is fostered by encouraging students to participate in research projects. The AVS faculty advisement and mentorship efforts contribute to student success and timely completion of academic programs.

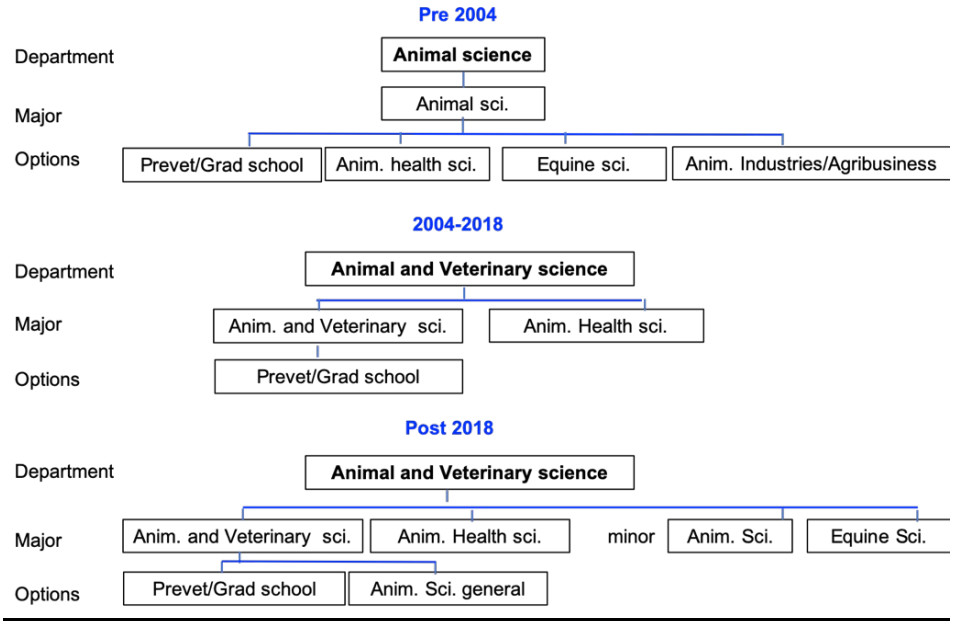
1.3 History

1.3.1 Evolution of the program since the last program review (2002-2003)

The last program review for the Animal & Veterinary Sciences (AVS) Department was conducted in 2002-2003. Many changes have taken place in the intervening 18 years. All the original faculty from the previous review are no longer faculty within the AVS department; thus, there is limited institutional and departmental information to reference. The program has changed tremendously in terms of options within the major. In the last review there was only one major, Animal Science, with options in Prevet/Graduate School, Animal Health Sciences (AHS), Equine Sciences, and Animal Industries/Agribusiness. AHS is now a separate major, which has been accredited. The Equine Sciences and Animal Industries/Agribusiness options

were discontinued as BS options. Equine Sciences is now an Equine Studies minor (since 2018) within Animal Sciences, whereas Animal Industries/Agribusiness evolved into a separate department-- (the Department of Agribusiness and Food Industry Management/Agricultural Science). The Animal Science major now has 2 options: Prevet/Graduate School and Animal Science (general) option. The Animal Science (general) option was introduced in Fall 2018 to provide a high-caliber curriculum for students who do not plan to go to veterinary school.

The evolution of the department can be summarized in the chart below:



In addition to the changes in options for study within the department, major changes have occurred in the animal units and resources in the AVS department. We no longer have a Poultry Unit and consequently we do not offer poultry courses. We lost use of the Meat Processing Plant (Building 34) in 2015 (resulting in discontinuation of AVS 327L Meat Science and Industry laboratory course). The Arabian Horse Center (AHC, now W. K. Kellogg Arabian Horse Center) is no longer a unit of the AVS Department; it is now an independent entity that reports to the College of Agriculture Dean and University President. The W.K. Kellogg Arabian Horse Center used to have a Director who was a faculty member in AVS until 2015 when Jeanne Brooks was hired. Since 2019 the W.K. Kellogg Arabian Horse Center has been administered by an Executive Director, John Lambert.

Importantly, our instruction moved from Quarters to Semesters in Fall 2018. Concurrent changes in technology have gradually increased use of online learning management systems (LMS) such as Blackboard and Canvas. In Spring 2020 all instruction was migrated to online instruction due to the COVID-19 pandemic. Faculty have been teaching online (synchronously and asynchronously) using Zoom and maximizing use of online LMS. The number of full-time faculty, tenured/tenure track, has been considerably reduced despite an increase in the number of students over the years. In 2002 the AVS Department had 13 full-time faculty. The faculty consisted of 10 professors whose responsibilities were divided between administration, advising, research, and outreach activities. Seven faculty had 12-month appointments while 4 had 9-month academic year appointments. Currently the AVS Department has 8 full-time

faculty; three of these faculty are in AHS with one who is on the Faculty Early Retirement Program (FERP; Dr. Jim Alderson; who will fully retire in May 2022), and 5 in Animal Science, including the Chair of the AVS department). All faculty are on 9-month appointments. We are supported by approximately15 part-time faculty. It is also notable that the department used to have an Associate Chair position which was discontinued in the intervening years since the last program review. Drs. Edward Fonda, Cedric Matsushima and Robert Brey were Associate Chairs. The department no longer has faculty (since Dr. Brey's retirement) who conduct dedicated outreach activities. The program will continue to request for more full-time faculty (tenure track) to replace those that have retired, with the goal of building this number to previous levels (13 faculty).

1.3.2 Major recommendations made by previous review committee, actions taken, and their impact

The last AVS Program review was conducted (2002-2003) by 3 external reviewers: Dr. Ashley Robinson (Western University of Health Sciences), Dr. Andrew Thulin (California State University San Luis Obispo), and Dr. David Kooyman (Brigham Young University). Several recommendations made by the committee were addressed and implemented by the AVS department. These recommendations are summarized below:

A. Development of a departmental curriculum committee

The creation of the AVS departmental curriculum committee has been instrumental in enhancing the learning opportunities provided for students enrolled in all Animal Science options and minors. A curriculum review committee was established in 2004 and a comprehensive analysis of the instructional curriculum was conducted. Recommendations provided by the committee were implemented and are summarized in section 1.3.2 (B – D). The role of the committee has been to review AVS Department courses for their content, value, and relevance to departmental goals and student learning outcomes. As a part of this process, all faculty members can submit requests to change current AVS courses (through Curriculog). The curriculum committee reviews requests and makes recommendations on the requested changes. The recommendations are advanced to college and university-level curriculum committees before they are approved. Since the establishment of the current AVS Curriculum Committee, numerous modifications have been made to the curriculum. Some of these modifications are listed below:

B. Creation of the Animal Science general option and Equine Studies minor

In 2018, a new option, Animal Science (general) was created to serve the interests of students opting not to pursue a degree in Veterinary Medicine or Graduate School. In addition, a new minor in Equine Studies was created to offer more opportunities to students opting for diversified careers in the animal science industry.

C. Development of new and modified courses

The new AVS instructional curriculum restructured the seven core Animal Management classes required of students into 4 redesigned Animal Science courses (AVS 112 Animal Science I, AVS 114L Animal Science I Lab, AVS 113 Animal Science II, and AVS 115L Animal Science Lab II). These courses expose students to all the domestic livestock species maintained at Cal Poly Pomona helping them to gain relevant hands-on experiences while

taking fewer classes. Previously, students only specialized in two animal species over two quarters and were not required to take all the animal management courses. With these changes students' overall knowledge base was significantly enhanced and the student usage of animal units has increased. Furthermore, many course changes were instituted with the conversion from the Quarter to the Semester system in Fall 2018. New courses were created while others were merged, and some were discontinued. Some course descriptions and content were modified, e.g., AVS 3350 (Anatomy and Physiology) units were increased from 3 to 4 units, and AVS 1112 (Food Animal Production) units were increased from 2 to 3 units. Some new courses were created and added to the curriculum as major/option courses e.g., AVS 3456 Animal Behavior and AVS 4402 Advanced Animal Nutrition as well as elective courses, e.g., AVS 4114 Undergraduate Research, AVS 2980A Animal Practicum (Table 7).

D. Development of degree curriculum sheets

Degree curriculum sheets for the Animal Science major and options have been modified to enable proper course sequencing and facilitate timely completion of undergraduate programs, realignment of courses (e.g., the merging of quarter AVS 412 Mammalian Endocrinology, and AVS 414 Physiology of Reproduction and Lactation to form AVS 4214 Mammalian Endocrinology and Physiology of Reproduction and Lactation), and creation of a pool of elective courses (e.g., AVS 2990, AVS 4990, AVS 4411, AVS 4114), giving students flexibility in course selection.

E. Establishment of an AVS Coordinator for Undergraduate and Graduate Studies position

In Spring 2018, we created a new position of AVS Coordinator for Undergraduate and Graduate Programs who also serves as the AVS Curriculum Coordinator. In the latter role, the coordinator takes the lead regarding updates, reviews of pre-requisites, new course proposals, etc.

F. Establishment of a departmental faculty peer-review system

Currently, the department conducts peer reviews of tenured and tenure-track faculty (twice a year), tenured full professors (once every five years), and temporary faculty, i.e., both full-time and part-time faculty (twice a year). For tenure-track faculty, reviews are used as part of the Retention, Tenure, and Promotion (RTP) process required by the university. Written feedback is provided to all faculty members being evaluated and is kept in the AVS Department office and Personal Action Files in the Dean's Office. Since 2020 peer evaluations have been conducted online (via Interfolio) as mandated by the University RTP process. Peer evaluation is conducted by a faculty member of higher rank than the faculty being evaluated. The RTP Committee Chair makes all necessary arrangements for peer evaluations.

G. Elimination/reduction of small ruminant unit and use of the unit for other animals

The 2002-2003 program review committee recommended the elimination/dramatic reduction of the sheep population on campus and use of the sheep unit for cattle and/or horses. The committee cited the relatively insignificant contribution of the sheep industry in the United States and the pressing need to limit funds spent on maintenance of these animals on campus. The AVS department believes that it is necessary to maintain the animal units at current levels, including the small ruminant unit, to support the shared polytechnic

instructional approach that is in line with the departmental, college, and university missions. Currently, most lab courses offered in the Animal Science option, Pre-vet/Grad school option, Equine Studies minor, and Animal & Veterinary Science minor use one or more of these units to train students in handling and interacting with livestock. In addition, the sheep unit provides animals and other resources that support undergraduate and graduate-level research, including animals for the Livestock Show Team and Petting Farm, which are important components of interaction with the community. Animal numbers at the sheep, swine and cattle units have been adjusted over the years depending on instructional and research needs. We experienced an overall reduction in animal numbers during the pandemic (Spring 2020-Spring 2021) since instruction had moved 100% online and minimal research with animals was being conducted. It is also notable that some of our pastureland has been lost to the W.K. Kellogg Arabian Horse Center, construction of housing, and other campus reassignments in land use.

H. Establishment of Faculty Advancement Committee

Currently, the Center for the Advancement of Faculty Excellence (CAFE), which serves all departments in the university handles all issues of faculty training and development. CAFE offers workshop and training opportunities for all tenure-track and part-time lecturers, in use of University Learning Management Systems (LMS) including Blackboard (up to Spring 2021) and Canvas (starting Fall 2021), pedagogical approaches (including use of flipped classroom, development, and design of course syllabi, etc.), and other faculty resources. Many of the workshop opportunities offered by CAFE provide a small stipend to motivate and compensate faculty members for their time spent enhancing/developing pedagogical skills. More information on the advancement opportunities provided to faculty can be found on the CAFE website. All our part-time and full-time faculty, including graduate teaching assistants, have participated in CAFE-led workshops and training sessions.

I. Investment in the development of the AVS Department Chair

The external review committee made recommendations to 'invest' in development of the AVS Department Chair. There have been several department chairs since 2003 (namely, Drs. Fonda, Matsushima, Alderson, Sandelin and Murinda). This recommendation is no longer applicable.

J. Acquisition of a farm manager to oversee the existing production units (excluding horses and meat laboratory)

In a reorganization effort prompted by the review conducted in 2002-2003, the management of the Cal Poly Pomona Beef Unit was assigned to Dr. Fernandez as Beef Unit Manager. The changes were made in compliance with the external review team's recommendation to create a Livestock Farm Manager position. Dr. Fernandez later requested to return to a full-time teaching appointment to redirect and refocus his efforts in other areas of his professional development. In response to this management change, a decision was made to reclassify Linda Schmidt, formerly a Beef Unit Animal Technician II, to a Farm Instructional Support Technician III to take over from Dr. Fernandez. In this position, Ms. Schmidt had oversight of the Sheep, Swine and Beef Units. This allowed her to better allocate institutional resources to best solve delayed maintenance issues and provide for better support of instructional activities. She was also expected to work cooperatively and more efficiently with the Equine Farm and Crop managers to best allocate limited resources

to support instructional programs. However, in the succeeding years, the Farm Livestock manager position was not supported and was discontinued (~2009) and the three units returned to the previous arrangement, i.e., with oversight of unit managers without an overall Farm Manager. Retaining such positions requires understanding, input and support from administrators.

K. Develop department research goals and priorities and then build multi-purpose core laboratories around those priorities (i.e., Genomics laboratory, Reproductive Physiology laboratory, Biotechnology laboratory, etc.). Develop a culture of scholarly productivity. Establish collaborations with scientists in other academic institutions and industry. Solicit advisory feedback from industry and the USDA on possible research priorities and goals.

Presently, one "Core" research laboratory (Room 2-109) was established within the College of Agriculture to support faculty-supervised graduate and undergraduate student research. We agree with the review team's assessment that "quality dedicated laboratory space" is needed for teaching AVS courses. SPICE grants have been funded by the Office of Student Success at CPP to support classroom teaching. Several faculty members have been successful in obtaining funding to support improvements of instructional classrooms and resources. The AVS department has been instrumental in supplementing some of these grants to create more impactful changes to teaching labs (e.g., room 2-111). We also concur that a greater utilization of internship training possibilities would enhance our existing programs. However, our urban setting greatly limits farm internship opportunities and we face a challenge in providing these learning experiences for the more than 800 students currently enrolled in our Animal Science major. Nevertheless, we will intensify our efforts to develop new externship programs with the livestock industry in the state and nationally.

All full-time faculty are required to teach 12 units and advise an equivalent of another 3 units. However, faculty that are successful at acquiring funds (external and internal) can use these funds to acquire release time that allows them to conduct research with reduced teaching loads. Over the years several faculty and students had research interactions with Western University of Health Sciences (WUHS) in Pomona. It is also notable that for many years (until the COVID-19 pandemic) WUHS veterinary students have used our animal units for their training since they do not have animal units. AVS has also benefited from WUHS' veterinary assistance. A few WUHS professors from the College of Veterinary Medicine (e.g., Dr. Morishita) were appointed to adjunct teaching faculty positions in the AVS Department, and some have collaborated on grant writing and research projects with AVS faculty (e.g., Drs. Morishita, Karama, Dawes, and Reynolds). Summarized information on faculty and student scholarly activities can be found in Appendix Table 4 (4.1 – 4.5).

It will take time to build critical capacity in faculty numbers as well as recruit faculty with suitable skills that will advance the department to the cutting edge of current technologies in the Animal Sciences (e.g., Genomics, Reproductive Physiology, Biotechnology, etc.). Lack of qualified faculty, space, and institutional support, as well as large student to faculty ratios, have hindered progress in this need area. Internship courses, i.e., AVS 441, now AVS 4411, with units ranging from 1-3, representing 30, 60 and 90 hours of engagement, respectively, were developed to enable students to intern at animal hospitals and clinics, aquaria, zoos and animal farms. The internship classes are under supervision by the Department Chair. The courses contribute towards graduation units and are used as electives and can be used to earn hours to support veterinary school applications. Students in the AVS program have completed

externships/internships through the AVS department at local animal operations, including the Batista Dairy, as well as local veterinary clinics, and some campus sites (e.g., Animal House and BioTrek).

1.4 Inclusive Polytechnic Education

The AVS department supports the university's mission in providing experiential learning for our students. Departmental activities are closely aligned with our university's inclusive polytechnic education (Table 2).

Table 2. Alignment of Department Activities to the Inclusive Polytechnic Education

Department Activity (Curricular and Co-Curricular)	Elements of Inclusive Polytechnic Education							
	Application of Knowledge	**Critical Thinking & Problem Solving**	**Creativity, Discovery, & Innovation**	**Diverse & Multi-Disciplinary Perspectives**	**Integration of Technology**	**Collaborative Learning**	**Community & Global Engagement**	**Professional & Career Readiness**
Volunteering	Students volunteer at CPP animal units, Animal clinics and hospitals, Batista Brothers Dairy farm, etc., where knowledge learned in class is put into action (hands-on work)						Students volunteer to do community work on campus (AG Valley Beautification), at animal hospitals and clinics, animal shelters, etc. We also have the AGRIscapes discovery farm, and virtual field trips where students can engage with the community	Students volunteer at animal hospitals and clinics, zoos, government entities, etc. to gain experience in addition to their lab experience at CPP. This also prepares them for success in vet/graduate school.
Students Clubs	The AVS student clubs conduct regular meetings where organizational, group and soft skills are learned and applied in a group setting, like what they could face at job places	Students learn critical thinking and problem solving through competition with peers in other teams.	Student clubs are run by E-Boards charged with the task of being creative on how to run clubs e.g., fund-raising plans, innovative and appealing recruitment drives to attract membership, etc.	The AVS student clubs are diverse and represent different disciplines in the animal industry, offering students other perspectives and options to explore available career opportunities.	Student clubs have latitude over the use and application of technology to communicate effectively e.g., use of social networking platforms (Facebook, Instagram, Twitter, etc.), zoom, etc.	The AVS student clubs work together to complete group assignments e.g., at the Pumpkin Festival, campus activities	The Petting Farm engages students and the community in appreciating and interacting with farm animals (e.g., goats, sheep, pigs, cattle). The Petting farm has a mobile unit that travels to other venues including County Fairs.	Students participate in various clubs (e.g., Prevet) some that emphasize career readiness. Speakers from industry are invited to speak to students.
Study abroad	Students participating in study abroad had an opportunity to apply knowledge as they learned husbandry practices of wildlife animals in national parks, nature conservancies , and zoos.						Students travelled to countries outside the US (e.g., South Africa, Thailand) and participated in community services and took courses that enabled graduation	
Professional career advising								CoA hired DeVoneia L. Jordan College of Agriculture Career

Department Activity (Curricular and Co-Curricular)	Elements of Inclusive Polytechnic Education							
	Application of Knowledge	**Critical Thinking & Problem Solving**	**Creativity, Discovery, & Innovation**	**Diverse & Multi-Disciplinary Perspectives**	**Integration of Technology**	**Collaborative Learning**	**Community & Global Engagement**	**Professional & Career Readiness**
								Counselor. Jordan counsels students on career readiness and introduced a class on "career guidance." Assists with writing resumes, interviewing skills, etc.
Career Days								AG Career Days and University-wide career days. Bringing industry Professionals to Campus. Professor for a Day Program.
Internships	Students engage in internships (AVS 4411) with farms, animal clinics and hospitals, zoos, aquaria, etc., where they earn units to graduation							Students engage in internships (AVS 4411) with farms, animal clinics and hospitals, zoos, aquaria, etc., where they earn units to graduation.
Group Work	Learning use of instrumentation and sample preparation and analyses (AVS 4430L, 4214L, 1114L, 1115L, 2101L)	Learning use of instrumentation, sample preparation and analyses (AVS 4430L, 4214L, 1114L, 1115L, 2101L)			Learning use of instrumentation and sample preparation and analyses (AVS 4430L, 4214L,1114L, 1115L, 2101L) Students work in groups to study animal behavior through a remote software system (AVS 3456)	Students participate in in-class group projects in various classes (e.g., AVS 4430), as well as in research projects (AVS 4114, AVS 4610, AVS 3456)		
Research Projects	Participating in research, data collection and analyses, conference presentations, peer reviewed publications (AVS 4430L, 2101L, 1115L). We have an Undergraduate student research Club, and Research lecture series, CoA RSCA	Participating in research, data collection and analyses, conference presentations, peer reviewed publications (AVS 3456, AVS 4430L, 2101L, 1115L)	Participating in research, data collection and analyses, conference presentations, peer reviewed publications (AVS 4430L, 4214L, 2101L)	Students participate in collaborative research projects within the departments and other departments (Plant, Sciences, Nutrition and Food Sciences, Chemistry, Biology, Physics, etc.)	Students participate in collaborative research projects within the departments and other departments (Plant, Sciences, Nutrition and Food Sciences, Chemistry, Biology, Physics, etc.)			
Class Assignments	Term assignments based on research data collected by students e.g., AVS 4430	Group essays, product analyses			Writing of literature review papers, and essays (AVS 4430, AVS 4610)			

1.4.1 Ensuring that we provide an inclusive polytechnic education

As part of a polytechnic university, the AVS Department provides quality education through practical application of science and technology in the animal industries. The educational process is integrative and multidisciplinary and serves to prepare students for rewarding careers in animal agriculture and allied industries. The faculty are engaged in scholarly activities that lead to technological advancements that sustain and enhance the quality of animal and human life. Our emphasis is on hands-on training. This "learn by doing" polytechnic philosophy has earned Cal Poly Pomona a reputation for producing well-balanced graduates who are sought-after in today's marketplace. Our diversity across multiple dimensions (students and faculty) reflects and enhances our department. We are welcoming and respectful, and value diversity. Our students come from diverse backgrounds, and we encourage inclusiveness, e.g., through student club memberships, inviting guest speakers who address the state of the animal science industry and agriculture in general, including how minoritized groups are affected by policies (see https://www.cpp.edu/agri/news/2021-rainey-lecture.shtml). The University offers opportunities to enhance faculty awareness of issues relating to equity, diversity and inclusivity through the Center for the Advancement of Faculty Excellence (CAFE). Workshops offered by CAFE include pedagogy that encompasses inclusivity in syllabus and course design. Examples of these CAFE courses include: the USC Equity Institute for Equity-Minded Teaching and Engaging the Digital Student Initiative (EDSI). Several of the AVS department faculty have enrolled in these workshops.

1.5 Credit Hour

As of July 1, 2011, federal law (Title 34, Code of Federal Regulations, sections 600.2 and 600.4) requires all accredited institutions to comply with the federal definition of the credit hour. For all CSU degree programs and courses bearing academic credit, the “credit hour” is defined as “the amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates not less than:

- One hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or ten to twelve weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time; or
- At least an equivalent amount of work as required in paragraph (1) of this definition for other academic activities as established by the institution, including laboratory work, internships, practical, studio work, and other academic work leading to the award of credit hours.”
- A credit hour is assumed to be a 50-minute period. In courses in which “seat time” does not apply, a credit hour may be measured by an equivalent amount of work, as demonstrated by student achievement.

All our courses meet the credit hour policy. With changes from Quarters to Semesters in Fall 2018, the AVS Department has defined a credit unit to be an engagement of 15 hours per Semester. Special Topic classes (e.g., AVS 2990, AVS 4990), have 1, 2 and 3 credit unit versions, which respectively translate to 15, 30, and 45 hours of engagement on an activity per Semester. The hours are recorded for grading by the animal unit managers. For the internships

(AVS 4411), it respectively translates into 30, 60 and 90 hours, corresponding to 1, 2, and 3 credit units. The hours are recorded for grading by the company or institutional supervisors.

2. PROGRAM QUALITY

2.1 Student Profile at Admission and Enrollment

Tables 3, 4, and 5 were compiled using data provided by the Office of Academic Research and Resources. Tables 3 and 4 provide data on admission trends, while Table 5 provides data on admission test scores. Some of the data may be missing due to students not reporting information or inaccessibility of the information. Table 6 summarizes enrollment trends for all students.

Table 3. Admission trends for first-time freshmen (FTF)

	Fall 2019	Fall 2018	Fall 2017	Fall 2020	Fall 2016
Applied	**1273**	**1075**	**1035**	**1235**	**903**
Gender					
Male	193	182	133	189	154
Female	1080	893	902	1045	749
Not Reported	0	0	0	1	0
URM Status					
URM	74	55	48	75	42
Non-URM	48	60	37	29	32
Not Reported	1151	960	950	1131	829
1st Gen Status					
1st Generation	67	61	45	69	37
Not 1st Generation	55	54	39	35	36
Not Reported	1151	960	951	1131	830
Admitted	**497**	**455**	**398**	**475**	**323**
Gender					
Male	75	64	47	66	40
Female	422	391	351	409	283
Not Reported	0	0	0	0	0
URM Status					
URM	74	55	48	75	42
Non-URM	48	60	37	29	32
Not Reported	375	340	313	371	249
1st Gen Status					
1st Generation	67	61	45	69	37
Not 1st Generation	55	54	39	35	36
Not Reported	375	340	314	371	250
Enrolled	**131**	**116**	**90**	**121**	**85**
Gender					
Male	17	16	9	12	7
Female	102	99	74	88	67
Not Reported	12	1	7	21	11
URM Status					
URM	79	55	48	86	49
Non-URM	52	61	42	35	36
Not Reported	0	0	0	0	0
1st Gen Status					
1st Generation	72	62	49	80	44
Not 1st Generation	57	54	40	41	39
Not Reported	0	0	1	0	2

*Note: Students who did not report their demographics are counted as “Not Reported”.
URM = underrepresented minorities

Table 4. Admission trends for transfer students

	Fall 2020	Fall 2019	Fall 2018	Fall 2017	Fall 2016
Applied	**193**	**233**	**181**	**178**	**188**
Gender					
Male	25	39	28	21	35
Female	167	194	153	157	153
Not Reported	1	0	0	0	0
URM Status					
URM	19	28	19	26	30
Non-URM	16	17	25	11	20
Not Reported	158	188	137	141	138
1st Gen Status					
1st Generation	21	31	30	28	37
Not 1st Generation	13	13	14	9	12
Not Reported	159	189	137	141	139
Admitted	**75**	**72**	**70**	**73**	**70**
Gender					
Male	8	12	11	9	10
Female	67	60	59	64	60
Not Reported	0	0	0	0	0
URM Status					
URM	19	28	19	26	30
Non-URM	16	17	25	11	20
Not Reported	40	27	26	36	20
1st Gen Status					
1st Generation	21	31	30	28	37
Not 1st Generation	13	13	14	9	12
Not Reported	41	28	26	36	21
Enrolled	**39**	**54**	**44**	**37**	**45**
Gender					
Male	5	8	5	4	4
Female	30	37	39	33	41
Not Reported	4	9	0	0	0
URM Status					
URM	21	33	19	26	26
Non-URM	18	21	25	11	19
Not Reported	0	0	0	0	0
1st Gen Status					
1st Generation	23	35	30	28	33
Not 1st Generation	15	18	14	9	11
Not Reported	1	1	0	0	1

*Note: Students who did not report their demographics are counted as “Not Reported”.
URM = underrepresented minorities

Table 5. Admission test scores for first-time freshmen[1]

	2020					2019					2018					2017					2016				
	SAT M	SAT V	ACT M	ACT E	HS GPA	SAT M	SAT V	ACT M	ACT E	HS GPA	SAT M	SAT V	ACT M	ACT E	HS GPA	SAT M	SAT V	ACT M	ACT E	HS GPA	SAT M	SAT V	ACT M	ACT E	HS GPA
Overall Admitte																									
Gender																									
Male	N/A	N/A	25	26	3.98	N/A	N/A	25	26	3.93	N/A	N/A	24	22	3.85	660	594	26	26	3.86	603	567	27	27	3.95
Female	N/A	N/A	23	25	4.05	N/A	N/A	23	25	3.99	N/A	N/A	23	25	3.94	600	562	24	26	3.94	557	553	24	25	3.92
URM Status						N/A	N/A				N/A	N/A													
URM	N/A	N/A	20	20	3.96	N/A	N/A	21	23	3.89	N/A	N/A	19	22	3.72	472	500	21	23	3.86	509	521	20	21	3.79
Non-URM	N/A	N/A	25	26	3.96	N/A	N/A	24	26	3.90	N/A	N/A	25	26	3.74	588	507	23	25	3.78	550	562	25	25	3.85
1st Generation St	N/A	N/A				N/A	N/A				N/A	N/A													
1st Generation	N/A	N/A	20	20	3.95	N/A	N/A	21	23	3.89	N/A	N/A	20	23	3.75	492	496	20	22	3.87	497	506	20	20	3.80
Not 1st Generatic	N/A	N/A	25	26	3.98	N/A	N/A	24	26	3.89	N/A	N/A	24	25	3.71	555	508	24	25	3.78	556	573	24	25	3.82
Overall Enrolled	N/A	N/A				N/A	N/A				N/A	N/A													
Gender	N/A	N/A				N/A	N/A				N/A	N/A													
Male	N/A	N/A	N/A	N/A	3.87	N/A	N/A	N/A	N/A	3.91	N/A	N/A	N/A	N/A	3.59	N/A	N/A	N/A	N/A	3.75	561	505	N/A		3.84
Female	N/A	N/A	22	22	3.98	N/A	N/A	22	24	3.89	N/A	N/A	22	24	3.75	540	504	22	24	3.83	520	540	23	23	3.81
URM Status	N/A	N/A				N/A	N/A				N/A	N/A													
URM	N/A	N/A	20	19	3.97	N/A	N/A	21	23	3.89	N/A	N/A	19	22	3.72	472	500	21	23	3.85	509	521	20	21	3.79
Non-URM	N/A	N/A	25	26	3.96	N/A	N/A	24	26	3.90	N/A	N/A	25	26	3.74	588	507	23	25	3.78	550	562	25	25	3.85
1st Generation St	N/A	N/A				N/A	N/A				N/A	N/A													
1st Generation	N/A	N/A	20	20	3.96	N/A	N/A	21	23	3.89	N/A	N/A	20	23	3.75	492	496	20	22	3.86	497	506	20	20	3.80
Not 1st Generatic	N/A	N/A	25	26	3.98	N/A	N/A	24	26	3.89	N/A	N/A	24	25	3.71	555	508	24	25	3.78	556	573	24	25	3.82

*Note: N/A = not available (Some cohorts did not have enough students to generate an average)..
URM = underrepresented minorities

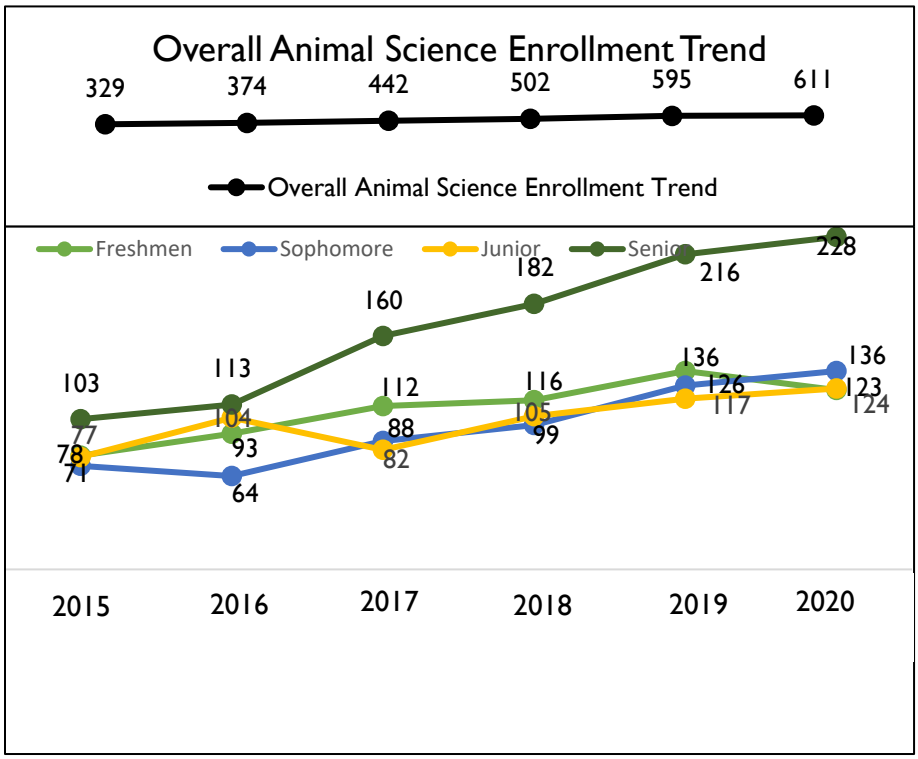
[1] ARAR Office data request

Table 6. Enrollment trends for all students

Enrollment Trends					
Term	**Overall Program**	**Freshmen**	**Sophomore**	**Junior**	**Senior**
Fall 2015	329	78	71	77	103
Fall 2016	374	93	64	104	113
Fall 2017	442	112	88	82	160
Fall 2018	502	116	99	105	182
Fall 2019	595	136	126	117	216
Fall 2020	611	123	136	124	228

Figure 1 provides data for students enrolled in the AVS program each Fall semester between 2015 and 2020.

Figure 1. Enrollment headcount for all students majoring in Animal Science



2.1.1 Program efforts to attract well-qualified students

From 2015-2020, total enrollment numbers increased in all student categories, especially seniors (Figure 1). The sharp increase in seniors' numbers could be due to increased enrollment of transfers and changes of major to our Animal Science major. Students that are well-versed in the Animal Science curriculum (trained by College Advisors), i.e., peer advisors and Ag Ambassadors, visit high schools and junior colleges in southern California to recruit prospective AVS students. Faculty members are also invited to these institutions to give presentations that encourage recruitment of students to AVS. The department hosts an Open House once a year, in March, when prospective students visit campus (2020 and 2021 events were virtual) and attend demonstrations of areas of Animal and Veterinary Sciences (e.g., anatomy, physiology, meat science and biotechnology), and orientation activities, including

seminars. AVS is an impacted program that attracts only the best students from high schools and community colleges. “Impaction” means that the department has reached its enrollment capacity for instructional resources and physical support and cannot accommodate all the eligible applications it receives. In general, applications received from students from outside designated local areas will be held to higher admission requirements than those received from students inside the local areas. We therefore recruit students of the highest caliber (high GPA) due to the high selection index (See Table 5).

2.1.2 Support for student enrollment in the department

To support enrollment, the department engages in recruitment efforts, e.g., Open House and Orientation, and provides intensive training to eligible major advisors and student registration assistants. These efforts ensure that the incoming students are enrolled in the correct major and option. Scholarships and research opportunities are available for some students. In addition, some freshmen embark on programs that enable priority registration and/or graduation in 4 years, e.g., the CA Promise (formerly 4-Year Pledge) Program, and the Kellogg College Honors Program. The latter program also offers scholarships to attract students.

2.2 Curriculum and Pedagog

Table 7 summarizes the 2021-2022 Academic Year curriculum sheets for the two Animal Science major options.

Table 7. Cal Poly Pomona Animal Science major (AVS) curriculum (new, modified or merged courses are in bold)

Course #	Course Name	Units
Required Core Courses for Animal Science Major (53 Units)		
AG1110	Agriculture: The Foundation of Civilizations	3
AG4010	Ethical issues in Food Agricultural and Apparel industries	3
AHS3305	Parasitology and Infectious Diseases	3
AHS3305L	Parasitology and Infectious Diseases Laboratory	1
Or		
BIO2060	Basic Microbiology	3
BIO2060L	Basic Microbiology Laboratory	1
AVS1000	Orientation to Animal & Veterinary Sciences	1
AVS1112	**Food Animal Production**	3
AVS1113	Companion, Laboratory and Exotic Animal Care	3
AVS1114L	Food Animal Production Laboratory	1
AVS1115L	Companion Animal Management Laboratory	1
AVS2101	**Fundamentals of Animal Nutrition**	3
AVS2101L	**Fundamentals of Animal Nutrition Laboratory**	1
AVS3305	**Animal Genetics**	3
AVS3311	Animal Industry and Society	3
Or		
AVS3333	Canine and Feline Compendium	3

Course #	Course Name	Units
AVS3350	**Anatomy and Physiology**	4
AVS3350L	Anatomy and Physiology Laboratory	1
AVS4430	Biotechnology Applications in Animal Science	3
AVS4430L	Biotechnology Applications in Animal Science Laboratory	1
AVS4610	Senior Seminar	1
CHM1210	General Chemistry I	3
CHM1210L	General Chemistry Laboratory I	1
CHM1220	General Chemistry II	3
CHM1220L	General Chemistry Laboratory II	1
MAT1050	College Algebra	3
STA1200	Statistics with Applications	3
Prevet/Graduate School Option required (31 Units)		
BIO1210	Foundations of Biology: Energy, Matter, and Information	3
BIO1210L	Foundations of Biology: Energy, Matter, and Information Laboratory	1
BIO1220	Foundations of Biology: Evolution, Ecology, and Biodiversity	3
BIO1220L	Foundations of Biology: Evolution, Ecology, and Biodiversity Laboratory	1
CHM3140	Organic Chemistry I	3
CHM3140L	Organic Chemistry Laboratory I	1
CHM3150	Organic Chemistry II	3
CHM3150L	Organic Chemistry Laboratory II	1
CHM3210	Elements of Biochemistry	3
MAT1060	Trigonometry	3
PHY1210	Physics of Motion, Fluids, and Heat	3
PHY1210L	Physics of Motion, Fluids, and Heat Laboratory	1
PHY1220	Physics of Electromagnetism, Circuits, and Light	3
PHY1220L	Electromagnetism, Circuits, and Light Laboratory	1
Prevet Option Restricted electives (0-6 Units)*		
*Students should meet with their advisor for a list of approved courses. Select enough courses so that the total from "Major Required", "Subplan/Option Required", "GE", and "Restricted Electives" is at least 120 units.		
Animal Science Option required (21-22 Units)		
AVS3327	Meat Science	3
AVS3456	**Animal Behavior**	3
AVS4214	**Mammalian Endocrinology and Physiology of Reproduction and Lactation**	3
AVS4214L	**Mammalian Reproduction and Lactational Physiology Laboratory**	1
AVS4402	Advanced Nutrition	3
Or		
AVS4473	Clinical Nutrition	3
BIO1150	Basic Biology	3
BIO1150L	Basic Biology Laboratory	1

Course #	Course Name	Units
Or		
BIO1210	Foundations of Biology: Energy, Matter, and Information	3
BIO1210L	Foundations of Biology: Energy, Matter, and Information Laboratory	1
CHM2010	Elements of Organic Chemistry	3
CHM2010L	Elements of Organic Chemistry Laboratory	1
Or		
CHM3140	Organic Chemistry I	4
CHM3140L	Organic Chemistry Laboratory I	1
Animal Science Option Restricted Electives (0-16 Units)*		
*Students should meet with their advisor for a list of approved courses. Select enough courses so that the total from "Major Required", "Subplan/Option Required", "GE", and "Restricted Electives" is at least 120 units.		

Curricula from peer and aspirational institutions are presented in Appendix Table 1 (1.1 – 1.3).

2.2.1 Major curricular changes in the AVS program and their impact

Conversion from Quarter to Semester systems in Fall 2018, resulted in many changes in courses. These changes included: course numbering systems from 3 to 4 digits (e.g., **AVS 101** to **AVS 2101**), merging or elimination of some courses, and modification of course descriptions and content, including development of Extended Course Outlines (ECOs) that included Student Learning Outcomes (SLOs).

New courses: **AVS 2101L** Fundamentals of Animal Nutrition Lab, **AVS 3456** Animal Behavior, **AVS 4402** Advanced Nutrition in the major, and the elective courses, **AVS 4114** Undergraduate Research and **AVS 2980A** Animal Practicum.

Merged courses: Animal Breeding and Animal Genetics were merged into **AVS3305**; **AVS 412** Mammalian Endocrinology; and AVS 414 Physiology of Reproduction and Lactation were merged into **AVS 4214** Mammalian Endocrinology and Physiology of Reproduction and Lactation.

Modified courses: **AVS 3350** (Anatomy & Physiology) units were increased from 3 to 4 units, and **AVS 1112** (Food Animal Production) units were increased from 2 to 3 units.

Because of the change to a semester system in Fall 2018, unit requirements for graduation for the AVS major decreased from 180 to 120 units. However, the overall contact hours remained the same. Curriculum sheets for the Animal Science major options have also been modified to enable proper course sequencing and to facilitate timely completion of undergraduate programs (Table 7). Courses were realigned and a pool of eligible elective courses were created, allowing for flexibility in course selection and course substitution in the subplan area.

In the past 7 years dissemination of instruction has also moved from traditional projectors and slide presentations to PowerPoint presentations supported by online platforms such as Blackboard, Canvas and Zoom. The instruction mode has been diversified by providing face to face, synchronous online, asynchronous online, and face to face online hybrid teaching modes. Starting in Spring 2021, we have been providing face to face, synchronous online, synchronous

online, and face to face online hybrid, including hyflex modes of instruction due to the COVID-19 pandemic. In Fall 2021 we moved from Blackboard to using Canvas as a learning management system. With increased online formats we have been able to enroll more students without seat number restrictions, providing flexibility and accommodating more students per section. One disadvantage to this is that it increases the student: faculty ratio, creating more workload for faculty and possibly worse course outcomes. Some lecture courses will invariably continue to be offered online as we progress post-COVID. Apart from the Fall, Spring and Summer sessions, a Winter Intersession was also introduced in 2019, however, AVS has not identified suitable courses to offer. Students can graduate timely or earlier.

2.2.2 Comparison of the AVS curriculum at CPP with other Animal Science programs in the state

Like its founding sister institution, Cal Poly San Luis Obispo, Cal Poly Pomona is a Polytechnic University. Polytechnics value the application of knowledge through the hands-on 'Learn by Doing' approach that relates to today's opportunities and challenges. In this regard our students have advantages over Chico and UC Davis. The Cal Poly Pomona AVS program benefits greatly from the 'Learn by Doing' approach as our students use animals (not just textbooks and simulations) in their classes. Hands-on experiences are a critical part of learning for our AVS students. Therefore, most of our classes require laboratories. For AVS students, animal classes have classroom and laboratory components. Unlike many other animal science major students across the country (including Chico, Cal Poly San Luis Obispo, and UC Davis), over 90% of the animal and veterinary sciences students at Cal Poly Pomona are *from non-agriculture backgrounds*. We are the only Animal and Veterinary Science Department in Southern California, and are in a metropolitan area; despite this, we are fortunate to have many livestock species (beef cattle, various breeds of sheep and goats, swine and horses) on campus, for teaching purposes. Many animal science students are exposed to farm animals for the first time during their freshman year; this is a unique opportunity considering our students' urban background setting. While we have access to livestock use for classes, we are at an extreme disadvantage in terms of laboratory space and equipment to support teaching and research.

2.2.3 Adaptations made in the AVS curriculum to prepare students for disciplinary and professional expectations

AVS students can participate in current and future efforts to enhance urban agriculture since most of our students are not likely to be employed in rural settings after graduation. Whereas some of our students on the Prevet option proceed to veterinary and/or graduate school, a majority of our AVS students will be employed in various sectors, including USDA and other federal agencies, state agencies, aquaria, zoos, veterinary hospitals and clinics, food industry, livestock feed industry, and allied industries. Many student clubs (e.g., Student Association for Animal Science/SAAS, and Prevet) invite experts from the industry including alumni to provide insights on careers in different fields of employment. There has been an uptake in incorporation of soft skills in many classes. These skills, e.g., public speaking, presentations, research, writing, use of computers, and ability to use various learning and presentation platforms (Blackboard, Canvas, Zoom, etc.), prepare our AVS students for their careers.

The College of Agriculture in conjunction with the campus has a 'Professor for a Day Program' which brings back our departmental graduates (alumni) and invites other experts into the

classrooms to share their experiences with the current students. This program has promoted networking opportunities for our students.

Figure 2 and Table 8 summarize data on high DFW courses offered by the AVS (See Appendix Table 2 for additional data on AVS courses with relatively high DFWs).

Figure 2. AVS courses with the highest DFWs

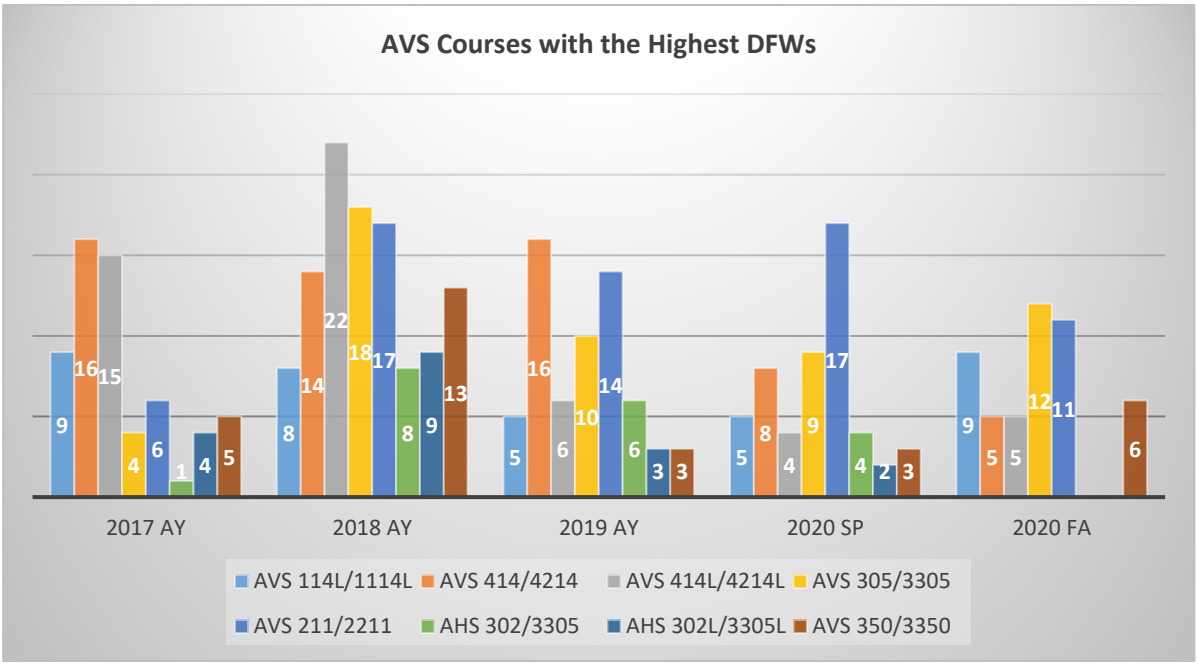


Table 8. High DFWs by impact factor

Impact Factor					
	Course	**Course Title**	**Enrollment**	**Non-passing Rate**	**Impact***
Quarter	AHS302L	Animal Parasitology Lab	433	10%	42
Quarter	AHS302	Animal Parasitology	438	9%	38
Quarter	AHS305	Clinical Pthlgy and Anml Disea	160	12%	19
Semester	AVS1112	Food Animal Production	44	14%	6
Semester	AVS4402	Advanced Nutrition	33	12%	4
Semester	AVS4214	Mammal Endcrn Reprdctn Lctatn	32	9%	3
Semester	AVS3305	Animal Genetics	39	8%	3
Semester	AVS4214L	Mammln Rprdctn Lactn Phys Lab	28	7%	2
Semester	AVS2101L	Fund of Animal Nutri Lab	33	6%	2
Semester	AVS3350	Anatomy and Physiology	40	5%	2
Semester	AVS1114L	Food Animal Production Lab	41	5%	2
Semester	AVS1113	Comp Lab and Extc Ani Care	46	4%	2
Semester	AVS1000	Orientation to AVS	48	4%	2

Impact = number of students affected.

Table 9 provides a list of GE courses taught by the department and Table 10 provides a list of honors courses taught by AVS the department.

Table 9. General Education courses

Course	Course Title
AVS 2211	Drugs and Society
AVS 3311	Animal Industry and Society
AVS 3333	Canine and Feline Compendium

Table 10. List of Honors courses

Course	Course Title
AVS 4114H	Undergraduate Research
AVS 461H*	Undergraduate Research I
AVS 499H*	Special Topics for Upper Division Students
AVS 4990H	Special Topics for Upper Division Students

Offered during quarters.

2.2.4 Bottle neck courses and their impact on student progress in the AVS program

A few of our AVS courses have limited seat availability, e.g., AVS2101/L, AVS3350/L, AVS4214/L and AVS4430/L. These courses require laboratories with lecture. Due to limited laboratory space (maximum 24 students), enrolling in these courses can be difficult (See Appendix Table 3 for more data on class enrollment).

Our primary high demand bottleneck courses are outside of the Department, i.e., in the Chemistry & Biological Sciences, and Mathematics Departments. Students continue to have difficulty getting into General Chemistry and the Biology courses in their first year of classes. These classes (e.g., BIO 1115/L, BIO 1210/L, MAT 1050, CH 1210/L; see Table 6) are vital pre-requisites for many courses on the Animal Science curriculum (Table 11). These courses negatively affect graduation rates, especially in the Pre-vet option. We do not have any bottleneck courses within our Animal Science program AVS courses and offer multiple sections of most classes when the demand is perceived. Furthermore, many of our AVS curriculum courses, apart from those required for veterinary school and GE courses, can be substituted with AVS elective courses or upper division courses with good rigor, from other departments (e.g., upper division 3,000-4,000 level BIO classes), after consultation with the faculty advisor and chair. For the past 7 years during freshmen orientation, we have had arrangements with the Biological Sciences Department to have our freshmen take BIO 1220/L out of sequence since seats will be unavailable in BIO 1210/L (a bottleneck class). Alternatively, students are advised to take equivalents or transferrable courses, e.g., BIO 1115/L, BIO 1210/L, MAT 1050, CH 1210/L, that are recognized in reciprocal course transfer agreements between Cal Poly Pomona, other CSU campuses, and community colleges in California (www.assist.org), as well as institutions and colleges in other states where our students could be taking courses (Transfer Evaluation System: https://www.cpp.edu/registrar//articulation/tes.shtml). The increase in online instruction via various learning management systems (Blackboard and Canvas) has enabled

increases in numbers of seats per class, and has alleviated many bottlenecks, and the need to be on campus all the time to take classes, especially lectures. There will be a decrease in online instruction if the COVID-19 situation improves.

We are unable to offer more class sections each semester due to the limited number of faculty and limitations in workload (WTUs) per Faculty Bargaining Agreements. We do offer summer sessions for some courses that are in high demand depending on lecturer availability. We are also considering introducing a few courses during the Winter Intersession in future.

Table 11. Course prerequisite checklist of Department of Animal & Veterinary Sciences Animal Science major curriculum year 2020-2021

Required Courses	**Prerequisites**
AVS 1000	
AVS 1112	
AVS 1113	
AVS 1125	
AVS 1114L	
AVS 1115L	
AVS 1125/L	
AVS 2101/L	AVS 1112, CHM1210/L, MAT 1050
AVS 3305	BIO 1150/L or BIO 1210/L
AVS 3327	
AVS 3350/L	BIO 1150/L or BIO 1210/L, CHM 1210/L
AVS 4214/4214L	AVS 3350/L
AVS 4402	AVS 2101/L
AVS 4430/L	AVS 1112, AVS 1113, AVS 3350/L, BIO 2400 or AVS 3305 or AVS 3450, and Junior/Senior Standing
AVS 4473	AVS 2101, AHS 3305; and AVS 3350 or AHS 2202.
AVS 4610	Senior Standing
AHS 3305/L	BIO 1150/L or BIO 1210/L
AG 1010	Satisfies GE D3
AG 4010	Junior or Senior Standing and Completion of GE A2; Satisfies C3 **OR** D4
AVS 2211	
AVS 3311 or 3333	Junior and Senior Standing; Satisfies GE B5
BIO 1150/L	Satisfies GE B2 and B3
BIO 1210/L	Satisfies GE B2 and B3
BIO 1220/L	BIO 1210/L
CHM 1210/L	MAT 1050 OR MAT 1060 or STA 1200; Satisfies GE B1 and B3
BIO 2060/L	BIO 1150/L or BIO 1220/L
CHM 1220/L	C- or better in CHM 1210/L; Satisfies GE B1 and B3
CHM 2010/L	CHM 1220/L
CHM 3140/L	C- or better in CHM 1220/L
CHM 3150/L	C- or better in CHM 3140/L.
CHM 3210	C- or better in the following CHM 1220/L, CHM 3140/L, CHM 2010/L
MAT 1050	Category M1; Category M2; MDTP >=14; ALEKS>=46; or C or better in MAT 1060/106, MAT 1250/125, MAT 1910/191, STA 1200/120, MAT 12, or ESM 12.
MAT 1060	Category M1; Category M2; MDPT >=14; ALEKS >=46; C or better in MAT 1050/105, MAT 1250/125, MAT 1910/191, STA 1200/120, MAT 12, or ESM 12; or C- or better in MAT 1051.
STA 1200	Category M1; Category M2; C or better in MAT 12, ESM 12, MAT 1060/106, MAT 1250/125, MAT 1910/191, MAT 1050/105, or STA 1300; or C- or better in MAT 1051.
PHY 1210/L	C- or better in MAT 1060

PHY 1220/L	PHY 1210/L

2.2.5 Reducing the impact of high drop/withdrawal/fail (DWF)

To improve the pass rate in some classes over the years we have used various approaches to adjust as seen relevant for the class and instructor. At the end of the term (Quarter/Spring) we identified the students that would be taking classes the following term and emailed these students. We provide students with Power Point lessons and reading assignments over the summer and encouraged them to begin to review course materials prior to the start of the academic year. In class, we set up a series of LMS quizzes (pretests) that students must review prior to taking tests associated with the material. Students are given opportunities to retake quizzes to benefit from their mistakes without being penalized. Detailed study guides are provided in many courses and students can review concepts, together with the instructor in the classroom setting. Unfortunately, many times students who need these revisions the most are not attending. Rigorous revision of course content is constantly made to provide students with the most relevant information without burdening them with irrelevant material. Our AVS graduates have benefited from these changes as witnessed by them reaching out to let us know that it has helped prepare them for advanced academic and professional schools.

Further to efforts made by faculty, we believe that our students would benefit greatly from student (peer) tutors. Students who have taken the courses and earned excellent grades can tutor the current cohort of students. We could employ small study groups for those students needing help on a weekly basis. The study groups would stimulate the students to review material and fill in gaps in their knowledge prior to the time of their assessment. Features on our LMS (Blackboard and Canvas) allow us to track student interaction and time spent on the course. This can be a good marker for students who need tutoring. The change from Quarter to Semester system in Fall 2018 likely helped students in many high DFW classes, as this allowed more time for many of the unique concepts to be understood over a longer period (i.e., 15 vs. 10 weeks). We are confident that if we can employ additional measures in many of our DFW courses we can improve the performance of the students without compromising the integrity of our impacted program or sacrificing academic rigor.

A further dissection of the data would be needed to understand the reasons behind some high DFW rates, and to know if the students that struggle with the courses are majors or non-majors, or for courses with multiple sections, if it is a particular instructor they struggle with. Instructors are encouraged to take attendance and report issues to the department chair. We also have early warning systems that support student success whereby we must report student progress early (first few weeks) and at certain stages of the semester before it is too late to intervene. Students that are struggling are identified early in the term and reported to the Student Success Center for relevant interventions. The student Success Center advises or counsels these students to ensure that they get back on track early in the semester.

At the department level we have previously placed registration holds on students (a practice that has been discontinued by the University), and this ensures that students meet with their designated academic advisor who will check on their progress, course selection, and graduation plans before registering for the next term. In addition, we have a system that identifies at-risk students whereby holds are placed on registration if a student's GPA (in the major or overall) falls below 2. These students are prevented from registering for classes and are forced to meet with a college advisor (who works with "At-risk" students) and the Department Chair, who will help them with a recovery plan. Furthermore, student support is available in various forms campus wide. For example, we have a Center for Student Success, a Center for Advising, and a

Disability Resource Center that deals with students with various disabilities, to ensure their success.

2.2.6 Impact of non AVS courses required for the AVS major

Courses offered in the Departments of Chemistry, Biological Sciences and Mathematics (Table 6 and Table 10) comprise most courses offered outside the Animal Science program and form part of the core curriculum of the Animal Science program. For instance, coursework in zoology prepares Animal Science majors for a career and work with zoo animals, research and wildlife conservation. Other courses offered in the Department of Biological Sciences e.g., General Microbiology complement the Parasitology course offered in AVS Department. Its content prepares students for a successful career in food safety and inspection. Advanced Biology courses teach molecular level content that prepares AVS students to succeed in the Biotechnology Applications course offered in AVS Department. Courses offered in the Chemistry Department, e.g., Biochemistry, teach content that prepares Pre-vet students to succeed in advanced courses offered in the AVS Department (e.g., Reproductive Physiology and Endocrinology, Advanced Nutrition, etc.). Courses offered in the Department of Mathematics and Physics teach content that prepares AVS students to succeed in AVS courses including Fundamentals in Animal Nutrition, Genetics, animal production and management. In addition, many of the courses offered in STEM Departments are often used to substitute for some courses for Animal Science programs.

2.3 Student Retention and Graduation Rates – Graduation Initiative 2025

Figures 3-6 provide graduation data for students entering the Animal Science Department as First-Time Freshman, Transfer, URM and PELL eligible students. Figure 4 provides graduation data for students entering the Animal Science Department as off-campus fall term Transfers. Any transfers entering in a term other than fall or are on-campus transfers are not accounted for in the Fall Entering Transfer Graduation Rates for the Animal Science Department. The academic year 2016-2017 does not have data because, according to the CSU Dashboard, “no matching records were found”. The 2025 CSU Graduation Initiative goals for first-time freshmen are; 38% at 4 years, and 73% at 6 years; for transfers they are 29% at 2 years, and 85% at 4 years.

Figure 7-9 summarize other relevant metrics on our students, e.g., number of graduates per year, average GPA, and placement in vet schools, whereas Figure 10 summarizes CSU major migration of First-Time Freshmen declaring as Animal Science majors. Figure 8 provides the number of AVS graduates and their average GPA. The number of graduates increased gradually from 72 (2014) to 109 (2020). During the same period, GPA for AVS graduates also steadily improved from 3.1 to 3.5 (Figure 8). One major path that graduates from AVS pursue is applying to vet schools. Figure 9 summarizes the success rate for AVS graduate admission into vet school. The national vet school acceptance rate is ~15% while the CPP graduates’ average success rate was 44% over the past 5 years.

Figure 3. Fall entering First-Time Freshman graduation rates[2]

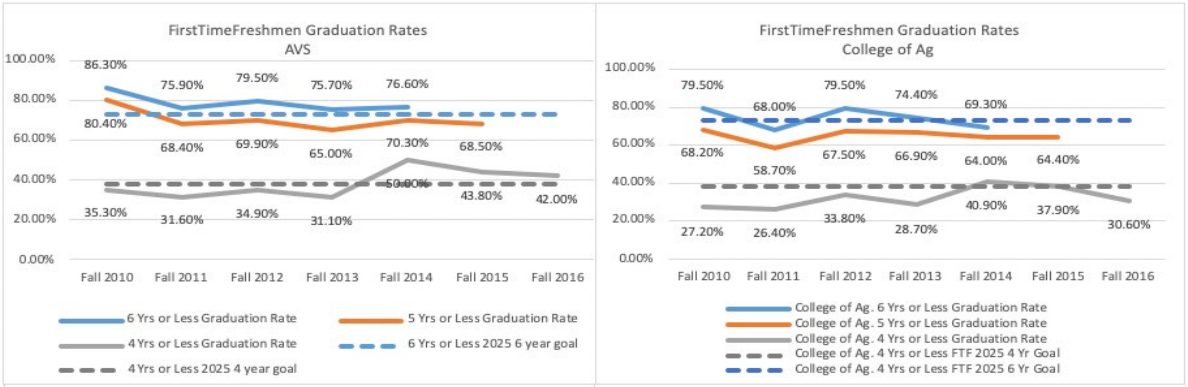


Figure 4. Fall entering Transfer graduation rates

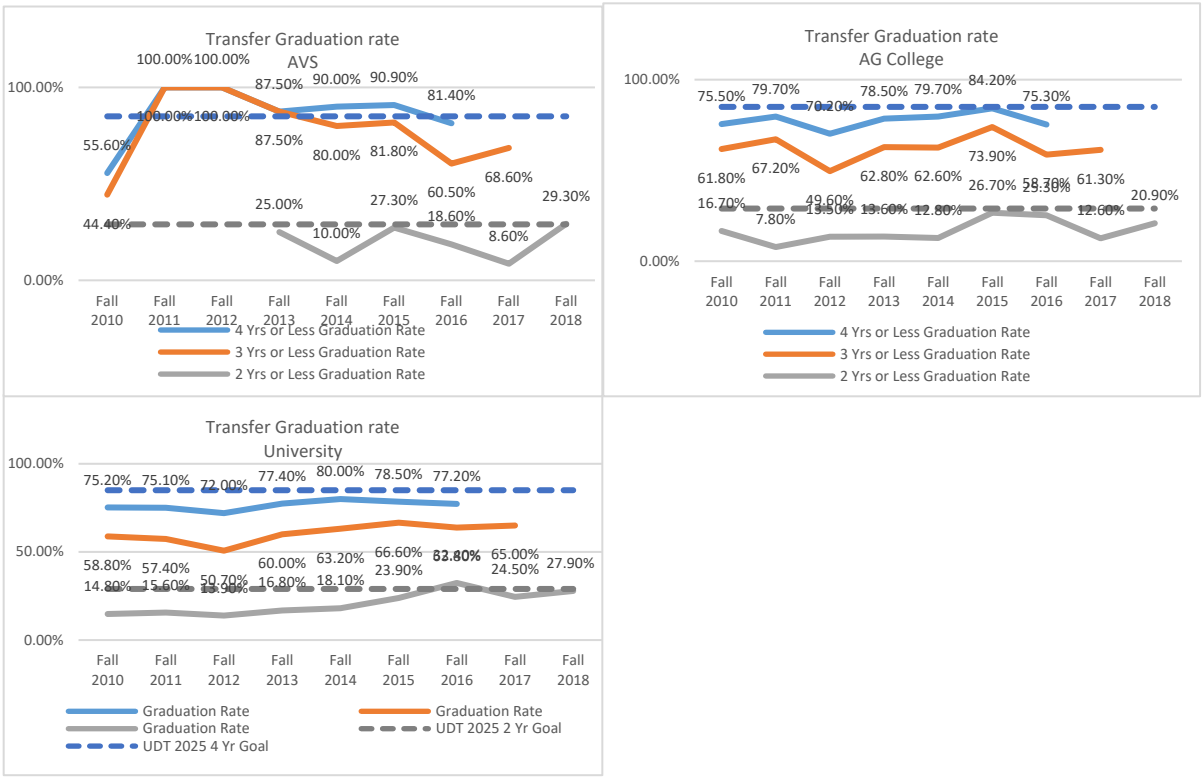
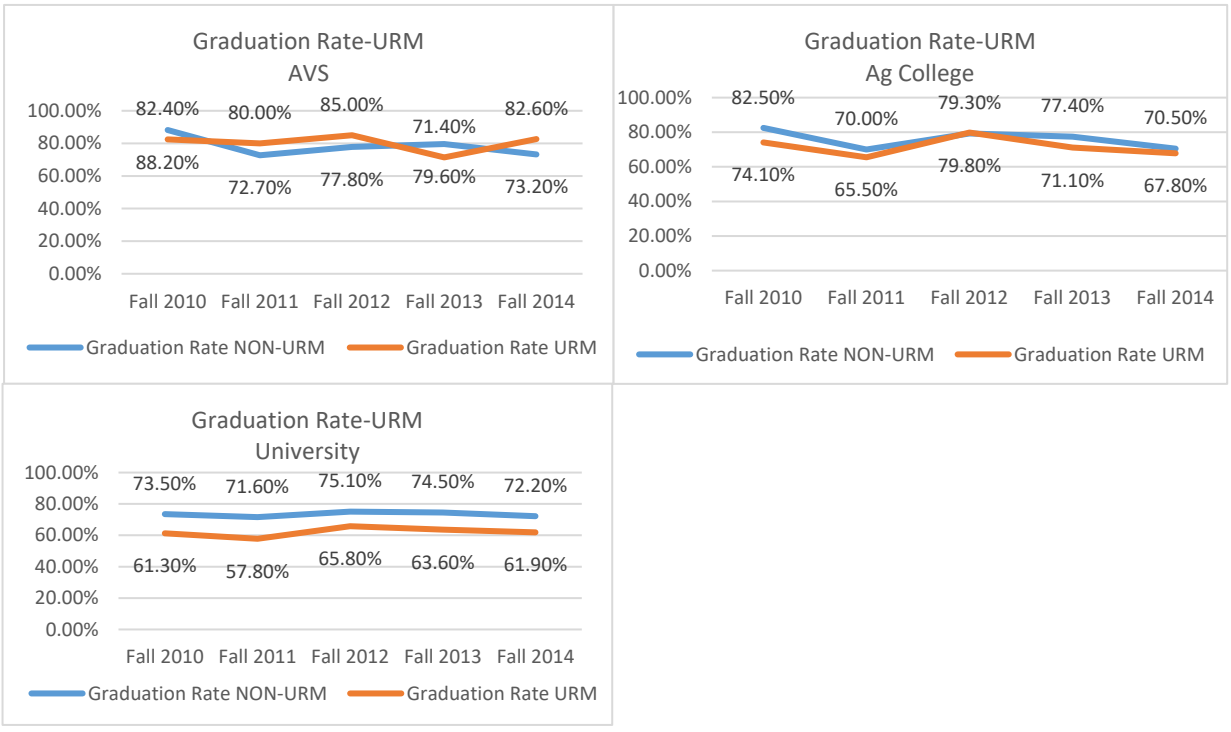


Figure 5. Fall entering URM graduation rates[3]



[3] CSU Dashboard "What Paths Do They Follow" Report
https://csusuccess.dashboards.calstate.edu/public/faculty-dashboard/student-progress-units

Figure 6. Fall entering PELL eligible graduation rates

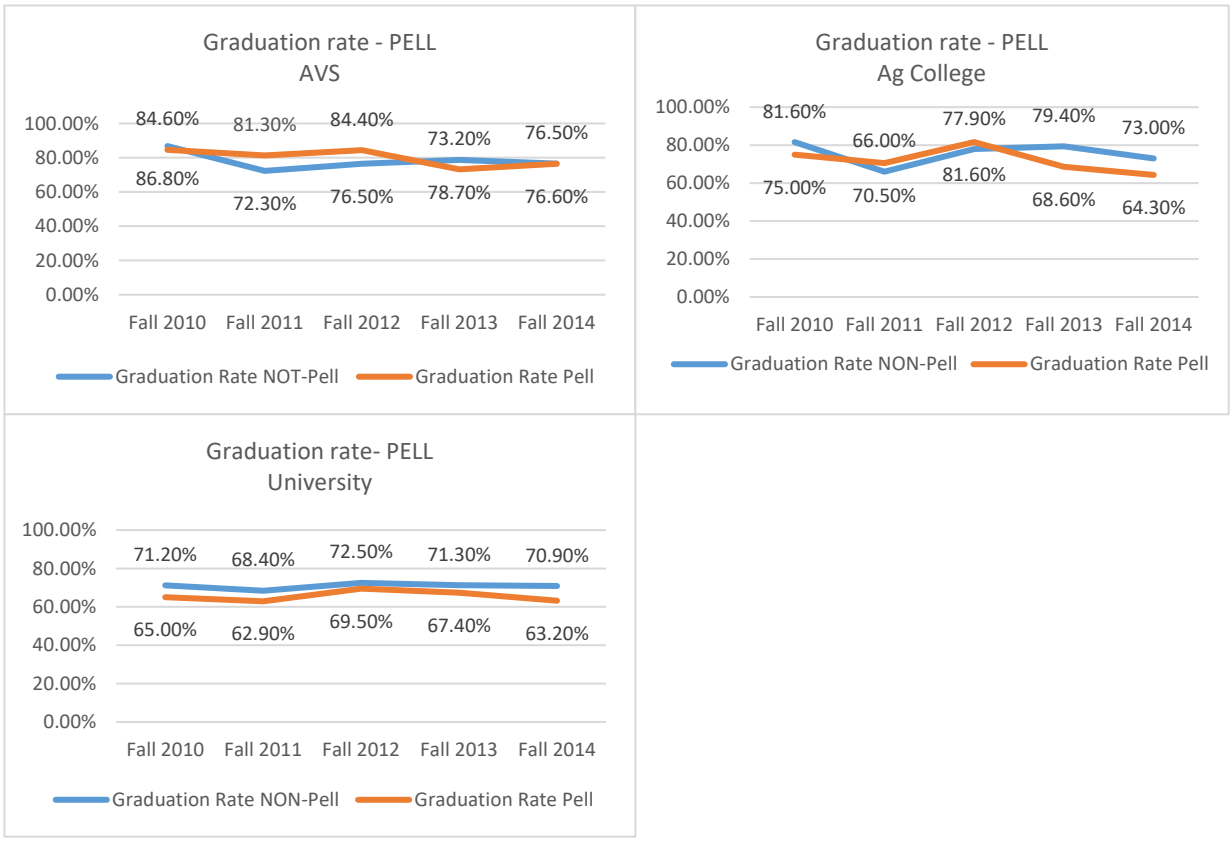


Figure 7. Number of AVS graduates

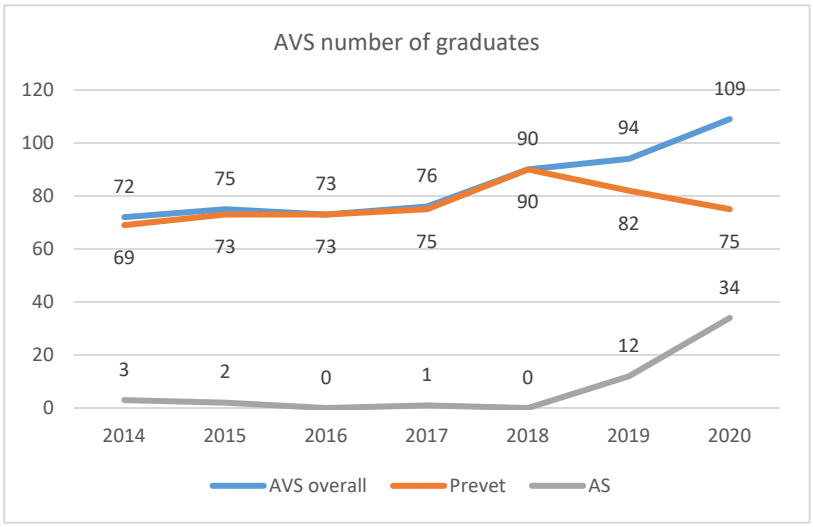


Figure 8. Average GPA of graduating AVS students

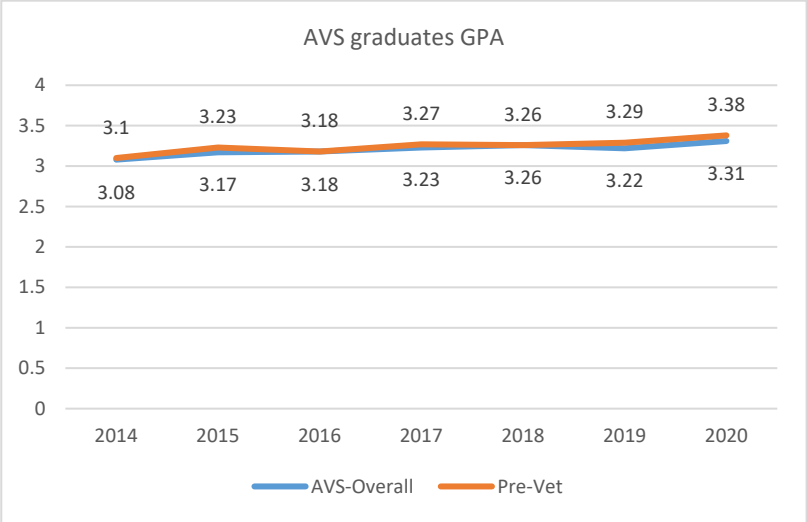


Figure 9. Placement of AVS graduates in Veterinary School

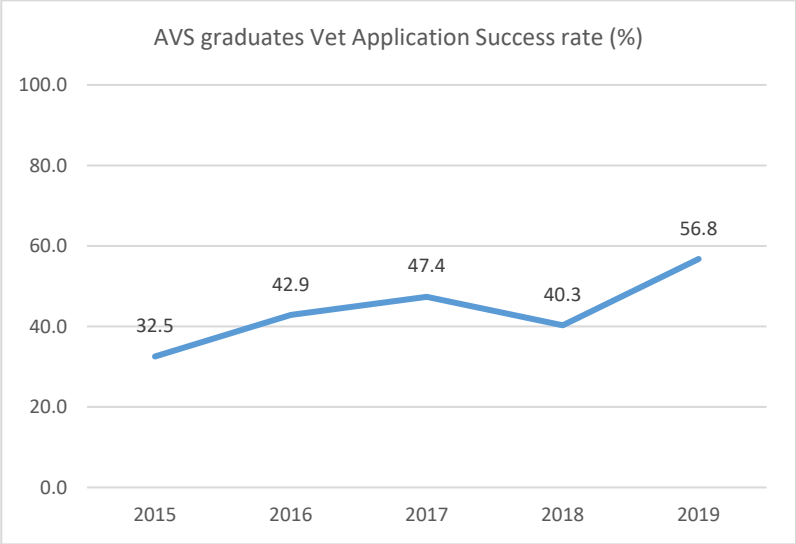
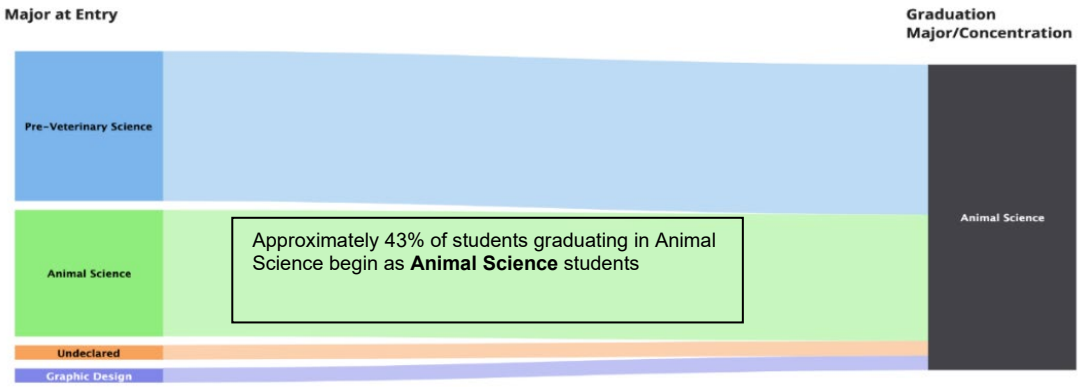


Figure 10. CSU major migration for all First-Time Freshmen Who Graduated in 2018, 2019, 2020[4]



Five-year trends for 1-yr, 2-yr and 3-yr retention/persistence (freshmen and transfers)
Five-year trends for 4-yr and 6-yr graduation rates (freshmen)

The data for 2010-2016 is summarized in Figure 3. The 4-year first-time freshmen AVS graduation rates for 2010-2013 were below the GI 2025 goal (38%), ranging 31.10-35.30%, whereas, 2014-2016 rates were above the goal, ranging 42-52%. The 6-year graduation rates for 2010-2014 were consistently above the GI 2025 goal of 73%, ranging 75.60-86.60%. College and University graduation rates were generally below AVS graduation rates, and below the GI 2025 targets for both 4-years (<38%) and 6-years (<73%).

Five-year trends for 2-yr and 4-yr graduation rates (transfers)

The data for 2010-2018 is summarized in Figure 4. For 2011-2013 AVS 4-year transfer graduation rates were 87.5-100%, whereas they were lower for 2010, and 2014-2016. Both College and University graduation rates were below GI 2025 goals of 29% for 2-year graduation, and 85% for 4-year graduation whereas AVS graduation rates achieved these goals.

Five-year trend in the equity gap of URM and Pell-eligible students.

There are no perceivable equity gaps for the URM and Pell-eligible students compared to their non-URM or non-Pell-eligible counterparts. The URM and Pell-eligible students on average performed better than or the same as non-URM or non-Pell-eligible students for both first-time freshmen (Figure 5) and transfers (Figure 6).

2.3.1 Efforts to improve student persistence and graduation rates

At University level, the Office of Student Success contacts each instructor and requests an update on progress of each student and identify students who are at risk of failure for the course. The office follows up with students to help them to succeed. At college level, we also have a designated advisor for students who are At-risk, i.e., if their GPA is 2.0 or less. The advisor helps the students to restructure the academic plan to ensure the success of the

[4] CSU Dashboard "What Paths Do They Follow" Report https://csusuccess.dashboards.calstate.edu/public/db-what-paths-do-they-follow

students. At the instructor level in the department, many instructors are providing in-class and out-of-class review sessions prior to quizzes/exams, for successful completion of the course.

One of the most significant challenges on improving graduation rates for the past 7 years includes issues pertaining to the semester conversion process (in Fall 2018). There were many complexities and challenges that arose for sophomores, juniors and seniors, when, e.g., courses were merged, or courses disappeared from their curriculum sheets. For many students the DPR (degree progress reports) was corrupted, and some students were not certain whether they were graduating or not since there was a tremendous backlog in processing their DPRs by the Registrar's Office. Another complexity was introduced via unit shortages that prevented students from readily graduating without having to scramble for unused course units or take an additional class to satisfy graduation unit requirements.

Much effort was expended by advisors and students in submitting memos, substitution forms and course repeat forms. These issues necessitated a tremendous amount of advising and were most stressful in large departments such as AVS that have severely depleted tenured faculty lines, since the advising burden falls on this category of faculty. Students were enforced to work on MyPlanner (a course scheduling tool) for the rest or most of their remaining terms towards graduation. In summer 2018 orientations sessions, all freshmen and transfer students were mandatorily migrated into FYE (first year experience) classes for Fall 2018, and a few that could not fit the FYE courses into their Fall schedule took the FYE courses in Spring 2019. Mandatory holds were placed on sophomores, juniors and seniors before Spring 2019 registration. One-on-one advising, group advising sessions, phone advising, and email advising were implemented relevantly. During department meetings, we invited advising experts to train departmental advisors., e.g., on best interpretation of degree progress reports (DPR) to optimally assist students with their graduation concerns. Furthermore, major successes in graduation rates were derived by introducing an Animal Science (general option) within the Animal Science major in Fall 2018. This option enabled some students who had opted off the more rigorous Pre-Vet option to graduate sooner and to substitute for supporting courses more flexibly that were outside the major (e.g., Organic Chemistry series courses). Additionally, the hiring of an expert advisor (in CoA) to assist with at-risk students (probation and other students on the verge of failing) increased student retention and enabled earlier graduation.

First time freshmen (FTF) graduation rates in 4, 5 and 6 years have been higher for the AVS Department compared to the whole College of Agriculture (CoA), and all university. The 4-year graduation rates were 38.4%, 32.2%, and 23.6% for AVS department, CoA, and university, respectively. The 6-year graduation rates were 78.8%, 74.1% and 68.5%, respectively. The university graduation initiative (GI) for 2025 is 38% and 73%, graduation rates, for 4 and 6 years, respectively. The AVS Department is on course to exceeding the GI for 2025 goal. Transfer graduation rates in 2 and 3 years have been lower for AVS compared to CoA and all university. Two year-graduation rates were 19.8%, 16.7% and 20.9%, respectively. Four-year graduation rates were 86.5, 77.6 and 76.5%, respectively. The low two-year graduation rates for transfer students can be attributed to students taking or re-taking coursework that needed to be taken at junior college level to prepare for upper-level courses, particularly to get ready for the organic chemistry series. Furthermore, the transfer students, by virtue of their orientation occurring towards the end of summer, have a disadvantage as most of the classes fill up by the time of their turn to register, thus, end up taking coursework that may cause them to get off track. Our department has in the recent past addressed the later problem by reserving seats in some AVS courses to accommodate the transfer students especially those that miss chemistry/biology courses because they fill up way before the transfer students get to register for classes.

The success of AVS is likely due to the impaction of the program which happened soon after the last program review (2003 – 2004). Consequently, the AVS program retains a cadre of highly motivated, goal-oriented students. Student success is embodied in strong retention and degree completion rates coupled with high-quality learning. Increased advising efficiency including putting a hold on registration to enforce all students to meet with their academic advisor enabled development of individual academic plans and shortened pathways to graduation and consequent reduction in drop-out rates. More intensive advising and use of the DPR, Transfer Course Report, and other tools may have played a role in enhancing high retention rates, and focused course taking and facilitated earlier or timely graduation of students.

2.3.2 Addressing Equity gaps for URM and Pell-eligible students

Average graduation rates for Pell-eligible students were 80.0, 72.0 and 65.6%, for AVS, CoA and all university, respectively. Average graduation rates for Non-PELL-eligible students were 78.2, 75.6 and 70.9%, for AVS, CoA and all university, respectively.

Average graduation rates for URM students were 80.3, 71.7 and 62.1% for AVS, CoA and all university, respectively. Average graduation rate, for Non-URM students were 78.3, 75.9 and 73.4% for AVS, CoA and all university, respectively.

There are no perceivable equity gaps for the URM and Pell-eligible students compared to their non-URM or non-Pell-eligible counterparts. Rather, the URM and Pell-eligible students on average performed better than or the same as non-URM or non-Pell-eligible students (Figure 5 and 6).

2.3.3 Proposed strategies for improving student retention and graduation rates

Student retention and graduation rates depend primarily on quality faculty and staff, scholarly activities of faculty that elevate the visibility of the department in academics and research. Research enables students to correlate theoretical knowledge with practical applications and currently student enrolled in some of the AVS courses e.g., AVS 2101L, AVS 4430L, AVS 4214L, and AVS 3456, are involved in research where they can earn additional course credit. In addition, good and consistent student advisement and mentorship programs, will promote student interest and focus on their program. Although the student to faculty ratio is unfavorable at 135:1 (AS Program), faculty commitment to the success of students is partly responsible for the better than average student retention and timely graduation. Furthermore, we believe that the reinstatement of student holds on enrollment would improve our student retention and graduation as they will benefit from timely faculty advisement and early intervention. Student engagement in several student clubs will be promoted to increase extracurricular activities and this effort will enhance other student retention efforts. Increased use of Bronco Advising Center to help students that may be struggling in coursework e.g., courses with high DFWs. Also, recruiting tutors from our department and using all available platforms, e.g., student clubs, to promote and encourage students to use this resource.

2.4 Assessment of Student Learning

Tables 12 to 15 provide the curriculum matrix and assessment plans for AVS courses.

Table 12. Curriculum matrix

Student Learning Outcome	Course Number																
	AVS 1000	AVS 1112	AVS 1113	AVS 1114L	AVS 1115L	AVS 2101/L	AVS 3305	AHS 3305/L	AVS 3311	AVS 3327	AVS 3333	AVS 3350/L	AVS 4214/L	AVS 4402	AVS 4430/L	AVS 4473	AVS 4610
SLO1. Students will apply conceptual and technical knowledge of domestic animals (e.g. animal health, animal physiology, animal nutrition, animal genetics, and use of biotechnology) to solve animal science problems. (PLO 1)		I	I	I	I	D	D	D			D	D	M	M	M	M	M A
SLO2. Students will communicate effectively in interpersonal and professional settings (PLO 1, 3)	I A		I A			D					D			D	M A	D	M A
SLO3. Students will demonstrate critical thinking and problem-solving skills necessary to solve complex, interdisciplinary problems which impact animals, people, and their environments. (PLO 1, 2, 3)		I	I	I	I	D A	D	D	D		D		M	M A	M	M A	
SLO4. Students will evaluate ethical responsibilities of professionals in animal science industries. (PLO 1, 2)	I A	I	I A				I	D	D	D	D	D A			M		M A
SLO5. Students will collaborate in teams to develop leadership and team building skills (PLO 1, 3)	I		I A	I	I	D					D	D		D	M A	D	M A

I = introduced; D = developed and/or practiced; M = demonstrated mastery; A = Assessed

Table 13. Alignment matrix

Program Learning Outcome	PLO/SLO Alignment	Student Learning Outcome	Core Competencies					Strategic Vision		
			Critical Thinking	Information Literacy	Oral Communication	Written Communication	Quantitative Reasoning	Innovation and Creativity	Civic Engagement	Problem Solving
1. It is the goal of the Animal & Veterinary Sciences Program to provide the students with the scientific knowledge and training that would allow them to enter veterinary school, graduate school or a scientific career in the animal sciences.	PLO 1	SLO1. Students will apply conceptual and technical knowledge of domestic animals (e.g. animal health, animal physiology, animal nutrition, animal genetics, and use of biotechnology) to solve animal science problems. (PLO 1)	X				X			X
2. The program will endeavor to provide our students the critical thinking skills necessary to solve complex, interdisciplinary problems which impact animals, people and their environment.	PLO 1, 3	SLO2. Students will communicate effectively in interpersonal and professional settings (PLO 1, 3)		X	X	X				
3. The program will promote professionalism and leadership skills, preparing our graduates for professional school, graduate school and scientific careers.	PLO 1, 2, 3	SLO3. Students will demonstrate critical thinking and problem-solving skills necessary to solve complex, interdisciplinary problems which impact animals, people, and their environments. (PLO 1, 2, 3)	X	X			X			X
	PLO 1, 2	SLO4. Students will evaluate ethical responsibilities of professionals in animal science industries. (PLO 1, 2)	X						X	

Table 14. Overall assessment plan

PLO/SLO Alignment	SLOs	Courses where each SLO is addressed.	Assessment activity (signature assignment) used to measure each SLO.	Assessment tool used to measure outcome success	How assessment data will be reported as evidence SLO performance criteria have been met	Designated personnel to collect, analyze, and interpret student learning outcome data for the program	Student learning outcome data disseminatio n schedule	Closing the loop strategies
PLO 1	*SLO1. Students will apply conceptual and technical knowledge of domestic animals (e.g. animal health, animal physiology, animal nutrition, animal genetics, and use of biotechnology) to solve animal science problems. (PLO 1)*	AVS 4610	Capstone Assessment Examination	Student performance on each question and by subject area	Student performance on each question reported by question and data aligned by subject area	Course instructor with support from Assessment Coord. Will organize and facilitate assessment and distribute results to Department Assessment Team. Department Assessment Team will analyze data	Assessment data will be evaluated in a three-year review cycle. Annual reports will be provided to the Academic Programs and Planning Office for feedback. Feedback will be used to improve the assessment plans for the following year/cycle.	The Department Assessment Team and Department Chair will review the data and will identify where improvement is needed. Feedback from the Academic Programs and Planning Office will be used to improve the assessment plans for the following year/cycle.
PLO 1, 3	*SLO2. Students will communicate effectively in interpersonal and professional settings (PLO 1, 3)*	GWT, AVS 1000, AVS 1113, AVS 4430, AVS 4610	GWT, Course literature supported writing (all) and class presentation (all but AVS 1000)	GWT scale, Oral and Written communicatio n rubrics	Report on percentage of students at the introductory, developing and mastery level in each course and the number that meet or exceed a minimum level for each SLO	Course instructor with support from Assessment Coord. Will grade assessment using rubric and will distribute results to the Department Assessment Team. Department Assessment Team will analyze data		
PLO 1, 2, 3	*SLO3. Students will demonstrate critical thinking and problem-solving skills necessary to solve complex, interdisciplinary problems which impact animals, people, and their environments. (PLO 1, 2, 3)*	AVS 2101, AVS 4402, AVS 4473	Course case problem	Critical Thinking rubric				
PLO 1, 2	*SLO4. Students will evaluate ethical responsibilities of professionals in animal science industries. (PLO 1, 2)*	AVS 1000, AVS 1113, AVS 3350, AVS 4610	Post discussion reflection (all but AVS 4610) Capstone Assessment examination (AVS 4610)	Department developed Ethical Awareness rubric				
PLO 1	*SLO5. Students will collaborate in teams to develop leadership and team building skills (PLO 1, 3)*	AVS 1113, AVS 4430, AVS 4610	Group Presentation	Department developed Team Collaboration rubric				

Table 15. Assessment data collection timelines

Student Learning Outcome	Academic Yea					
	AY 18-19	AY 19-20	AY 20-21	AY 21-22	AY 22-23	AY 23-24
SLO1. Students will apply conceptual and technical knowledge of domestic animals (e.g. animal health, animal physiology, animal nutrition, animal genetics, and use of biotechnology) to solve animal science problems. (PLO 1)		AVS 4610 Direct: Capstone Assessment (examination). Student performance on each question reported by question and data aligned by subject area. Evaluated by department faculty, Department Assessment Team and Department Chair. Administered each semester. Aggregated results reviewed every three years to close the loop			AVS 4610 Direct: Capstone Assessment (examination). Student performance on each question reported by question and data aligned by subject area. Evaluated by department faculty, Department Assessment Team and Department Chair. Administered each semester. Aggregated results reviewed every three years to close the loop.	
SLO2. Students will communicate effectively in interpersonal and professional settings (PLO 1, 3)	Direct: GWT, Course level assessment (AVS 1000, AVS 1113, AVS 4430, AVS 4610) using oral and written communication rubrics by course instructors. Report on percentage of students at the introductory, developing and mastery level in each course and the number that meet or exceed a minimum level for each SLO. Data acquired each semester. Aggregated results reviewed every three years to close the loop.			Direct: GWT, Course level assessment (AVS 1000, AVS 1113, AVS 4430, AVS 4610) using oral and written communication rubrics by course instructors. Report on percentage of students at the introductory, developing and mastery level in each course and the number that meet or exceed a minimum level for each SLO. Data acquired each semester. Aggregated results reviewed every three years to close the loop.		
SLO3. Students will demonstrate critical thinking and problem-solving skills necessary to solve complex, interdisciplinary problems which impact animals, people, and their environments. (PLO 1, 2, 3)		Direct: Course level assessment (AVS 2101, AVS 4402, AVS 4473) using critical thinking rubric by course instructors. Report on percentage of students at the introductory, developing and mastery level in each course and the number that meet or exceed a minimum level for each SLO. Data acquired each semester. Aggregated results reviewed every three years to close the loop.			Direct: Course level assessment (AVS 2101, AVS 4402, AVS 4473) using critical thinking rubric by course instructors. Report on percentage of students at the introductory, developing and mastery level in each course and the number that meet or exceed a minimum level for each SLO. Data acquired each semester. Aggregated results reviewed every three years to close the loop.	

Student Learning Outcome	Academic Yea					
	AY 18-19	AY 19-20	AY 20-21	AY 21-22	AY 22-23	AY 23-24
SLO4. Students will evaluate ethical responsibilities of professionals in animal science industries. (PLO 1, 2)			Direct: Course level assessment (AVS 1000, AVS 1113, AVS 3350, AVS 4610) by course instructors. AVS 4610 Capstone Assessment (examination). Evaluated by instructors using ethical awareness rubric. Report on percentage of students at the introductory, developing and mastery level in each course and the number that meet or exceed a minimum level for each SLO. Data acquired each semester. Aggregated results reviewed every three years.			Direct: Course level assessment (AVS 1000, AVS 1113, AVS 3350, AVS 4610) by course instructors. AVS 4610 Capstone Assessment (examination). Evaluated by instructors using ethical awareness rubric. Report on percentage of students at the introductory, developing and mastery level in each course and the number that meet or exceed a minimum level for each SLO. Data acquired each semester. Aggregated results reviewed every three years.
SLO5. Students will collaborate in teams to develop leadership and team building skills (PLO 1, 3)			Direct: Course level assessment (AVS 1113, AVS 4430, AVS 4610). Evaluated by instructors using ethical awareness rubric. Report on percentage of students at the introductory, developing and mastery level in each course and the number that meet or exceed a minimum level for each SLO. Data acquired each semester. Aggregated results reviewed every three years to close the loop.			Direct: Course level assessment (AVS 1113, AVS 4430, AVS 4610). Evaluated by instructors using ethical awareness rubric. Report on percentage of students at the introductory, developing and mastery level in each course and the number that meet or exceed a minimum level for each SLO. Data acquired each semester. Aggregated results reviewed every three years to close the loop.

2.4.1 Reflection on assessment results in the AVS program

Until AY 2016-2017, there was not enough data collected for assessment. From AY 2017-2018, the entire assessment plan was revamped and implemented consistent methods (rubrics) for assessment. We found that quantitative reasoning was below expectation. Due to COVID 19 pandemic, since AY2019, class formats were changed to virtual instruction mode and assessment became very difficult and it was not feasible to make any changes due to unpredictable events.

2.4.2 Efforts to close the loop and achieve student learning outcomes

To improve student performance on quantitative reasoning, quantitative problem solving was increased and emphasized throughout the curriculum from 1000-4000 level courses (nutrition, animal science anatomy and biotechnology). For instance, efforts have been made to make assignments more accessible to our students e.g., AVS 4402. The SLOs are designed to be

reevaluated to close the loop. Since we revamped our assessment plan in AY 2017, due to COVID pandemic, we were not able to assess the student assessment results. However, we continue to make efforts to close the loop e.g., making the assignments more accessible, including more explanations, and providing examples of poor and excellent quality work as a guide.

2.5 Student Support, Satisfaction and Services

2.5.1 Co-Curricular

Student organizations supported within the AVS Department:

- Animal Health Science & Technology Association
- Intercollegiate Horse Show Team
- Knitting Club/Poly Purlers
- Livestock Show Team
- Pre-Vet Club
- Rodeo Team
- Student Association for Animal Science
- Veterinary Research Group

Number of students within the program/department doing undergraduate or graduate research

During the 2014 – 2018 period, 22-45 undergraduate students participated in research each year. From 2014-2018 the graduate program in AVS had been discontinued. The few students that conducted research were registered in a different MS program. In Fall 2017 there were 2 graduate students, 8 in 2018, 10 in 2019, 25 in 2020, and we currently have 22 students.

Number of undergraduate and/or graduate students attending conferences and submitting papers

On an annual basis our students attend various annual conferences, e.g., Research, Scholarship & Creative Activities (RSCA) Conference, Annual ARI Showcase, Southern California Conferences for Undergraduate Research (SCCUR), Algal Biomass, Biofuels and Bioproducts Conference, College of Science Symposium Cal Poly Pomona, American Society for Engineering Education PSW Conference, Annual CSU Biotechnology Symposium. Annual Ronald McNair Scholar Undergraduate Summer Research Symposium, Cal Poly Pomona Student Research Conference, Kellogg Honors College Show of Excellence, American Society for Microbiology Annual General Meeting, Annual Biomedical Research Conference for Minority Students (ABRCMS).

In the period under review, an average of 22-45 undergraduate students participated in research, were co-authors of conference proceedings, and attended conferences. Some of the undergraduate students were co-authors of peer-reviewed publications (Appendix Table 4.1 - 4.4 During the same period of review, AVS had 2-25 graduate students per year. They participated in research, were co-authors of conference proceedings, and attended conferences. Some of the graduate students were co-authors of peer reviewed publications (See Appendix Table 4.1 – 4.4).

Faculty published numerous conference proceedings with both undergraduate and graduate students in the period of review. The number of published proceedings ranged from 8-48 depending on the year. On average faculty and student researchers published 29 conference proceedings per year (Appendix Table 4.1 – 4.4).

Some faculty also published peer reviewed papers, book chapters, or lab manuals with graduate and undergraduate students (Appendix Table 4.3 and 4.5):

- Murinda; 1 book chapter; 3 peer reviewed articles
- Brundage; 5 peer reviewed articles; One lab manual
- Gekara; 1 peer reviewed article
- Han: 3 peer reviewed articles.

Student organizations

The eight student organizations listed above reside within the department. Student organizations enable students to participate in extracurricular activities, where students develop diverse skills, including, soft and leadership skills, and networking abilities, while they engage in group activities, competitions and other collaborative efforts. Clubs provide a forum for inclusiveness.

The role of undergraduate research, scholarship, and creative activities on professional development of students enrolled in the AVS program

Animal Science students are also actively involved in undergraduate research. At any given time, the 4 faculty involved in research could have an average of 6 undergraduates each depending on the project. All students in the department are encouraged to participate in the research opportunities that the program has to offer. Research is first introduced in the First Year Experience course (AVS 1000) and then at club meetings (Pre-Vet Club, Student Association for Animal Science, and Veterinary Research Group) or by word of mouth. Students under the supervision of the AVS faculty have presented their research in oral and poster formats at intramural, regional and national conferences including RSCA CPP, CSU Research Conference, SCCUR, etc. Research experiences deepen students' understanding of theoretical concepts by applying the concepts to solution of problems. Students learn to identify problems, formulate hypotheses, develop science-based solutions as well as conduct systematic research approaches to solve the problems under guidance from their mentors. Some students that conduct undergraduate research progress to MS, PhD or DVM/MS or DVM/PhD degree programs without difficulty.

The role of faculty in engaging students in scholarly activities

We have several faculties (currently 5) that are participating in research with undergraduate and graduate students. Students learn how to think critically, define problems and work towards solutions using science-based approaches using the research method. Some of the students go on to graduate school for MS or PhD programs, or DVM/MS or DVM/PhD programs.

2.5.2 Academic Advising

Faculty members provide academic and career advising

Both full time, tenure track/tenured faculty and eligible adjunct faculty serve as academic advisors for AVS students. At the department level each student is assigned a major advisor depending on their status (freshmen, sophomore, junior, senior or pledge program). The departmental advisors have expertise on the curriculum and other advising matters and receive training through the University's Office of Student Success on how to use CPP Connect, the online advising system. One of the AVS faculty advisors, Dr. Brundage, was recognized as Advisor of the Year (2020-2021) by the CoA. Students are assigned faculty advisors based on their last name and the AVS office sends out the list of advisors to all students. Additionally, a list of faculty advisors for all departments within the CoA are also published on the CoA advising website. Students can make appointments to visit faculty during their advising hours through the CPP Connect system. Additionally, faculty advisors have access to their advisees' academic records at CPP, including courses that transferred from other institutions (high school/colleges/universities).

Students have access to advising resources such as the curriculum sheets and roadmaps, CPP Connect Planner, the university catalog and instructional modes as well as forms for academic petitions that are available online at Student Success Central. Access to the degree progress report and transfer credit report are provided through the BroncoDirect Student Center.

The College of Agriculture has a special Retention and Graduation Specialist, Henry Flores, who provides academic counseling for at risk students. Henry works with faculty advisors in all departments to provide support with counseling of students at risk of failing the AVS program.

Traditionally holds were placed on student registration to ensure that the student met with an advisor who would check on their progress, choice of classes, as well as progress towards graduation, before the students registered for classes. We also have tool kits (online Planners) that permit students to plan all their courses from start to graduation, with the assistance of their academic advisors. Students are directed to use these planners to map out their 4-year plan for graduation during their first semester in AVS 1000, the FYE course.

Several full-time faculty members mentor students by involving them in research projects. AVS students working towards their BS in Animal Science have an opportunity to become involved in research with cattle, swine, and sheep. Dr. Gekara is mentoring undergraduate students involved in nutrition studies with sheep and cattle. Dr. At-Taras has students who are conducting endocrine studies with swine. Dr. Han mentors several students involved in research on cattle and sheep. The department also offers internship opportunities through AVS 4411, which is overseen by the Department Chair, Dr. Murinda. AVS students involved in research on campus may sign up for AVS 4114 (Undergraduate Research) and receive credits for their research activities.

Faculty members serve as AVS club advisors. The Pre-Vet Club is mentored by 2 veterinarians who are also faculty members in the AVS department (Dr. Kathleen Earle and Dr. Cord Brundage); this club connects students interested in careers in veterinary medicine and exposes them to potential opportunities in the field, including visiting various veterinary schools and involvement in community service at local animal shelters.

The College of Agriculture provides career advising for students in all departments, including AVS. DeVoneia Jordan, a career counselor, works closely with students on career-related opportunities. Her office also coordinates with the Office of Student Success.

Support of student academic success through on campus resources in conjunction with the AVS department

The Department of Animal and Veterinary Sciences partners with the Bronco Advising Center to promote student success, especially first-generation students, and students on Pell Grants or those who are Dream Act (DACA) eligible. The department facilitates course enrollment for students who are part of the California Promise Program to ensure that these students graduate within 4 years (freshman) or 2 years (transfer students). Students can make appointments or drop in for help at the Bronco Advising Center. Another platform, CPP Connect, enables students to make appointments or virtual drop-ins with college advising centers and advising and tutoring centers. The Bronco Advising Center also provides resources such as the new student registration guide and videos on how to register for classes (https://www.cpp.edu/studentsuccess/virtual-advising-toolkit.shtml).

The College of Agriculture has a Student Success office and the staff coordinate with the AVS department and with the Bronco Advising Center to support students in timely completion of their degrees.

Training of faculty for student advising

At least once a year, AVS faculty advisors attend advising workshops at the University level. The Office of Student Success holds hands-training sessions on the use of campus advising platforms, including CPP Connect. Senior faculty advisors train incoming/junior faculty; additionally, faculty advisors regularly exchange emails to seek advice and assist each other on the advising process. The Associate Dean for CoA provides opportunities to improve academic advising throughout the semester.

The department chair, Dr. Murinda, attends meetings with other department chairs, deans and University administrators and communicates pertinent information about policy changes that affect the department and AVS students. Faculty members regularly receive email communication from the Registrar's Office, the Office of Student Success, and other university administrative offices communicating important policy changes. Implementation of these changes is discussed in AVS monthly meetings.

Need for support of academic advising in the AVS department

Currently, student records are still found on an older platform (BroncoDirect) while the new online advising tool (CPP Connect) is used by students and faculty advisors to make advising appointments and for creating 2-year and 4-year graduation plans/roadmaps. Consolidation of these 2 important advising platforms is crucial in creating a seamless adviser-advisee one-stop shop. Over the past couple of years, a switch from paper to electronic petition/advising forms (whose adoption was accelerated by virtual operation during the COVID-109 pandemic) has greatly facilitated the advising process. However, these forms are still scattered across several university websites and may not be easily found, especially by new faculty advisors.

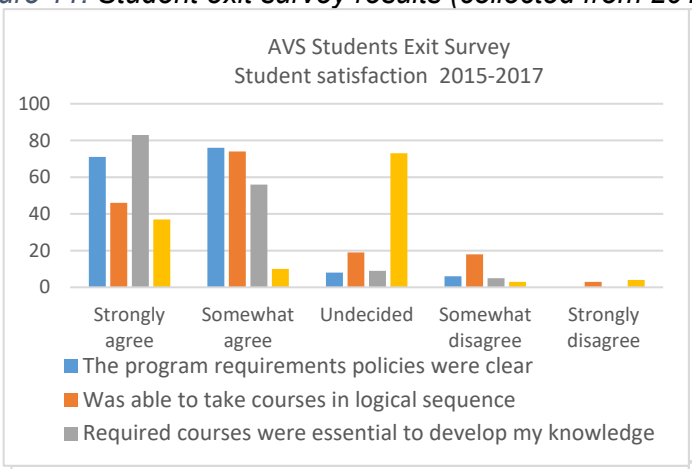
Incorporating necessary advising request forms (e.g., course substitution form, etc.) into CPP Connect or onto a single weblink accessible to all academic advisors will facilitate the advising process and support faculty advisors in this important role.

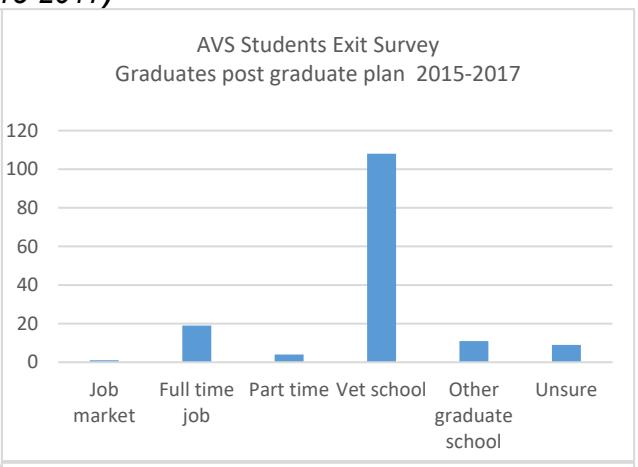
2.5.3 Student Satisfaction

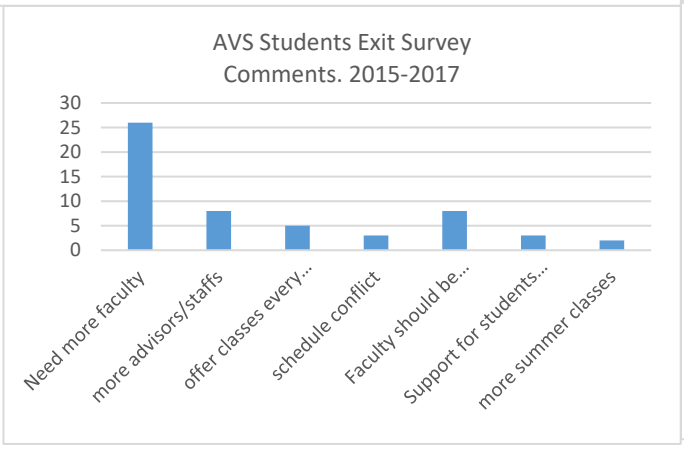
Student satisfaction with the AVS program

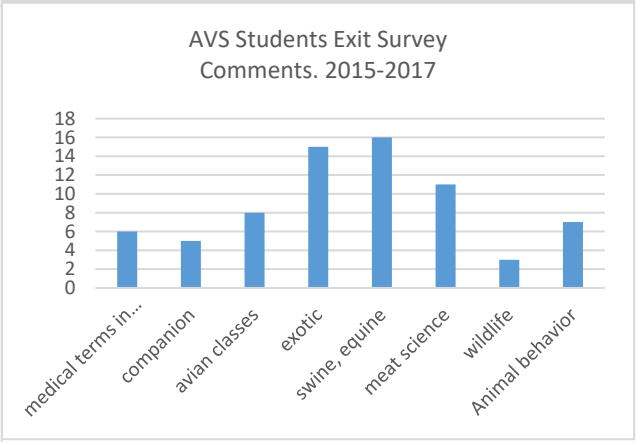
Figure 11 summarizes student exit surveys conducted between 2015-2017. Due to lack of business continuity (hand-over/take-over) and inadequate training of key administrative staff, as well as COVID-19 related issues such as lack of on-campus commencement exercises, exit surveys were discontinued. Most of the students strongly or somewhat agree on program requirements and policies, courses were offered in logical sequence and were essential to knowledge development. As many students did not take internship classes (AVS 4411), most responses were 'undecided' on the value of internships. Students felt that the department needs more faculty, advisors, and technical staff. Students also wanted to have courses that covered medical terminology, avian, swine, equine, and to have the Meat Science Laboratory classes reintroduced. The Meat Science Laboratory was offered until 2015, however, due to the outdated meat processing building, the laboratory was discontinued. Based on student requests, we are now offering Medical Terminology (AVS 2990) as well as Animal Behavior classes (AVS 3456).

Figure 11. ***Student exit survey results (collected from 2015-2017)***









2.6 Stakeholders

Data obtained from your department: Department Alumni Survey (e.g., post-graduate success and perceptions of the program); Graduate school placements; Employer surveys/interviews of graduates' job readiness

Based on the evidence, how well does your program prepare graduates for meaningful lives, further education and successful careers?

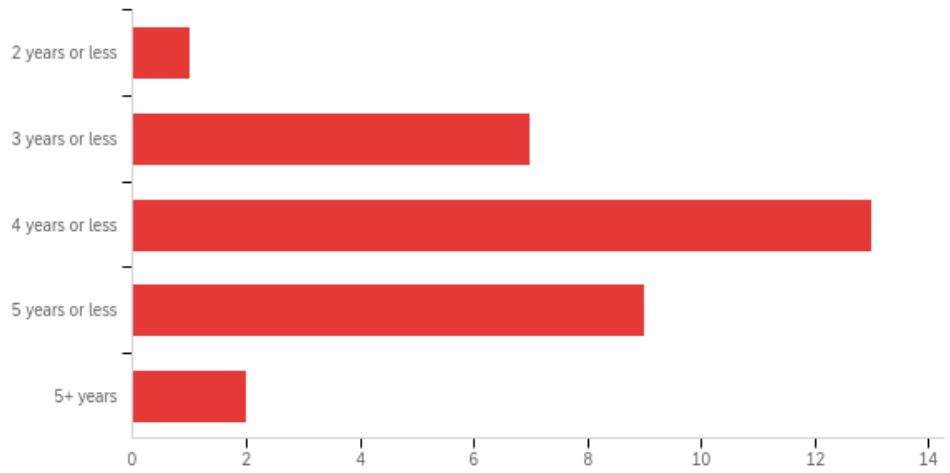
Overall, as summarized in sections 2.6.2 to 2.6.X most alumni surveyed rated the Animal Science (AS) program highly when it came to its role in preparing job-ready graduates with hands on skills. In addition, the AS program was rated highly for imparting other skills to its graduates including soft skills, leadership and team building skills, collaborative learning, education on available technology, etc. The strengths of the AS program as seen through the experience of alumni are highlighted and discussed based on the survey questions.

Select survey questions for alumni:

How many years were you a student at Cal Poly Pomona

The alumni survey results indicate that the AS program adequately prepared students to succeed in various careers across the animal industry. Of particular mention is that the majority (>65%) completed their baccalaureate degree in four or less years and more than 83% finished in five or less years, clearly exceeding the average for college and university (see Figures 3 and 4)

Figure 12. How many years were you a student at Cal Poly Pomona?

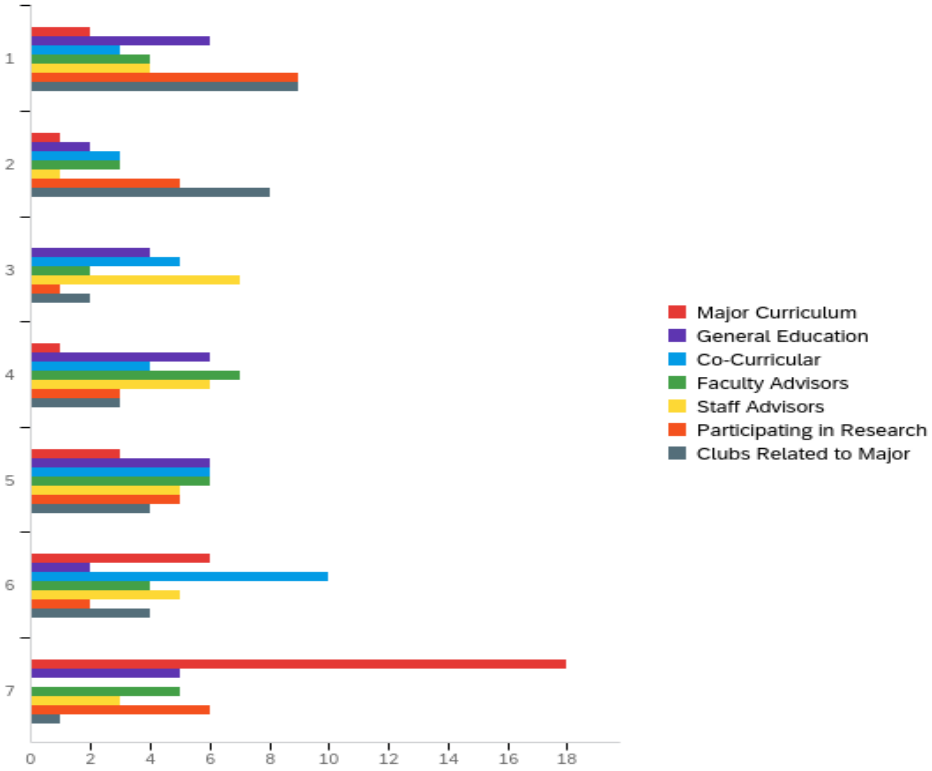


Please rank the components of your education you found the most relevant to your success in your current profession from 1 (least relevant) to 7 (most relevant).

Most alumni responding to this survey question ranked advising, participation in research, major curriculum and enrichment activities (mainly student clubs) as the most relevant components of their education, and which contributed to their career success. The respondents "agreed" or

“agreed strongly” when asked about the relevance of the co-curricular activities (campus clubs, competition teams, research, etc.) promoted by the Animal Science program.

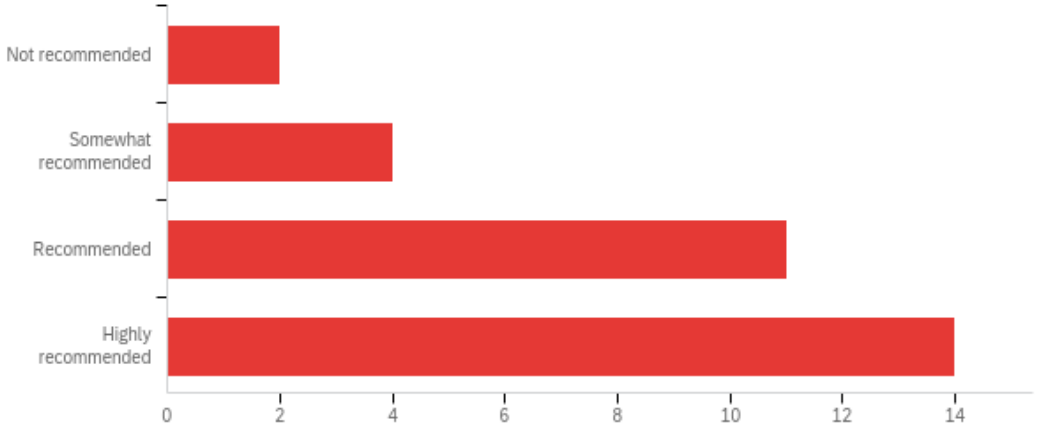
Figure 13. Please rank the components of your education you found the most relevant



Would you recommend this program to your family and friends?

When asked if they can recommend the AS program to family and friends, most of the respondents (>80%) affirmed that they would either “recommend” or “highly recommend” the program. The respondents further appreciated the ‘hands on’ animal experiences that impacted their success in vet school and graduate school.

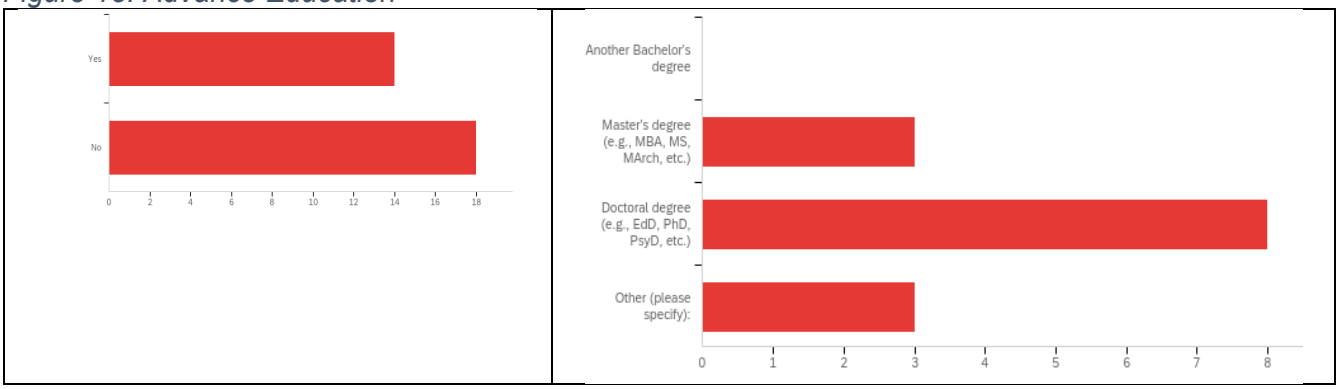
Figure 14. Would you recommend this program?



Did you further your education after completing your degree at Cal Poly Pomona?

The value of the AS program in producing graduates that pursue higher education beyond vet school is a plus for the program. A significant number of the AS program graduates pursued higher education (MS degree and above) and a good number received doctorate degrees in the same or closely related fields. This shows that the AS program has and continues to impact society positively, thus, realizing its goal and mission of producing graduates with appropriate skillsets.

Figure 15. Advance Education



What changes will you make to improve student preparation?

Feedback from the alumni survey identified some negative aspects of the AS program which need improvement. The alumni took issue with the high professor turnover, overworked professors not able to find time to attend to more individualized student needs such as increased mentorship. In recent years, the AS program has intensified advising on career guidance and assistance via qualified and experienced staff, e.g., DeVonea Jordan (Career Advisor). The AS program faculty and staff have taken a lead role in encouraging students to attend career fairs organized by the college and university, e.g., promoting participation by assigning bonus points to students attending the career fair. Another area where the AS program has made steady progress is in the placement of student interns, in private and public sector entities thus increasing their preparedness to succeed in the workplace.

3. FACULTY

3.1 Overview of Faculty

Figure 16 to Figure 18 provide data over 10 years on the historical Full Time Equivalent-Student and Faculty (Figure 16), Student enrollment and FTEF(T/TT) faculty trend and T/TT and temporary faculty ratio (Figure 17) and Student to Faculty and Major to Faculty Ratio (Figure 18).

Figure 16. Full Time Equivalent-student and Full Time Equivalent Faculty (FTE-F)

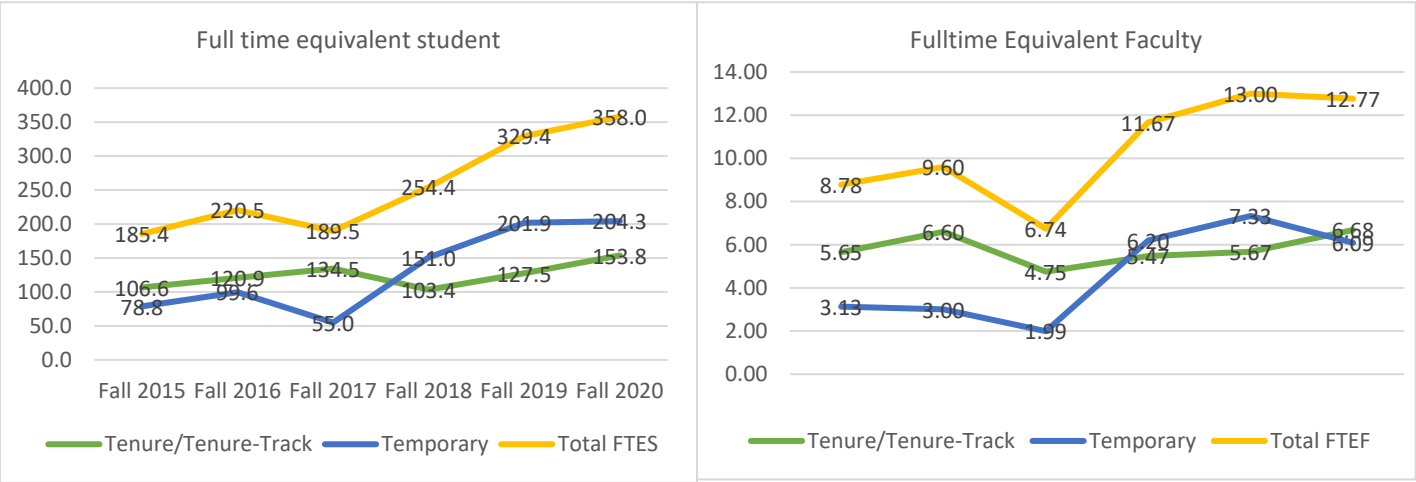


Figure 17. Student enrollment and FTEF T/TT faculty trend (left`) and T/TT and temporary faculty ratio.

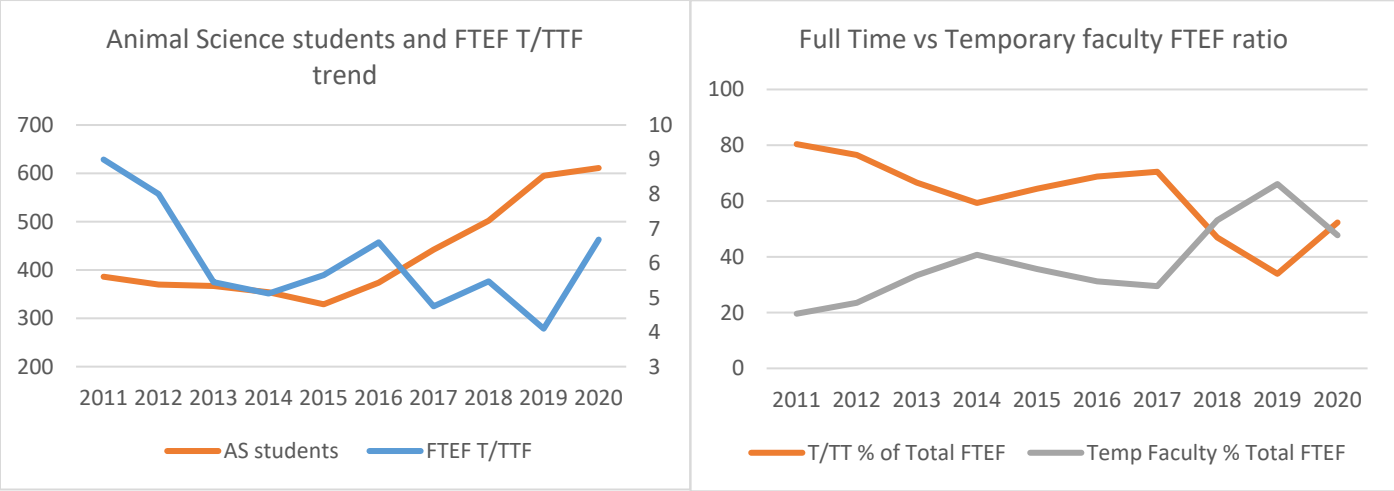
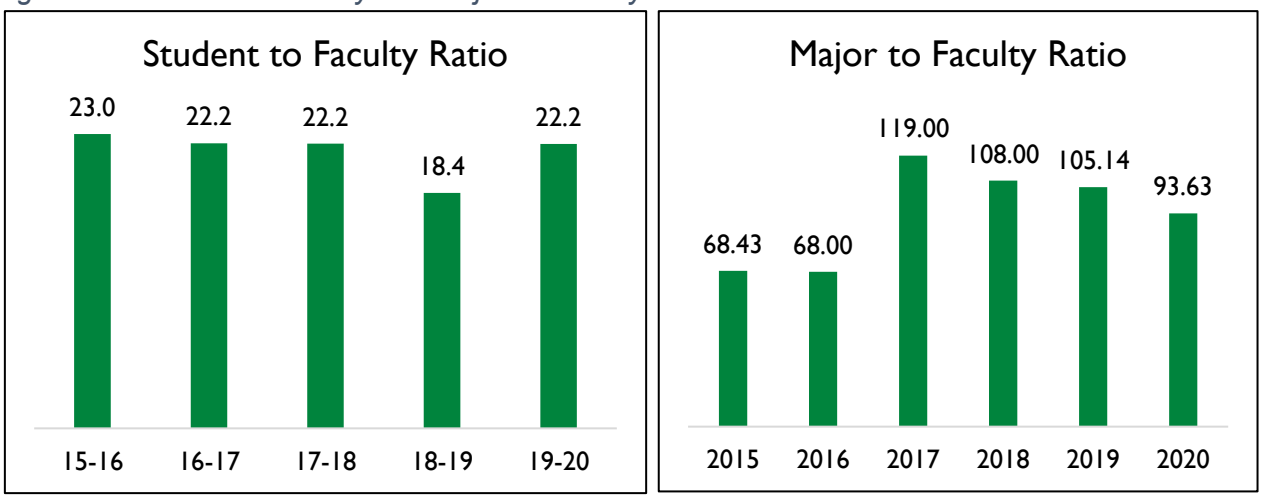


Figure 18. Student to Faculty and Major to Faculty ratio



Over the past 5 years, student enrollment has doubled (from ~300 in 2015 to ~600 in 2020, Figure 12 and 13) while full time equivalent (FTE) tenure/tenure track (T/TT) faculty has declined from 9 in 2011 to 6 in 2020. Due to decreased tenure/tenure track faculty, full time (who are T/TT) to temporary instructor ratio has changed from 80:20 in 2011 to 50:50 in 2020. While University student to faculty ratio averaged at 21.6:1 for the past 5 years, AVS student to faculty ratio averaged at 112.4:1 (Figure 14).

What are the primary disciplinary areas of faculty within your program? If there are areas that are missing or need further attention, how is your department managing the curriculum to ensure that students are receiving the appropriate knowledge?

There are 8 full time faculty in the AVS department. Five of these faculty are involved in teaching students in the BS in Animal Science program. The Department Chair, Dr. Murinda, is trained in Biotechnology, Meat Science and Microbiology. Dr. Brundage is a Veterinarian and specializes in Neurophysiology. Dr. Gekara is an Animal Nutritionist. Dr. Han specializes in Animal Genetics and Metabolism. Dr. At-Taras is trained in Animal Reproduction and Endocrinology. These faculty are teaching several courses on the BS program including, Animal Nutrition, Advanced Nutrition, Biotechnology, Animal Genetics and Breeding, Anatomy and Physiology, Endocrinology and Reproduction, Senior Seminar, and Animal Behavior. Other courses, including courses in Food Animal Production, Companion Animal Management, Meat science, Drugs and Society, and Introduction to the Animal and Veterinary Sciences are mostly taught by adjunct faculty/lecturers. All required courses in the Animal Science and Pre-Vet/Graduate School options are offered each semester as are most elective courses. For the time being, all the primary discipline areas within animal sciences are covered by the faculty. However, more tenure-line faculty are need in the areas of animal nutrition, biotechnology, animal behavior, livestock management, equine science, etc. This will create a sustainable balance in faculty:student ratios and to guarantee stability in the department as some of the current faculty members may retire in the next few years.

What portion of your course work is taught by adjunct lecturers?

Table 16 below summarizes the number of courses taught in Fall between 2017 to 2021.

Table 16. Courses taught by Faculty on the Animal Science major, 2017-2021

Faculty	***Percent of Course Taught***				
	2017	***2018***	***2019***	***2020***	***2021***
Part Time	*31%*	*44%*	*60%*	*73%*	*56%*
Full Time	*69%*	*56%*	*40%*	*27%*	*44%*
Total # of sections taught	*35*	*50*	*63*	*69*	*71*

Part-time faculty taught 31-73% of the courses, an average of 53% of the courses on the Animal Science major. The number of course sections offered has been progressively increasing due to increased enrollment. While tenure track faculty (T/TT) numbers have remained almost stagnant, part-time faculty numbers have increased over the years and are currently 2 times greater than T/TT faculty [8 (5 AVS only) vs 20 (16 AVS only)]). Over the period of review the temporary faculty have contributed to 29-66% of FTEF. In addition, full time faculty that retired or moved on to other institutions were not replaced and this partly explains the increased percentage of courses taught by adjunct lecturers starting in the 2019 academic year.

Is demand for your major increasing, decreasing, or stable?

We are an impacted major and demand for our major is increasing as indicated by the number of applicants that have been rising almost every year compared to the numbers that get accepted and enroll. This demand is also reflected in the increase in the number of course sections that are being offered.

What role do student graders, teaching assistants, adjunct and part-time faculty play within your department?

Currently there are no student graders in the department. Undergraduate students who excel in a course may take on the role of 'Teaching Assistant' at the instructor's discretion. Undergraduate teaching assistants do not grade assignments or exams, but they can advise students during office hours and are able to assist students with class projects. Undergraduate teaching assistants receive credit for their role as teaching assistants. Student Peer advisors can assist in presentation of some materials (e.g., information about student clubs and opportunities) in the first-year experience (FYE) courses (AVS 1000). Graduate students are involved in teaching some lab sections (e.g., AVS 1114L, AVS 1115L, AVS 4430L) while adjunct faculty/lecturers are involved in teaching most of the lower division courses (e.g., AVS 1000, AVS 1112, AVS 1113, AVS 2211), as well as a few upper division courses (e.g., AVS 3327, AVS 3333, AVS 3350, AHS 3305/L).

What is your capacity for growth to accommodate more students? Consider strategies you could undertake with and without additional resources.

The capacity for growth of our program is real. As a result of increased demand, our program is impacted in that we receive far more qualified applications than the capacity to accommodate the students. The main constraint limiting the admission of more students to our program is lack of adequate instructional and faculty resources. Lack of adequate classroom space is a major issue. To address this handicap, the AVS Department has recently adopted the online approach and now offers some high-demand classes (e.g., AVS 1000, AVS 1112, etc.) via virtual platforms including Zoom. Another approach the program has taken is to offer some courses during summer sessions. In addition, hiring of more lecturers is a resource that has worked

adequately to offer instructions to more sections of high-demand courses such as AVS 1114L. Facilitating some courses to be instructed online is a strategy that may not significantly increase instructional resources. Moreover, the use of lecturers is a proven and less expensive approach to accommodate the increased demand for classroom seats and thus is a viable resource to facilitate program growth.

3.2 Faculty Support

3.2.1 Professional Development

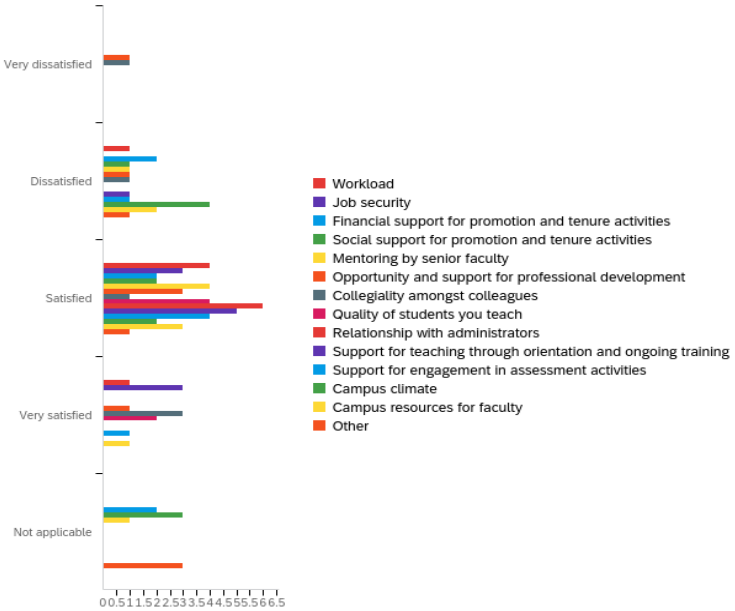
For tenure-track faculty to earn tenure and promotion in the AVS Department, they must meet specified requirements in scholarly activities, in addition to teaching success. Grantsmanship efforts are encouraged and supported by the department. Substantially, the department provides resources including animals and animal units to promote faculty research efforts. In addition, the department encourages faculty to apply for professional development grants available through the Huntley College of Agriculture. Some faculty have used the faculty development grants to attend professional meetings/conferences. In addition, the department promotes and has successfully used the current two full professors to mentor junior faculty particularly in scholarly activities.

3.2.2 Faculty Surveys

<u>Faculty satisfaction with resources at CPP</u>

Overall, faculty seem to be satisfied with resources ranging from classroom/lab space, student support resources, e.g., Disability Resource Center, Library, to faculty pedagogical resources made available through CAFE. However, classroom/lab space needs to be improved to accommodate the growing number of students electing to pursue future career goals with an animal science degree.

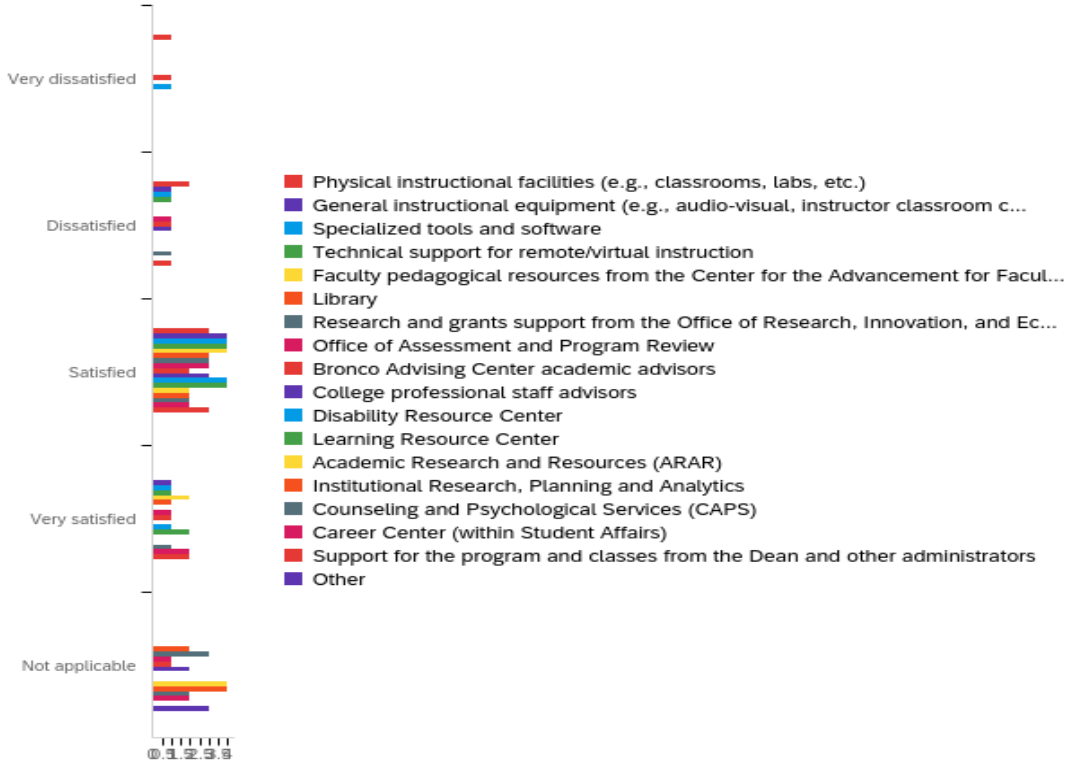
Figure 19. Faculty Satisfaction with resources



What could the program/department do to improve faculty satisfaction?

Here are some of the suggestions given by the faculty that were surveyed: better leadership; more office space; keeping class enrollment capped at realistic numbers, e.g., 48 for large lectures; improved classroom spaces, increased compensation, compensation for continuing education opportunities outside of the university, more financial support for laboratory classes.

Figure 20. Faculty recommendations



What additional resources do you wish were available to you through Cal Poly Pomona?

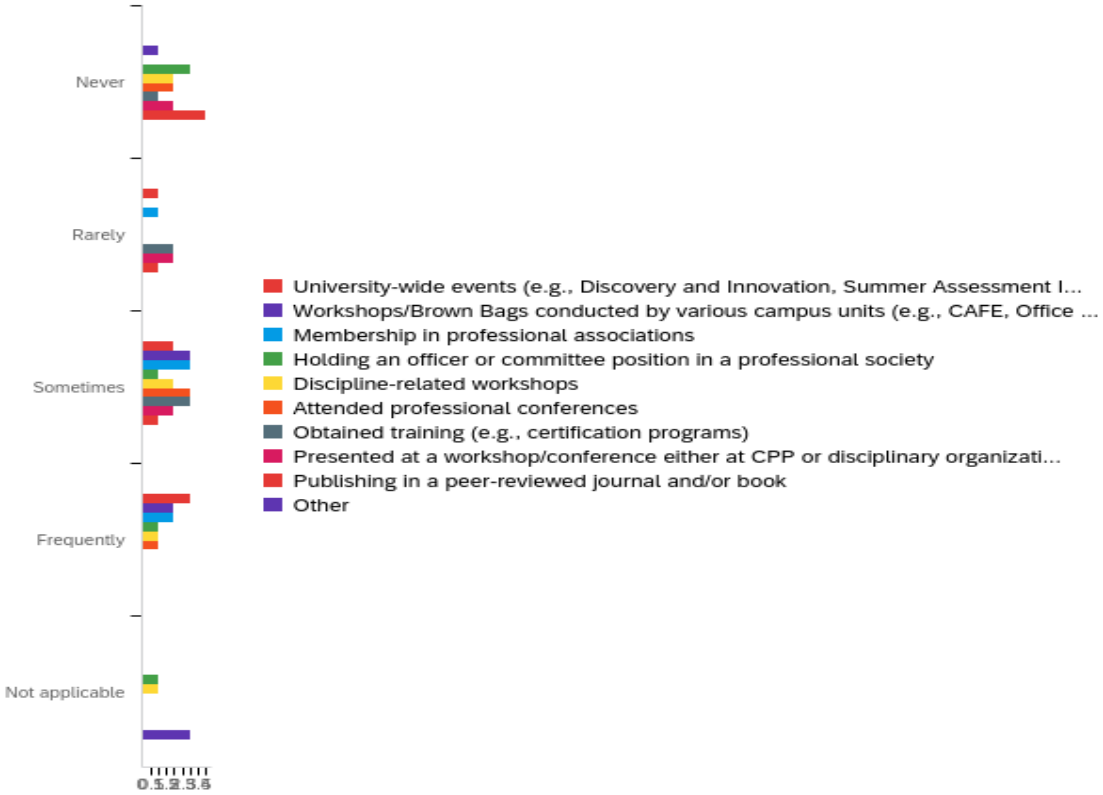
More training or workshops on advising and on rights and benefits for part-time lecturers. Comfortable classroom spaces, the classrooms are filthy, not cleaned and maintained regularly, poor to minimal facility care, there needs to be an emergency or safety issue to get the buildings to get attended to, we need less administrators at the university level, and more faculty and staff at the Department level.

- More training/workshops on advising and on rights/benefits for part-time lecturers.
- Comfortable classroom spaces (the classrooms are filthy, not cleaned and maintained regularly)
- Improved facility care
- An emergency or safety issue to get the buildings to get attended to
- Fewer administrators at the university level, and more faculty and staff at the Department level.

To what extent in the last 5 years did you participate in professional development opportunities on- or off-campus? Please list CPP trainings/workshops you have attended over the last five years

CAFE Technology Tuesdays, CAFE Hybrid and Flipped Course Design, CAFE Remote Course Design, LTD Faculty/Staff Summer Institute, Introduction to Teaching with Canvas, New Lecturer Orientation, CAFE Assessment, Alignment, Variation of Activities, and Building Community in Remote Courses. Faculty advisor certification workshops, College of Ag faculty trainings/workshops, summer professional development workshops (e.g., Summer Institute), Canvas training, budget training for Administrative Support Coordinators/ASCs; CAFE Workshops.

Figure 21. Professional Development

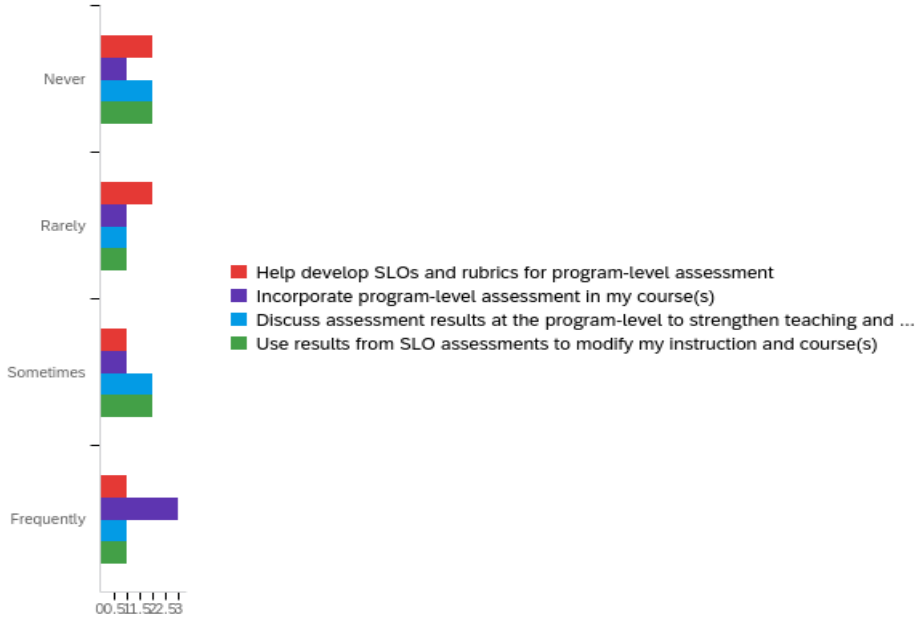


In the last 5 years, to what extent have you participated in assessment activities at Cal Poly Pomona?

California Polytechnic University Pomona conducts annual program assessment. Animal and Veterinay Science department participates annual assessment and each year's report is posted on University assessment website (click here for College of Agriculture annual assessment report). AVS department updated program assessment and initiated new assessment plan which started in 2018-2019 AY (Please see Appendix 5 for assesement plan). Undergraduate program coordinator collects assessment data from participating classes, analyze the data and report to the program assessment committee. The program asses core competencies (critical thinking, information literacy, oral communication, written communication and quantitative reasoning) and stragetic vision (innovation and creativity, civic engagement and problem

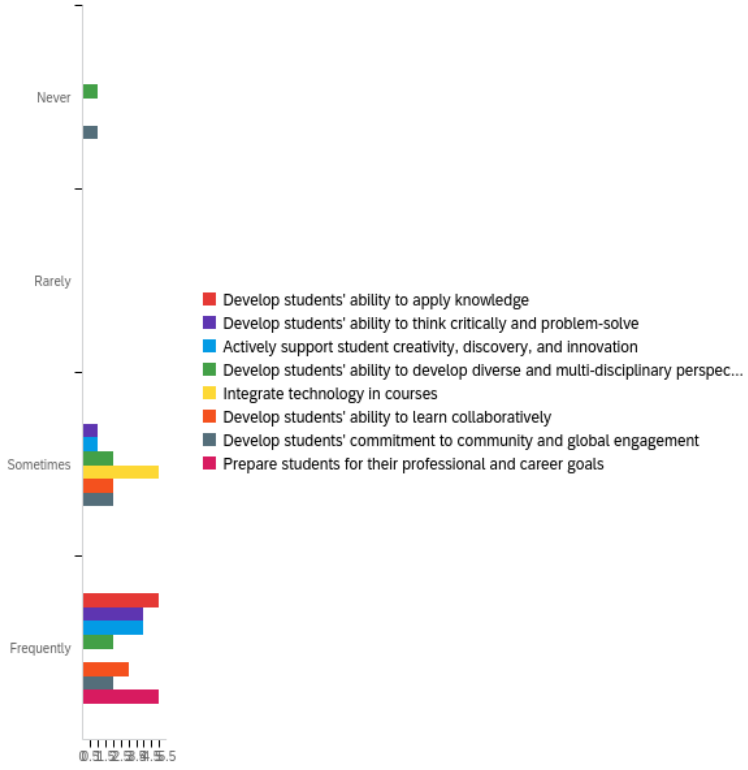
solving) areas. We also updted grading rubric from 3 level into further defined 4 level evaluation (benchmark 1, milstones 2 and 3 and capstone 4).

Figure 22. Participation in Assessment Activities



To what extent do you contribute (teaching, research, service) to helping students develop CPP's inclusive polytechnic university identity?

Figure 23. Contribute to Teaching, Research and Service



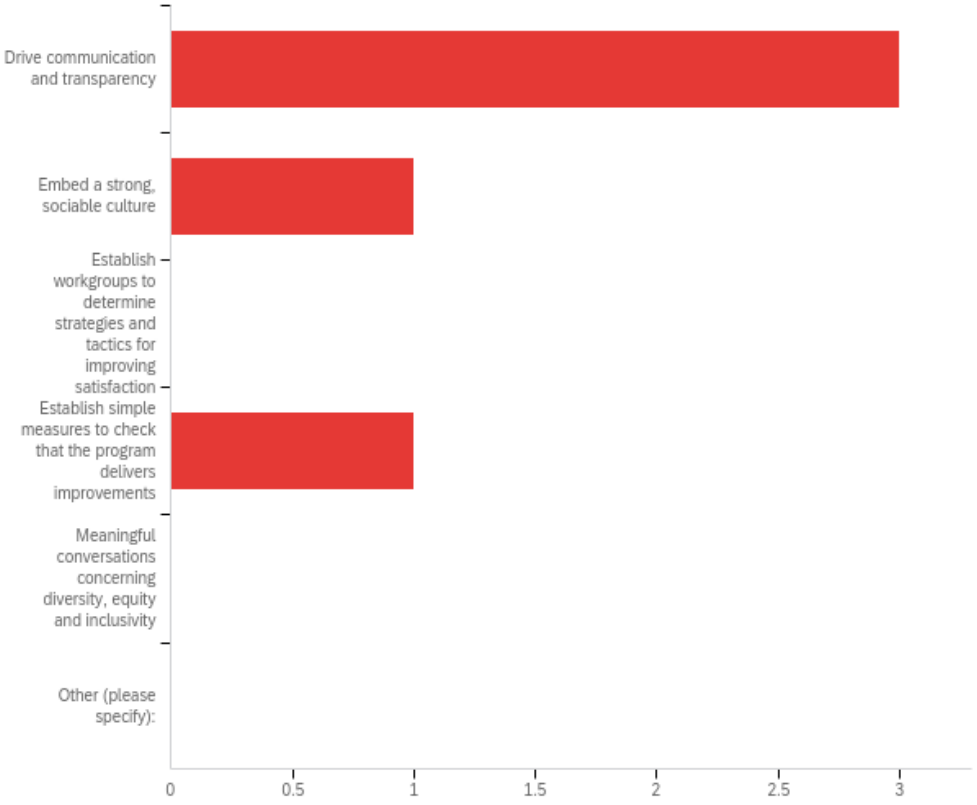
Provide an example of how you have contributed to helping students develop CPP's inclusive polytechnic university identity.

Having the students work in groups and provide a presentation teaching fellow students about a specific animal breed and species. For two courses, students were placed in groups and were tasked with tackling a real-world problem in their community: fundraising money for much-needed repairs at the Cal Poly Pomona Cattle Unit. Students presented their top 3 marketing and fundraising ideas at the virtual PolyX Showcase to judges, moderators and fellow students from numerous departments at Cal Poly Pomona.

What could the program/department do to improve the success of the program?

Most faculty feel that the program needs to improve on program communication and transparency, embed strong social culture (more social events where students can interact with faculty and staff need to be encouraged), and work on benchmarks that would show program success that is tangible.

Figure 24. Improve the Success of the Program

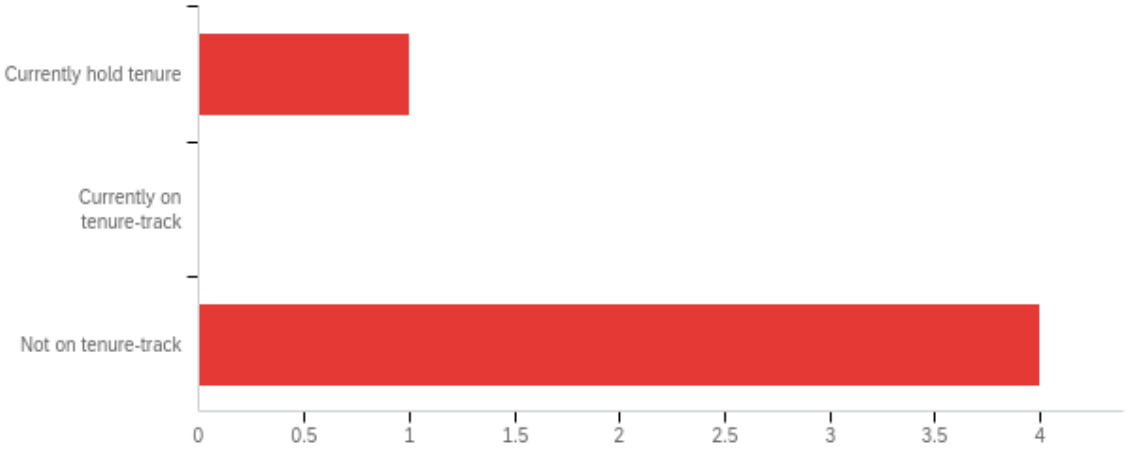


What could the program do to improve student success? Please consider actionable items and provide examples of what could/should be implemented.

More in-depth faculty advising training. Support in the classrooms for instructors or smaller class sizes.

Faculty tenure status

Figure 25. Tenure Status



Please indicate the amount of time spent on the following activities (must sum to 100%)

#	Field	Minimum	Maximum	Mean	Std Dev	Variance	Count
1	Teaching (including prep)	40.00%	100.00%	72.00%	20.40%	416.00	5
2	Research	0.00%	5.00%	1.00%	2.00%	4.00	5
3	Service	0.00%	20.00%	9.00%	9.17%	84.00	5
4	Administrative (Department Chair, Faculty Director, Faculty Fellow)	0.00%	40.00%	8.00%	16.00%	256.00	5
5	Other (please specify)	0.00%	30.00%	10.00%	12.65%	160.00	5

Note: Data presented as percentage of time. e.g., #1 Teaching: The percentage of time spent teaching by faculty respondents ranged from 40% to 100% of their total time.

What changes will you make to strengthen student satisfaction with the program?

Allocate more time to supporting student enrichment activities e.g., student club activities, advisement/mentorship engagements, research projects, inviting students to participate in scientific conferences and related meetings. Also spend more time outside classroom to engage in extracurricular activities, e.g., social or community events (pumpkin festival, LA County Fair, etc.) where students are also involved.

4. UNIVERSITY SUPPORT AND RESOURCES

4.1 Personnel

4.1.1 What role do non-teaching personnel within your department play in student success?

Non-teaching personnel who contribute to student success as part of the BS Animal Science program include one Administrative Support Coordinator (ASC) and 2 animal unit managers. The ASC manages administrative tasks including coordination of departmental meetings, assistance with student enrollment in classes, assistance of faculty with processing of orders for internal and State research funds, and coordination with the Dean's office for processing personnel papers. Currently, the department has hired 2 student office assistants who help the ASC in her tasks. The animal unit managers are responsible for the care and well-being of all animals (cattle, sheep, goats and swine) in their respective units. The managers coordinate with the AVS Department Chair and teaching and research faculty on use of animals for teaching and research. The managers oversee all student assistants and students who live in the animal units and help care for the animals. The Animal Unit managers also assist with community engagement, e.g., with the Livestock Show team and Petting Farm. We also have a member of staff, Holly Greene, who is responsible for Compliance and Animal Safety in the department. She teaches part-time and is also involved in supervision of research students.

4.1.2 To what extent are non-teaching personnel adequate to meet the needs of your program/department?

The number of non-teaching personnel is not sufficient for the needs of our BS in Animal Science program. The AVS Department Chair has a great workload due to management of teaching staff and overseeing the animal units. Traditionally, there have been student helpers who assist in the AVS office. With the COVID-19 pandemic and staff turnover during the past 2 years, student assistants were not employed in the department. More recently, the department was able to employ 2 students on a part-time basis to assist with tasks in the AVS office. This has made the AVS department workload more manageable for the ASC. Two Animal Health Technicians from the Animal Health Science major assist with ordering lab supplies for teaching. Employment of a full-time lab technician in the AVS department would be most efficient because the Animal Health Technicians have teaching duties on the Animal Health Science program. A full-time lab technician is needed to manage and coordinate the Animal Science teaching labs. Additionally, there is a great need for a full time Animal Farm Manager to oversee the animal unit managers and allow for distribution of workload, so the AVS Chair has more time to focus efforts on other aspects of departmental administration, including teaching faculty, academics, and advising.

4.2 Facilities and Space

What measures are the department implementing to improve the utilization of teaching and laboratory facilities?

Our department is facing insurmountable challenges to provide adequate teaching and laboratory facilities. Although the teaching and laboratory facilities are stretched to the limit, the

department has found ways to effectively utilize the resources to cope with demand from increased student numbers. CPP offers grants to improve classroom and laboratory facilities (i.e., Special Projects for Improving the Classroom Experience (SPICE) grants). The AVS faculty have actively sought grant support to increase space and improve instructional equipment in the classroom. SPICE classroom modernization grants were awarded to Drs. At-Taras, Brundage and Han, and Holly Greene to improve and update equipment in Building 2 (room111) and Building 38. In addition, a high-performance thermal imaging camera was acquired by Dr. Murinda. Laboratory instruments were acquired by Drs. Murinda and Gekara though USDA and ARI grants, and animal behavior equipment was acquired by Drs. At-Taras and Gekara, to support research and instruction in courses, e.g., AVS 2101L and AVS 3456. All the equipment are used to support undergraduate research in addition to their direct use in teaching labs. Dr. Han also purchased real time PCR thermocycler for molecular biology related classes thorough a Rotary Grant. Through a SPICE grant Dr. Han developed fistulated cows for use in studying the digestive process. To provide hands on experiences in mitigating methane emission from livestock, a respiration chamber for methane measurement, funded through a SPICE grant, is under construction.

4.2 Library

The University Library supports student learning through a wide variety of services. The Reference and Instruction Department aids students in accessing the library's rich information resources and helps students develop information skills that not only serve their immediate research needs but also prepare them for graduate studies, careers, and lifelong learning. Librarians use a variety of methods, including course-integrated library instruction, special workshops, personal assistance in-person or via email, chat, phone, or by appointment, instructional guides, tutorials, and FAQs.

The Circulation Desk is located on the 2nd floor of the library and is open all hours that the library is open. Library staff assist in renewing materials, tracking down missing materials, placing holds on materials checked out to another borrower, paying fees, and updating patron records. Other services include checking out Course Reserve materials, Document Delivery, and getting materials (e.g., books, manuscripts) from other CSU campuses. The Agriculture Subject Librarian works with faculty and students in Animal Science Program.

4.2.1 To what extent are current library resources sufficient for the program?

The AVS department, along with the rest of the departments in the College of Agriculture, are assigned a specific subject librarian, who holds training sessions on how to conduct online database searches using the library resources for all departmental affiliates. The library maintains subscriptions to numerous journals and databases that are specific to the field of animal sciences. Sources that are not available in the university library can be requested by students, faculty, or staff through the library inter-loan system (Document Delivery). These sources include textbooks and journal articles. The university library also has computer labs where training sessions are held for students, staff, and faculty. Currently, online library resources are sufficient. Usage of library resources greatly increased during the pandemic.

4.2.2 To what extent are current resources unnecessary and could be replaced?

To our knowledge, none of the current library resources are unnecessary.

4.2.3 How are the program(s) engaging with the library to strengthen student success?

Several classes within the AVS department have a research/writing component (including AVS 1000, AVS 4610, AVS 3456, AVS 4430); instructors in these courses have traditionally coordinated with the university library/subject librarian to have students enrolled in the class receive training in use of the library's online resources. Students are encouraged to use peer-reviewed journal articles and other reliable information sources. Based on the library's records of AVS affiliates' use of the library's resources, engagement of AVS department with library resources has increased over the past 5 years (Table 16).

Table 17. Usage of library resources by the BS Animal Science program

	AY 16-17	*AY 17-18*	*AY 18-19*	*AY 19-20*	*AY 20-21*
Librarians and library staff assisted students and faculty with research questions relating to the BS Animal Science program during the period under review	*3*	*4*	*2*	*20*	*21*
Library instruction for BS Animal Science program	*N/A (via AG 100)*	*N/A (via AG 100)*	*0*	*24*	*79*
Library Research Tutorials Usage by the BS Animal Science program	*3*	*7*	*27*	*81*	*74*
Library Research Guides Usage by BS Animal Science program	*1931*	*1604*	*589*	*1288*	*2603*

Animal Science-supporting journal subscriptions:

- American Journal of Veterinary Research
- Animal Feed Science and Technology
- Animal Genetics
- Animal Reproduction Science
- Journal of Animal Science
- Journal of the American Veterinary Medical Association
- Livestock Science
- Poultry Science
- Small Ruminant Research
- Theriogenology

Animal Science-supporting search engines:

- AGRICOLA
- Biological Abstracts
- PubMed
- Web of Science Core Collection

4.3 Other Campus Resources

What other campus resources does the program utilize to strengthen student academic success (e.g., Learning Resource Center, Bronco Advising Center, Graduate Study Room, Maker Space, Center for Community Engagement, Division of Student Affairs, etc.)?

The program utilizes all the listed resources including the Disability Resource Center, Veterans Resource Center, Student Health Services, Bronco Scholarships, Student Associations (e.g., African American Student Center, Hispanic Student Center, etc.), to enable student accommodations, wellness, inclusiveness, and overall academic success.

If additional resources are needed to support your students, please explain.

More faculty, staff, classrooms and modern equipment are needed.

4.4 Budget

4.4.1 *How is the department using the current budget to meet its needs?*

The State operating budget of the AVS department over the past 7 years is summarized in Table 18 and includes both AHS and Animal Science programs. A total of 86-95% (average 91%) goes to salaries, whereas 5-14% (8.53% average) goes to supplies and services. For some years the annual budget included stipends for professional development of tenure track and part-time faculty, ranging from $1,000 to $1,500 per year per individual. Currently this component is disbursed from the Dean's account. Other smaller components of the budget that are not included in the materials and supplies are: travel, equipment, printing, professional development, recruitment, memberships and subscriptions, communication (phone, wireless).

*Table 18. AVS operating budgets, 2014-2020**

Operating Budget	Year						
	2014	2015	2016	2017	2018	2019	2020
TOTAL	$900,642	$1,229,06	$1,326,549	$1,485,179	$1,688,491	$1,605,240	$1,917,820
All Salaries (chair, faculty (TTF/PTF), staff, etc.)	$855,589	$1,138,87	$1,165,046	$1,345,573	$1,453,770	$1,521,566	$1,729,735
Salaries as % of Total	95.00%	92.66%	87.83%	90.60%	86.10%	94.79%	90.19%
Supplies/Services	$45,053	$83,747	$151,869	$131,852	$231,889	$80,147	$169,185
Supplies/Services as % Total	5.00%	6.81%	11.45%	8.88%	13.73%	4.99%	8.82%

*The budget information was obtained from Tableau via Claudia Grano, the Administrative Support Coordinator for AVS Department.

4.4.2 How are expenditures aligned with program, department, college, and university priorities?

The mission, vision, and values of the University, College of Agriculture, and AVS Department are well-integrated. We work cohesively to recruit, retain, and educate students while providing them with hands-on experiences through 'Learn by Doing' engagement in laboratory activities, internship courses and participation in research, thereby preserving our polytechnic identity. The funds support instruction (i.e., salaries, and materials and supplies) including maintenance or improvement (modernizing) of facilities that are used for instruction of students.

4.4.3 How could funds be more effectively utilized?

Funds could be more effectively used if we knew what was in the budget for procurement of materials and supplies at the beginning of the academic year. Commonly this information is not available. This knowledge would enable us to manage our resources more efficiently among all the classes, especially labs without lab fees, that need financial support for materials and supplies.

4.4.4 What support and resources will your program need from the university to 1) improve student success; 2) adapt to anticipated changes?

The university needs to provide adequate tenure track faculty lines that will enable the AVS Department to teach and advise students more efficiently. We are commonly in short supply of adequate space to hold some of our large lecture classes. For many years (till Fall 2021), the department did not have a dedicated space for holding labs within the main College of Agriculture building.

4.4.5 What support and resources outside of the university could be pursued to help fund these changes?

Faculty have been successful with extramural grants (USDA, ARI, SCIFTS) that have enabled the purchase of high-end equipment that can be used in instruction and research in areas such as, animal nutrition and animal biotechnology. There are possibilities of pursuing donor funds from alumni and external organizations. Faculty have also won state lottery funds to support the purchase of equipment e.g., real-time PCR machine. Additional grants e.g., from USDA have provided funds to purchase equipment to support teaching e.g., Nitrogen Analyzer equipment. Many of our faculty have applied for internal resources to equip classrooms and laboratories via the university's Special Projects for Improving the Classroom Environment (SPICE) competitive grant program. In total, AVS faculty can bring more than $100,000 per year in SPICE funds.

5.CONCLUSION

The AVS Department offers a four-year curriculum leading to a bachelor's degree in Animal Science with options in Pre-veterinary Science/Graduate School, and Animal Science (general). Animal Health Science is offered by the department as a separate major. The department offers an Animal and Veterinary Science Minor (33 units) for non-Animal Science majors, and an Equine Studies Minor (18 units) which is open to any major. The department also offers a master's degree in Agriculture with a subplan in Animal Science. The location of the university provides rich opportunities for students to obtain specialized and practical educational experiences in production, management, feeding, and marketing of animals. The Pre-veterinary science/Graduate School option meets requirements for admission to most schools of veterinary medicine, related medical technical fields, and for graduate study in animal nutrition, meat science, animal breeding, animal physiology, and related fields. Our majors are popular as evidenced by increased intake of students compared to other majors in the college. The AVS department supports the university's mission in providing experiential learning for our students. Departmental activities are closely aligned with our university's inclusive polytechnic education.

5.1 Strengths of the BS in Animal Sciences and the AVS department

The AVS is an impacted program. We get many more applicants than are accepted into our Animal Science and Animal Health Science majors; our acceptance rate is approximately 40%. Nation-wide, we are one of few Animal and Veterinary Sciences departments that has a polytechnic approach to learning, with an emphasis on hands-on training. Furthermore, we are the only Animal Sciences/Veterinary Sciences department in Southern California. Whereas most Animal Science departments in North America focus mainly on Animal Sciences, we place a large emphasis on both animal and veterinary sciences. Our students exceed the average admissions rate (10-15%) into veterinary schools compared with students from other animal science institutions; between 2015 and 2021, 55 - 69% of our Pre-Vet majors were successful in getting admission into veterinary school.

The AVS department has the only 4-year Registered Veterinary Technician (RVT) program on the West Coast. AHS is accredited by the American Veterinary Medical Association (AVMA) and is one of only 25 AHS programs approved nationwide. Our AHS graduates have a 91 % RVT certification exam success rate and a 90 % passing rate on the Veterinary Technician national exam (compared with 72% nationwide, 2017-2020). Our program is listed as the "Best Affordable Veterinary Studies Degree" for quality and cost by AffordableSchools.com.

Our students are recruited from many backgrounds, and we encourage inclusiveness through participation in student clubs. In addition to teaching, our faculty are active in research, committee involvement, and student mentorship. Innovation is fostered by encouraging students to participate in research projects. Our animal units comprising of sheep/goats, swine, and cattle, and the Arabian Horse Center, are a major resource that facilitates hands-on learning.

5.2 Opportunities for improvement

The AVS faculty advisement and mentorship efforts contribute to student success and timely completion of our academic programs. Our full-time faculty members are few compared to our student intake (student: full time faculty are 99:1 (including both AVS and AHS major) and 130:1 (AVS only). **For reference, the university student:full time faculty ratio is 19:1**. We need to

build critical capacity in faculty numbers as well as recruit faculty with suitable skills that will advance the mission of the department.

Currently our department ranks highly compared with other departments at CPP for student graduation rates, especially URM and Pell Grant students. However, our 2-year transfer and 4-year first year freshmen graduation rates can be improved.

With the limitations in resources and limited number of faculty, we are faced with serious challenges to our program, including losing diversity in our curriculum. We are not able to offer courses in Poultry production because we lack a poultry unit. Also, the meat science lab was eliminated from the program because our meat processing facility was closed in 2015. As evidenced in the paragraph above, acquisition of faculty as well as adequate administrative and financial support are necessary to maintain the rigor of our program.

5.2.1 Actions needed for improvement

Student Success

- Improve retention and graduation rates to match or exceed the university baseline goals (GI 2025).
- Offer more courses and course sections that allow students to graduate timely
- Reduce the number of DFWs via early and preemptive intervention
- Encourage student to take bottleneck lower division courses at community colleges
- Continue the recruitment of best students and intensify advising.
- Curb uncontrolled intake of new students (freshmen and transfers, including change of majors from outside AVS)

Faculty/staff

- Request for additional full-time faculty positions
- Enhance the mentoring of new faculty
- Request for increased advising of freshmen and sophomore students by advising staff
- Recruit faculty with complementary and additive expertise to enable the department to advance to the cutting edge
- Enhance student advising via training of faculty

Department

- Increase opportunities for student internships on campus and industry
- Increase funding for scholarships by working with Advancement Office
- Request for increased funding to support operational budget

5.3 Measuring program improvement

Student Success

- Improved graduation rates for both first-time freshmen and transfer students
- Get positive feedback from students regards success of teaching and advising via exit surveys
- Introduction of new courses that reflect moving with times and technology
- Decreased number of students getting failing grades (DFWs)
- Increased enrollment of students in vet schools and placement of students in industry

Faculty/staff

- Increased number of permanent faculty and decrease in numbers of part-time faculty.
- Decreased student:faculty ratios, and major:faculty ratios.

Department

- Ensure information on the departmental website is current for continuing and future students.
- Improved/updated animal unit facilities (repairs and maintenance) to be at par with other institutions
- Increased acquisition of grants for classroom improvement and research support
- Acquisition of more dedicated teaching space
- Ensure course transfer agreements with community colleges are current
- Have increased funding to support pedagogy (materials and supplies)

6. Appendices

Appendix 1 – Curriculum from peer institutions

Appendix Table 1.1. Curriculum from peer institutions: California State University, Chico

General information

Course Requirements for the Major: 79-80 units

Lower-Division Requirements: 33-34 units

Curriculum

4 courses required:

AGRI 180	The University Experience	1.0
ANSC 101	Introduction to Animal Science	3.0
ANSC 230	Animal Feeds and Nutrition	3.0
MATH 105	Introduction to Statistics	3.0

1 course selected from:

CHEM 107	General Chemistry for Applied Sciences	4.0
CHEM 111	General Chemistry I	4.0

1 course selected from:

CHEM 108	Organic Chemistry for Applied Sciences	4.0
CHEM 112	General Chemistry II	4.0

1 course selected from:

ABUS 101	Introduction to Agricultural Business and Economics	3.0
ABUS 261	Farm Accounting	3.0

1 course selected from:

BIOL 162	Principles of Cellular and Molecular Biology	4.0
PSSC 101	Introduction to Plant Science	3.0
PSSC 250	Introduction to Soil Science	3.0

9 units selected from: Any combination of lower division courses in Agriculture (AGRI), Agricultural Engineering Technology (AGET), Animal Science (ANSC), Plant Science (PSSC), Agricultural Business (ABUS), BIOL 161, BIOL 163, CHEM 270, PHYS 202A and PHYS 202B. Upper-Division Requirements: 25 units

7 courses required:

AGRI 305	Agricultural Genetics	3.0
AGRI 482W	Agricultural Issues (W)	3.0
AGRI 490W	Agricultural Experimental Research (W)	4.0
ANSC 330	Animal Nutrition	3.0
ANSC 340	Reproductive Physiology of Domestic Animals	3.0
ANSC 360	Animal Health and Disease	3.0
ANSC 440	Anatomy and Physiology of Domestic Animals	3.0

1 course selected from:

AGRI 331	Agricultural Ecology	3.0
PSSC 330	Rangeland Resources and Management	3.0
PSSC 363	Forage Crops	3.0

Animal Science Electives in the Major: 21 units

9 units selected from:

Note: 6 units must be upper division.

ANSC 271	Principles of Beef Cattle Production	3.0
ANSC 272	Principles of Sheep & Goat Production	3.0
ANSC 273	Principles of Swine Production	3.0
ANSC 274	Principles of Dairy Production	3.0
ANSC 301	Intermediate Animal Systems	3.0
ANSC 350	Meat and the Consumer	3.0
ANSC 374	Organic Dairy Production and Management	3.0
ANSC 450	Food Sanitation and Quality Control	3.0
ANSC 471	Advanced Beef Cattle Management and Production	3.0
ANSC 474	Dairy Production and Management	3.0

12 units selected from: Any combination of upper division courses in Agriculture (AGRI), Agricultural Engineering Technology (AGET), Animal Science (ANSC), Plant Science (PSSC), Agricultural Business (ABUS), BIOL 360, BIOL 416, CHEM 370, CHEM 451. A minimum of three UD ABUS units are recommended

Appendix Table 1.2. Curriculum from peer institutions: Cal Poly San Luis Obispo

General information

Tenure/Tenure track faculty: 17
Instructors: 14
Undergraduate student population: ~700 (estimated)
Student/faculty ratio (including instructors): 23:1
Student/faculty ratio (tenure/tenure track only): 41:1

86.1% female
57.8% white (Who are the others?)

Degree Requirements and Curriculum

In addition to the program requirements listed on this page, students must also satisfy requirements outlined in more detail in the 1 section of this catalog, including:

60 units of upper-division courses
Graduation Writing Requirement (GWR)
2.0 GPA
U.S. Cultural Pluralism (USCP)

Note: No Major or Support courses may be selected as credit/no credit.

MAJOR COURSES		
ASCI 101	Introduction to the Animal Sciences	2
ASCI 112	Principles of Animal Science	4
ASCI 211	Meat Science	4
ASCI 220	Introductory Animal Nutrition and Feeding	4
ASCI 229	Anatomy and Physiology of Farm Animals	4
ASCI 290	Animal Production and Management Enterprise	4
or ASCI 490	Advanced Animal Production and Management Enterprise	
ASCI 304	Animal Genomics	3
ASCI 351	Reproductive Physiology	4
ASCI 363	Undergraduate Seminar	2
ASCI 477	Senior Project - Research Experience in Animal Science	3
or ASCI 478	Senior Project - Advanced Internship Experience in Animal Science	
or ASCI 479	Senior Project - Current Topics in Animal Science	
Production Courses		
Select one from each of the three categories:		12
Ruminants		
ASCI 221	Introduction to Beef Production	
or ASCI 223	Systems of Small Ruminant Management	
or DSCI 230	General Dairy Husbandry	
Nonruminants		
ASCI 222	Systems of Swine Production	
or ASCI 225	Introduction to Poultry Management	
Companion Animals or Range Management		
ASCI 224	Equine Science	
or ASCI 227	Companion Animal Science	
or ASCI 239	Principles of Rangeland Management	
Biochemistry/Chemistry		
Select from the following:		4-5
ASCI 320	Physiological Chemistry of Animals	

CHEM 313	Survey of Biochemistry and Biotechnology	
CHEM 371	Biochemical Principles	
Nutrition		
Select from the following:		3-4
ASCI 346	Equine Nutrition	
ASCI 350	Nonruminant Nutrition	
ASCI 355	Ruminant Nutrition	
ASCI 420	Animal Metabolism and Nutrition	
DSCI 301	Dairy Cattle Nutrition	
Physiology		
Select from the following:		3-5
ASCI 333	Equine Reproduction	
ASCI 347	Equine Exercise Physiology	
ASCI 366	Veterinary Pharmacology	
ASCI 405	Domestic Livestock Endocrinology	
ASCI 406	Applied Animal Embryology and Assisted Reproduction	
ASCI 438	Systemic Animal Physiology	
ASCI 440	Immunology and Diseases of Animals	
ASCI 455	Advanced Equine Reproductive Technologies	
DSCI 321	Lactation Physiology	
DSCI 330	Artificial Insemination and Embryo Biotechnology	
Technology/Management		
Select from the following:		8-9
AG/ASCI 360	Holistic Management	
or AG 450	Applied Holistic Management	
ASCI 310	Technical Veterinary Skills	
ASCI 311	Advanced Beef Cattle System Management	
ASCI 312	Production Medicine	
ASCI 315	Equine Biomechanics	
ASCI 325	Egg Production, Processing and Distribution	
ASCI 330	Poultry Meat Production and Processing	
ASCI 340	Animal Welfare and Ethics	
ASCI 342	Poultry Business Management	
ASCI 366	Veterinary Pharmacology	
ASCI 370	Rangeland Improvements	
ASCI 372	California Rangeland & Ranch Resource Management	
ASCI 403	Applied Biotechnology in Animal Science	
ASCI 406	Applied Animal Embryology and Assisted Reproduction	
ASCI 407	Assisted Reproduction Technologies of Gametes and Embryos Laboratory	
ASCI 410	Applied Animal Behavior Science	
ASCI 415	HACCP for Meat and Poultry Operations	
ASCI 440	Immunology and Diseases of Animals	
ASCI 450	Computer Applications in Animal Science: Spreadsheet Analysis	
ASCI 455	Advanced Equine Reproductive Technologies	
ASCI 460	Rangeland Assessment and Planning	
ASCI 465	Applied Practices for Monitoring California Rangelands	
ASCI 484	Processed Meat Products	
Approved Electives		
Select courses from the list of Approved Electives; see Approved Electives Guide below. Depending on course selections in other areas, up to 14 units of 300-400 level courses may be required. Please consult with faculty and/or academic advisor to verify upper-division unit requirements.		24

SUPPORT COURSES		
BIO 111	General Biology (B2 & B3) [1]	4
or BIO 161	Introduction to Cell and Molecular Biology	
BIO 302	Human Genetics	4-5
or BIO 303	Survey of Genetics	
or BIO 351	Principles of Genetics	
CHEM 127	General Chemistry for Agriculture and Life Science I (B1 & B3) [1]	4
CHEM 128	General Chemistry for Agriculture and Life Science II	4
CHEM 216	Organic Chemistry I [2]	5
or CHEM 312	Survey of Organic Chemistry	
MATH 118	Precalculus Algebra (B4) [1, 3]	4
or MATH 161	Calculus for the Life Sciences I	
STAT 218	Applied Statistics for the Life Sciences (GE Electives) [1]	4
GENERAL EDUCATION (GE)		
(see GE program requirements below.)		56
FREE ELECTIVES		
Free Electives		1-7
Total units		180

Approved Electives Guide

Approved Electives have been organized by area of interest to guide students in their selections. Any course on this list can be used as an elective; courses not on this list can serve as an elective but require faculty advisor approval. Consultation with a faculty advisor is recommended to ensure that the required number of upper-division units is met. Also, bear in mind that selection may impact pursuit of post-baccalaureate studies and/or goals.

Pre-Veterinary Medicine		
ASCI 227	Companion Animal Science [4]	
ASCI 290	Animal Production and Management Enterprise [5]	
ASCI 310	Technical Veterinary Skills [4]	
ASCI 315	Equine Biomechanics [4]	
ASCI 320	Physiological Chemistry of Animals [4]	
ASCI 333	Equine Reproduction [4]	
ASCI 339	Internship in Animal Science [5]	
ASCI 340	Animal Welfare and Ethics	
ASCI 347	Equine Exercise Physiology [4]	
ASCI 366	Veterinary Pharmacology [4]	
ASCI 405	Domestic Livestock Endocrinology [4]	
ASCI 420	Animal Metabolism and Nutrition [4]	
ASCI 438	Systemic Animal Physiology [4]	
ASCI 440	Immunology and Diseases of Animals [4]	
ASCI 490	Advanced Animal Production and Management Enterprise [5]	
BIO 160	Diversity and History of Life	
BIO 161	Introduction to Cell and Molecular Biology [4]	
BIO 162	Introduction to Organismal Form and Function	
BIO 303	Survey of Genetics [4]	
BIO 351	Principles of Genetics [4]	
BIO 361	Principles of Animal Physiology	
BIO 363	Principles of Conservation Biology	
CHEM 129	General Chemistry for Agriculture and Life Science III	

CHEM 217	Organic Chemistry II	
CHEM 218	Organic Chemistry III	
CHEM 220	Organic Chemistry Laboratory For Life Sciences II	
CHEM 223	Organic Chemistry Laboratory for Life Sciences III	
CHEM 371	Biochemical Principles [4]	
CHEM 372	Metabolism	
DSCI 330	Artificial Insemination and Embryo Biotechnology [4]	
MATH/HNRS 141	Calculus I [4]	
or MATH 161	Calculus for the Life Sciences I	
MATH/HNRS 142	Calculus II	
or MATH 162	Calculus for the Life Sciences II	
MCRO 221	Microbiology	
PHYS 121	College Physics I	
PHYS 122	College Physics II	
PHYS 123	College Physics III	
PHYS 125	College Physics I Laboratory	
PHYS 132	General Physics II	
PHYS 133	General Physics III	
PHYS 141	General Physics IA	
PHYS 200	Special Problems for Undergraduates	
Biotechnology		
ASCI 290	Animal Production and Management Enterprise [5]	
ASCI 339	Internship in Animal Science [5]	
ASCI 366	Veterinary Pharmacology [4]	
ASCI 403	Applied Biotechnology in Animal Science [4]	
ASCI 405	Domestic Livestock Endocrinology [4]	
ASCI 406	Applied Animal Embryology and Assisted Reproduction [4]	
ASCI 407	Assisted Reproduction Technologies of Gametes and Embryos Laboratory	
ASCI 440	Immunology and Diseases of Animals [4]	
ASCI 490	Advanced Animal Production and Management Enterprise [5]	
BIO 161	Introduction to Cell and Molecular Biology [4]	
BIO 162	Introduction to Organismal Form and Function	
BIO/CHEM 202	Orientation to Biotechnology	
BIO 231	Human Anatomy and Physiology I	
BIO 232	Human Anatomy and Physiology II	
BIO 308	Genetic Engineering Technology	
BIO 351	Principles of Genetics [4]	
BIO 405	Developmental Biology	
BIO 410	Functional Histology	
BIO/CHEM 475	Molecular Biology Laboratory	
BIO/CHEM 476	Gene Expression Laboratory	
CHEM 129	General Chemistry for Agriculture and Life Science III	
CHEM 216	Organic Chemistry I [4]	
CHEM 217	Organic Chemistry II	
CHEM 220	Organic Chemistry Laboratory For Life Sciences II	
CHEM 373	Molecular Biology	
CHEM 377	Chemistry of Drugs and Poisons	
CHEM 474	Protein Techniques Laboratory	
CHEM 477	Biochemical Pharmacology	
MCRO 221	Microbiology	
MCRO 224	General Microbiology I	

MCRO 225	General Microbiology II	
MCRO 320	Emerging Infectious Diseases	
MCRO 421	Food Microbiology	
PSY 340	Biopsychology	
Food Animal Production		
AEPS 150	Forage Crops	
AG/ASCI 360	Holistic Management [4]	
AGB 322	Principles of Agribusiness Management	
ASCI 212	Livestock Show Management	
ASCI 221	Introduction to Beef Production [4]	
ASCI 222	Systems of Swine Production [4]	
ASCI 223	Systems of Small Ruminant Management [4]	
ASCI 225	Introduction to Poultry Management [4]	
ASCI 226	Livestock Evaluation	
ASCI 260	Preparation of Livestock for Shows and Sales	
ASCI 270	Selected Topics	
ASCI 290	Animal Production and Management Enterprise [5]	
ASCI 311	Advanced Beef Cattle System Management [4]	
ASCI 312	Production Medicine [4]	
ASCI 339	Internship in Animal Science [5]	
ASCI 340	Animal Welfare and Ethics	
ASCI 410	Applied Animal Behavior Science	
ASCI 412	Advanced Livestock Event Planning	
ASCI 413	Advanced Livestock Event Management	
ASCI 450	Computer Applications in Animal Science: Spreadsheet Analysis [4]	
ASCI 470	Selected Advanced Topics	
BIO 427	Wildlife Management	
BRAE 141	Agricultural Machinery Safety	
DSCI 230	General Dairy Husbandry	
DSCI 231	General Dairy Manufacturing	
DSCI 241	Dairy Cattle Selection, Breeds, Fitting and Showing	
DSCI 301	Dairy Cattle Nutrition	
DSCI 330	Artificial Insemination and Embryo Biotechnology	
DSCI 333	Dairy Animal Health, Safety and Applied Technology	
NR 142	Environmental Management	
NR/LA 218	Introduction to Geographic Information Systems (GIS)	
SPAN 101	Elementary Spanish I	
SS 120	Introductory Soil Science	
Comparative Animal Biology Studies		
ASCI 203	Animal Parasitology	
ASCI 290	Animal Production and Management Enterprise [5]	
ASCI 321	Zoonoses and Veterinary Public Health Concerns	
ASCI 339	Internship in Animal Science [5]	
ASCI 490	Advanced Animal Production and Management Enterprise [5]	
BIO 162	Introduction to Organismal Form and Function	
BIO 227	Wildlife Conservation Biology	
BIO 263	Introductory Ecology and Evolution	
BIO 327	Wildlife Ecology	
BIO 442	Behavioral Ecology	
BIO 444	Population Ecology	
MSCI 324	Marine Mammals, Birds and Reptiles	

MSCI 330	Technologies for Ocean Discovery	
PSY 458	Learning	
STAT 313	Applied Experimental Design and Regression Models	
Equine Science		
AG 243	Theory and Practice of Rodeo	
ASCI 214	Equine Management	
ASCI 224	Equine Science [4]	
ASCI 228	Equine Evaluation	
ASCI 265	Equine Behavior and Training	
ASCI 290	Animal Production and Management Enterprise [5]	
ASCI 315	Equine Biomechanics [4]	
ASCI 324	Advanced Equine Evaluation	
ASCI 333	Equine Reproduction [4]	
ASCI 339	Internship in Animal Science [5]	
ASCI 344	Equine and Human Communication	
ASCI 345	Equine Behavior Modification	
ASCI 346	Equine Nutrition [4]	
ASCI 347	Equine Exercise Physiology [4]	
ASCI 455	Advanced Equine Reproductive Technologies [4]	
ASCI 490	Advanced Animal Production and Management Enterprise [5]	
Poultry Management		
AGB 310	Agribusiness Credit and Finance	
ASCI 225	Introduction to Poultry Management [4]	
ASCI 290	Animal Production and Management Enterprise [5]	
ASCI 325	Egg Production, Processing and Distribution [4]	
ASCI 330	Poultry Meat Production and Processing [4]	
ASCI 339	Internship in Animal Science [5]	
ASCI 342	Poultry Business Management	
ASCI 350	Nonruminant Nutrition [4]	
ASCI 415	HACCP for Meat and Poultry Operations [4]	
ASCI 440	Immunology and Diseases of Animals [4]	
ASCI 490	Advanced Animal Production and Management Enterprise [5]	
BUS 207	Legal Responsibilities of Business	
BUS 212	Financial Accounting for Nonbusiness Majors	
BUS 346	Principles of Marketing	
ENGL 310	Corporate Communication	
FSN 275	Elements of Food Safety	
FSN 334	Food Packaging	
FSN 335	Food Quality Assurance	
FSN 370	Food Plant Sanitation and Prerequisite Programs	
Rangeland Resource Management		
ASCI 239	Principles of Rangeland Management	
AG/ASCI 360	Holistic Management [4]	
ASCI 290	Animal Production and Management Enterprise [5]	
ASCI 311	Advanced Beef Cattle System Management [4]	
ASCI 370	Rangeland Improvements	
ASCI 372	California Rangeland & Ranch Resource Management	
ASCI 460	Rangeland Assessment and Planning	
ASCI 465	Applied Practices for Monitoring California Rangelands	
ASCI 490	Advanced Animal Production and Management Enterprise [5]	

BIO 263	Introductory Ecology and Evolution	
BIO 435	Plant Physiology	
BOT 121	General Botany	
BOT 313	Taxonomy of Vascular Plants	
NR/LA 218	Introduction to Geographic Information Systems (GIS)	
NR 306	Natural Resource Ecology and Habitat Management	
NR 320	Watershed Processes and Management	
NR 335	Conflict Management in Natural Resources	
NR/CRP 404	Environmental Law	
NR 418	Applied GIS	
SS 120	Introductory Soil Science	
SS 130	Soils in Environmental and Agricultural Systems	
SS 321	Soil Morphology	
Meat Science		
ASCI 290	Animal Production and Management Enterprise [5]	
ASCI 339		
Internship in Animal Science [5]	HACCP for Meat and Poultry Operations [4]	
ASCI 425	Meat Industry Study Tour	
ASCI 484	Processed Meat Products	
ASCI 490	Advanced Animal Production and Management Enterprise [5]	
DSCI 401	Physical and Chemical Properties of Dairy Products	
FSN 125		
FSN 275	Elements of Food Safety	
FSN 370	Food Plant Sanitation and Prerequisite Programs	
MCRO 221	Microbiology	
MCRO 421	Food Microbiology	
Agribusiness		
AGB 202	Introduction to Sales	
AGB 212	Agricultural Economics	
AGB 214	Agribusiness Financial Accounting	
or BUS 212	Financial Accounting for Nonbusiness Majors	
AGB 301	Food and Fiber Marketing	
AGB 310	Agribusiness Credit and Finance	
AGB 312	Agricultural Policy	
AGB 313	Agriculture Economic Analysis	
AGB 322	Principles of Agribusiness Management	
AGB 369	Agricultural Personnel Management	
AGC 314	California Fairgrounds and Expositions	
ASCI 212	Livestock Show Management	
ASCI 260	Preparation of Livestock for Shows and Sales	
ASCI 290	Animal Production and Management Enterprise [5]	
ASCI 311	Advanced Beef Cattle System Management [4]	
ASCI 412	Advanced Livestock Event Planning	
ASCI 415	HACCP for Meat and Poultry Operations [4]	
ASCI 484	Processed Meat Products	
POLS 338	Critical Issues in American Politics	
POLS 351	Public Policy and Administration	

Required in Major or Support; also satisfies General Education (GE) requirement.

CHEM 212 accepted in lieu of CHEM 312, but not for upper-division credit.

MATH 116 and MATH 117 substitute.

If a course is taken to meet a Major or Support requirement, it cannot be double counted as an Approved Elective.

A maximum of 6 units of CR/NC courses may be counted toward Approved Electives.

Appendix Table 1.3. Curriculum from aspirational institution: UC Davis

General information

Undergraduate student population: ~850 students
Tenure/Tenure track faculty: 40
Student to faculty ratio: 21.25

Curriculum

PREPARATORY SUBJECT MATTER (**49-53** units)

a) ANS 1 (4) F_____, ANS 2 (4) S___(ANS 1 is waived for incoming transfer students; ANS 2 may be waivedfor transfer students with appropriate coursework or animal experience).

b) ANS 41 (2) F_____, ANS 41L (2) F, W___**[Take Sophomore year to avoid future class conflicts]**
(ANS 41 and 41L are waived for incoming transfer students).

c) CHE 2A (5) F, W_____, 2B (5) W, S ___

d) CHE [8A (2) F, S_____, 8B (4) F, W___] **OR** [118A (4) F, W, Su I__, 118B (4) W, S, Su II_____]

e) BIS 2A (5)_____, 2B (5)___, 2C (5) ___

f) MAT [16A (3)_____, 16B (3)___] **OR** [17A (4)___, 17B (4)___,] **OR** [21A (4)___, 21B (4)_____]

g) PLS 120 (4) F_____**OR** STA 100 (4)_____(Students who have already taken or received credit for STA 13will only receive 2 units of academic credit for completing STA 100).

ADDITIONAL COURSES REQUIRED FOR UC DAVIS SCHOOL OF VETERINARYMEDICINE PREPARATION (SUBJECT TO CHANGE):

•CHE 2C (5) F, S, Su I ____

•PHY 7A (4)_____PHY 7B (4) _____

Other Target Schools: _____

**If you are planning to apply to other Veterinary schools, you may be required to take more/higher level courses in Englishand other requirements. It is important to regularly check the admissions criteria to make sure you fulfill the requirements. Refer to the UCD Veterinary Medicine admissions website or see an Animal Science Advisor.*

DEPTH SUBJECT MATTER (minimum **39-43** units)

BIOLOGY

BIS 101 (4)*(BIS 101D – Optional)*, ABI 102 (5) F,W, ABI 103 (5) W,S, ANG 107 (5) F, S, ANS 100 (5) S **OR** NPB 101 (5) _____

INTEGRATIVE ANIMAL BIOLOGY (Pick 2 of 4)

ANS 123 (4) S, ANS 124 (4) W, NPB 121 (4) W*(NPB 121L – Optional)*, NPB 130 (4) F

AQUATICS SPECIALIZATION (Pick 2 of 4):

ANS 123 (4) S, EVE 112 (3) W, NPB 123 (4) F, WFC 120 (3) F

AVIAN OR POULTRY SPECIALIZATION (Pick 2 of 4):

ANS 123 (4) S, AVS 100 (3) S____, AVS 103 (3) F___, NPB 130 (4) F ___

LABORATORY COURSE - select **ONE** from the following:

•ANS 106 (3) W _

•ANS 130 (3) S __

- ANS 132 (3) F __
- ANS 133 (4) W _
- ANS 134 (3) W _
- ANS 135 (3) F __
- ANS 136 (3) F __
- ANS 137 (3) S __
- ANS 138 (3) F (taught odd fall year) _____
- ANS 139 (3) W _
- ANS 160A (2) W + ANS 160B (2) S __
- MCB 120L (3) __
- MCB 160L (5) __
- PMI 126L (2) W _____
- NPB 101L* (3)__*Prereq: NPB 101(not ANS 100

SPECIALIZATION (20-23 units)

Select 20 letter graded units, with approval from your faculty advisor, to form a coherent series of courses centered on one of the following disciplines or species specific concentrations: **Animal Behavior, Biochemistry, Genetics, Nutrition, Physiology, Aquatic Animals, Avian Sciences, Companion and Captive Animals, Equine Science, Laboratory Animals (minimum 23 units), Livestock and Dairy, or Poultry.**

Note: Up to 3 units of ANS 194 or ANS 194HA may count towards specialization units with the approval from your facultyadvisor. ANS 92,192, 99, and 199 will not count towards specialization units.

Students must have 180 units by the end of graduation.

Appendix 2 – DFWs by Non-Passing Rates

Appendix Table 2.1 DFWs by Non-Pass rate

2014 Academic Year

Code	Course Name	Enrollment	Non-passing Rate	Impact
AVS112	Animal Science I	142	10%	14
AVS101	Fundamentals of Anim Nutrition	67	19%	13
AVS350	Anatomy and Phys Domestic Anim	80	16%	13
AVS414L	Phys of Reprod and Lactation L	69	13%	9
AVS201	Animal Diseases	56	13%	7
AHS302	Animal Parasitology	83	8%	7
AVS414	Phys of Reprod and Lactation	70	7%	5
AVS114L	Animal Science I Lab	85	6%	5
	Animal Parasitology Lab	81	5%	4
AVS412	Mammalian Endocrinology	73	5%	4
AVS113	Animal Science II	76	4%	3
AVS211	Drugs and Society	77	4%	3
AVS402	Animal Nutrition	46	4%	2
AVS311	The Animal Industry and Societ	106	4%	4
AVS113	Animal Science II	76	4%	3
AVS211	Drugs and Society	77	4%	3
AVS333	Feline and Canine Compendium	26	4%	1
AVS327	Meat Science and Industry	71	1%	1

2015 Academic Year

Course	Course	Enrollment	Non-passing Rate	Impact
AHS305	Clinical Pthlgy and Anml Disea	39	21%	8
AVS112	Animal Science I	34	6%	2
AVS463	Undergraduate Seminar	27	4%	1
AHS302	Animal Parasitology	39	3%	1
AHS302L	Animal Parasitology Lab	39	3%	1

2016 Academic Year

Code	Course	Enrollmen	Non-passing Rate	Impact
AVS 201	Animal Diseases	121	23%	28
AVS 414	Phys of Reprod and Lactation	69	16%	11
AVS 414L	Phys of Reprod and Lactation	66	15%	10
AVS 311	The Animal Industry and Socie	192	9%	17
AVS 114L	Animal Science I Lab	142	9%	13
AVS 299A	Spec Topics Ld Students Act	65	8%	5
AVS 333	Feline and Canine Compendium	25	8%	2
AVS 113	Animal Science II	181	7%	13
AVS 211	Drugs and Society	343	6%	20
AVS 101	Fundamentals of Anim Nutritic	141	6%	8
AVS 412	Mammalian Endocrinology	87	6%	5
AVS 112	Animal Science I	228	5%	11
AVS 350	Anatomy and Phys Domestic Anim	110	5%	6
AHS 302L	Animal Parasitology Lab	143	4%	6
AVS 430L	Biotech. App.In Animal Sci. La	89	4%	4
AVS 305	Genetics of Domestic Animals	77	4%	3
AVS 402	Animal Nutrition	90	3%	3
AVS 430	Biotech. Appl. In Animal Sci.	92	3%	3
AVS 327	Meat Science and Industry	179	2%	3

2017 Academic Year
Data N/A

2018 Academic Year

Course Code	Course	Enrollment	Non-passing Rate	Impact
AVS 4214L	Mammln Rprdctn Lactnl Phys Lab	36	22%	8
AVS 3305	Animal Genetics	166	18%	30
AVS 2211	Drugs and Society	255	17%	44
AVS 4214	Mammal Endcrn Reprdctn Lctatn	36	14%	5
AVS 3350	Anatomy and Physiology	124	13%	16
AHS 3305L	Prstlgy and Animal Disease Lab	122	9%	11
AVS 1114L	Food Animal Production Lab	121	8%	10
AHS 3305	Parasitology and Animal Diseases	123	8%	10
AVS 2990A	Spec Topic For Ld Students Act	27	7%	2
AVS 3311	Animal Industry and Society	184	5%	9
AVS 1112	Food Animal Production	209	4%	8
AVS 4430L	Biotech Apps In Animal Sci Lab	78	4%	3
AVS 1000	Orientation To Avs	205	3%	6
AVS 3350L	Anatomy and Physiology Lab	117	3%	3
AVS 4430	Biotech Apps In Animal Sci	78	3%	2
AVS 1113	Comp Lab and Extc Ani Care	199	2%	4
AVS 2101	Fundamentals of Animal Nutri	93	2%	2
AVS 2101L	Fund of Animal Nutri Lab	94	2%	2
AVS 3333	Canine and Feline Compendium	48	2%	1
AVS 2990	Spec Topic For Ld Students	411	1%	3
AVS 1115L	Companion Animal Mgmt Lab	221	1%	2
AVS 3327	Meat Science	109	1%	1

2019 Academic Year

Course Code	Course	Enrollment	Non-passing Rate	Impact
AVS 4214	Mammal Endcrn Reprdctn Lctatn	70	16%	11
AVS 2211	Drugs and Society	132	14%	18
AVS 3305	Animal Genetics	182	10%	18
AVS 1125L	Equine Management Lab	11	9%	1
AVS 1125	Equine Management Science	12	8%	1
AVS 4214L	Mammln Rprdctn Lactnl Phys Lab	67	6%	4
AVS 4434	Equine Reproduction	16	6%	1
AVS 1112	Food Animal Production	234	5%	11
AVS 1114L	Food Animal Production Lab	202	5%	11
AVS 3311	Animal Industry and Society	161	5%	8
AHS 3305	Parasitology and Anml Diseases	117	6%	7
AVS 4402	Advanced Nutrition	39	5%	2
AVS 3350	Anatomy and Physiology	140	3%	4
AVS 2101	Fundamentals of Animal Nutri	90	3%	3
AHS 3305L	Prstlgy and Animal Disease Lab	114	3%	3
AVS 1113	Comp Lab and Extc Ani Care	282	2%	5
AVS 1000	Orientation To Avs	211	2%	4
AVS 3327	Meat Science	160	2%	3
AVS 3350L	Anatomy and Physiology Lab	133	2%	2
AVS 3333	Canine and Feline Compendium	140	1%	2
AVS 4430L	Biotech Apps In Animal Sci Lab	112	1%	1
AVS 4610	Senior Seminar	111	1%	1
AVS 1115L	Companion Animal Mgmt Lab	222	0%	1
AVS 2990	Spec Topic For Ld Students	282	0%	1

2020 Spring Semester

Course Code	Course	Enrollment	Non-passing Rate	Impact
AVS 2211	Drugs and Society	70	17%	12
AVS 3305	Animal Genetics	86	9%	8
AVS 1125L	Equine Management Lab	11	9%	8
AVS 4214	Mammal Endcrn Reprdctn Lctatn	24	8%	2
AVS 1125	Equine Management Science	12	8%	1
AVS 1114L	Food Animal Production Lab	132	5%	7
AHS 3305	Parasitology and Anml Diseases	54	4%	2
AVS 4214L	Mammln Rprdctn Lactnl Phys Lab	23	4%	1
AVS 3350	Anatomy and Physiology	93	3%	3
AHS 3305L	Prstlgy and Animal Disease Lab	53	2%	1
AVS 3350L	Anatomy and Physiology Lab	87	2%	2
AVS1112	Food Animal Production	93	2%	2
AVS1113	Comp Lab and Extc Ani Care	120	2%	2
AVS 3311	Animal Industry and Society	64	2%	1
AVS 3327	Meat Science	55	2%	1

AVS 4430L	Biotech Apps In Animal Sci Lab	75	1%	1

2020 Fall Semester

Course Code	Course	Enrollment	Non-passing Rate	Impact
AVS 3305	Animal Genetics	242	12%	28
AVS 2211	Drugs and Society	302	11%	32
AVS 4430L	Biotech Apps In Animal Sci Lab	104	10%	10
AVS 1114L	Food Animal Production Lab	328	9%	30
AVS 1000	Orientation To Avs	392	7%	26
AVS 1112	Food Animal Production	332	6%	20
AVS 3350	Anatomy and Physiology	160	6%	10
AVS 3311	Animal Industry and Society	360	5%	18
AVS 2101L	Fund of Animal Nutri Lab	124	5%	6
AVS 4214	Mammal Endcrn Reprdctn Lctatn	130	5%	6
AVS 4214L	Mammln Rprdctn Lactnl Phys Lab	122	5%	6
AVS 2101	Fundamentals of Animal Nutri	106	4%	4
AVS 4402	Advanced Nutrition	114	4%	4
AVS 4430	Biotech Apps In Animal Sci	102	4%	4
AVS 3456	Animal Behavior	62	3%	2
AVS 4610	Senior Seminar	78	3%	2
AVS 1113	Comp Lab and Extc Ani Care	258	2%	6
AVS 2990	Spec Topic For Ld Students	132	2%	2
AVS 3327	Meat Science	132	2%	2
AVS 1115L	Companion Animal Mgmt Lab	288	1%	2
AVS 3350L	Anatomy and Physiology Lab	150	1%	2

Appendix 3 – Class Enrollment

Appendix Table 3.1 Class enrollment

Semester	Class	type	name	Room cap*	Class cap	enrollment	Enrollment %
F 2018	3350L	Lab	Anatomy and Physio Lab	1	20	20	100
F 2018	3350L	Lab	Anatomy and Physio Lab	1	21	21	100
F 2018	3350L	Lab	Anatomy and Physio Lab	1	20	20	100
F 2019	3350L	Lab	Anatomy and Physio Lab	24	24	24	100
F 2020	3350L	Lab	Anatomy and Physio Lab		26	26	100
F 2020	3350L	Lab	Anatomy and Physio Lab		25	25	100
F 2018	2101L	Lab	Fund of Animal Nutri Lab	24	26	26	100
F 2019	2101L	Lab	Fund of Animal Nutri Lab	24	24	24	100
F 2020	2101L	Lab	Fund of Animal Nutri Lab		31	31	100
F 2018	1115L	Lab	Comp Animal Mgmt Lab	20	24	24	100
F 2018	1115L	Lab	Comp Animal Mgmt Lab	20	26	26	100
F 2018	1115L	Lab	Comp Animal Mgmt Lab	20	24	24	100
F 2018	1115L	Lab	Comp Animal Mgmt Lab	20	24	24	100
F 2018	1115L	Lab	Comp Animal Mgmt Lab	20	24	24	100
F 2019	1115L	Lab	Comp Animal Mgmt Lab	24	24	24	100
F 2019	1115L	Lab	Comp Animal Mgmt Lab	20	27	27	100
F 2019	1115L	Lab	Comp Animal Mgmt Lab	24	24	24	100
F 2019	1115L	Lab	Comp Animal Mgmt Lab	24	24	24	100
F 2018	1114L	Lab	Food Animal Prod Lab	20	18	18	100
F 2019	1114L	Lab	Food Animal Prod Lab	20	25	25	100
F 2013	430L	Lab	Biotech.App. Lab	24	24	24	100
F 2015	414L	Lab	Repro Lab	0	24	24	100
F 2016	414L	Lab	Repro Lab	0	24	24	100
F 2016	414L	Lab	Repro Lab	0	24	24	100
F 2017	414L	Lab	Repro Lab	0	25	25	100
F 2012	350L	Lab	Anatomy lab	24	24	24	100
F 2013	350L	Lab	Anatomy lab	24	24	24	100
F 2015	350L	Lab	Anatomy lab	24	24	24	100
F 2016	350L	Lab	Anatomy lab	24	24	24	100
F 2017	350L	Lab	Anatomy lab	24	23	23	100
F 2017	350L	Lab	Anatomy lab	1	23	23	100
F 2012	327L	Lab	Meat Science Lab	24	24	24	100
F 2013	125L	Lab	Equine Manage Lab	0	23	23	100
F 2013	114L	Lab	Animal Science I Lab	0	24	28	117
F 2013	114L	Lab	Animal Science I Lab	0	24	26	108
F 2012	114L	Lab	Animal Science I Lab	0	24	24	100
F 2013	114L	Lab	Animal Science I Lab	0	9	9	100

Semester	Class	type	name	Room cap*	Class cap	enrollment	Enrollment %
F 2014	114L	Lab	Animal Science I Lab	0	24	24	100
F 2014	114L	Lab	Animal Science I Lab	24	24	24	100
F 2015	114L	Lab	Animal Science I Lab	0	24	24	100
F 2017	114L	Lab	Animal Science I Lab	24	24	24	100
F 2017	114L	Lab	Animal Science I Lab	20	24	24	100
F 2020	4214	Lecture	Endo Repro		65	65	100
F 2018	3350	Lecture	Anatomy and Physiology	56	42	42	100
F 2018	3350	Lecture	Anatomy and Physiology	56	44	44	100
F 2020	3333	Lecture	Canine Feline Compendium		60	60	100
F 2019	3327	Lecture	Meat Science	56	56	56	100
F 2019	3327	Lecture	Meat Science	56	49	49	100
F 2018	3311	Lecture	Animal Industry and Society	56	52	52	100
F 2018	3311	Lecture	Animal Industry and Society	69	48	48	100
F 2019	3311	Lecture	Animal Industry and Society	55	48	48	100
F 2019	3311	Lecture	Animal Industry and Society	69	49	49	100
F 2020	3311	Lecture	Animal Industry and Society		70	70	100
F 2019	3305	Lecture	Animal Genetics	48	48	48	100
F 2019	3305	Lecture	Animal Genetics	48	48	48	100
F 2020	2211	Lecture	Drugs and Society		40	41	103
F 2018	2211	Lecture	Drugs and Society		45	46	102
F 2018	2211	Lecture	Drugs and Society	56	56	56	100
F 2019	2211	Lecture	Drugs and Society	40	40	40	100
F 2020	2211	Lecture	Drugs and Society		60	60	100
F 2020	2211	Lecture	Drugs and Society		50	50	100
F 2018	2101	Lecture	Fund of Animal Nutrition	48	48	48	100
F 2018	1113	Lecture	Comp Lab and Extc Ani Care	40	40	40	100
F 2018	1113	Lecture	Comp Lab and Extc Ani Care	40	40	40	100
F 2019	1113	Lecture	Comp Lab and Extc Ani Care	40	40	40	100
F 2019	1113	Lecture	Comp Lab and Extc Ani Care	55	46	46	100
F 2019	1113	Lecture	Comp Lab and Extc Ani Care	43	41	41	100
F 2019	1113	Lecture	Comp Lab and Extc Ani Care	35	35	35	100
F 2019	1112	Lecture	Food Animal Production	47	46	46	100
F 2019	1112	Lecture	Food Animal Production	48	48	48	100
F 2020	1112	Lecture	Food Animal Production		55	55	100
F 2013	430	Lecture	Biotech. Appl. in Animal Sci.	56	24	24	100
F 2017	414	Lecture	Phys of Reprod & Lactation	0	46	47	102
F 2016	414	Lecture	Phys of Reprod & Lactation	0	48	48	100

Semester	Class	type	name	Room cap*	Class cap	enrollment	Enrollment %
F 2017	404	Lecture	Animal Breeding		35	35	100
F 2017	402	Lecture	Animal Nutrition	40	30	30	100
F 2013	350	Lecture	Anatomy & Phys	56	48	48	100
F 2017	350	Lecture	Anatomy & Phys	56	47	47	100
F 2014	333	Lecture	Feline Canine Compendium	40	30	30	100
F 2017	333	Lecture	Feline Canine Compendium	48	25	25	100
F 2012	327	Lecture	Meat Science and Industry	24	24	25	104
F 2014	311	Lecture	Animal Industry & Society	48	36	39	108
F 2015	311	Lecture	Animal Industry & Society	40	32	33	103
F 2012	311	Lecture	Animal Industry & Society	48	36	36	100
F 2013	311	Lecture	Animal Industry & Society	48	48	48	100
F 2016	311	Lecture	Animal Industry & Society	0	24	24	100
F 2017	311	Lecture	Animal Industry & Society	0	24	24	100
F 2015	211	Lecture	Drugs and Society	48	40	43	108
F 2012	211	Lecture	Drugs and Society		48	50	104
F 2016	211	Lecture	Drugs and Society	56	48	49	102
F 2014	211	Lecture	Drugs and Society		40	40	100
F 2015	211	Lecture	Drugs and Society		30	30	100
F 2016	211	Lecture	Drugs and Society		30	30	100
F 2015	201	Lecture	Animal Diseases		30	32	107
F 2017	201	Lecture	Animal Diseases	24	30	31	103
F 2013	201	Lecture	Animal Diseases	56	48	49	102
F 2012	201	Lecture	Animal Diseases	0	32	32	100
F 2014	201	Lecture	Animal Diseases		30	30	100
F 2016	201	Lecture	Animal Diseases		30	30	100
F 2016	201	Lecture	Animal Diseases		30	30	100
F 2017	201	Lecture	Animal Diseases	24	32	32	100
F 2013	125	Lecture	Equine Management Science	0	24	24	100
F 2016	113	Lecture	Animal Science II	56	56	56	100
F 2017	112	Lecture	Animal Science I		55	64	116
F 2014	112	Lecture	Animal Science I	56	45	48	107
F 2012	112	Lecture	Animal Science I	69	68	68	100
F 2013	112	Lecture	Animal Science I	120	100	100	100
F 2014	112	Lecture	Animal Science I	78	60	60	100
F 2015	112	Lecture	Animal Science I	69	60	60	100
F 2016	112	Lecture	Animal Science I	30	30	30	100
F 2017	101	Lecture	Anim Nutrition	60	55	56	102
F 2015	101	Lecture	Anim Nutrition		50	50	100
F 2016	101	Lecture	Anim Nutrition	48	48	48	100

Appendix 4 – Scholarly Accomplishments of Faculty

Appendix Table 4.1. Professional Meetings

AY	Professional meeting
2020-2021	• **Gekara** attended the Joint Annual Meeting of American & Canadian Societies of Animal Science held in Louisville, Kentucky, July 14-17, 2021 • **At-Taras** attended the Equity-Minded Teaching Institute. USC Race and Equity Center. April 27, April 29, May 4, May 6, 2021.
2019-2020	• **Gekara** attended the Virtual Annual Meeting and Trade Show of the Western Section of American Society held together with the Joint Annual Meeting of American & Canadian Societies of Animal Science, July 29-23, 2020 • **Gekara** attended the Annual Agricultural Research Institute (ARI) Showcase held at the Kellogg West Conference Center, Cal Poly Pomona, February 7, 2020 • **At-Taras** attended the Annual Agricultural Research Institute (ARI) Showcase held at the Kellogg West Conference Center, Cal Poly Pomona, February 7, 2020 • Shelton Murinda attended the Annual Southern California Conference on Undergraduate Research (SCCUR) 2018. Presented, chaired, or judged some of the sessions. • **Shelton Murinda** attended the Annual ARI Showcase, 2019.
2018-2019	• **Gekara** attended the Joint Annual Meeting of American & Canadian Societies of Animal Science held in Austin, Texas, July 8-11, 2019 • **Gekara** attended and presented at the Western Section of American Society of Animal Science Meeting held in Boise, Idaho, June 11-13, 2019 • Shelton Murinda attended the Annual Southern California Conference on Undergraduate Research (SCCUR) 2018. Presented, chaired, or judged some of the sessions. • **Shelton Murinda** attended the Annual ARI Showcase, 2018. • Shelton Murinda attended the Annual CPP Student RSCA Conference, 2018. • **Shelton Murinda** attended the Annual Agricultural Research Institute (ARI) Principal Investigator Meeting, Sacramento; 2018. • **Shelton Murinda** attended the 99th American Association of Advanced Science (AAAS) Pacific Division Annual Meeting; Organizer/Agriculture Program, and presenter; 2018.
2017-2018	• **Gekara** attended the Joint Annual Meeting of American & Canadian Societies of Animal Science held in Vancouver, British Columbia, July 8-12, 2018 • **Shelton Murinda**, attended and presented at the USDA National Integrated Water Quality program (NIWQP), AFRI Foundational Water Sciences and AFRI-Renewable, Energy, Natural Resources and Environment (RENRE) Foundational Program Annual Project Directors' Meetings, 2017 • **Shelton Murinda** attended the Annual Southern California Conference on Undergraduate Research (SCCUR), 2017. Presented, chaired, or judged some of the sessions. • **Shelton Murinda** attended the Annual ARI Showcase, 2017. • **Shelton Murinda** attended the Annual Agricultural Research Institute (ARI) Principal Investigator Meeting, Sacramento; 2017. • **Shelton Murinda** attended Annual CSU Biotechnology Symposium; 2018. Presenter/CPP campus representative.
2016-2017	• **Gekara** attended the Joint Annual Meeting of American & Canadian Societies of Animal Science held in Baltimore, MD, July 8-12, 2017 • **Shelton Murinda**, attended and presented at the USDA National Integrated Water Quality program (NIWQP), AFRI Foundational Water Sciences and AFRI-Renewable, Energy, Natural Resources and Environment (RENRE) Foundational Program Annual Project Directors' Meetings, 2016 • Shelton Murinda attended the Annual Southern California Conference on Undergraduate Research (SCCUR), 2016. Presented, chaired, or judged some of the sessions. • **Shelton Murinda** attended the Annual ARI Showcase, 2016. • Shelton Murinda attended the Annual CPP Student RSCA Conference, 2016. • **Shelton Murinda** attended the 6th International Conference on Algal Biomass, Biofuels and Bioproducts, 2016. • **Shelton Murinda** attended Annual CSU Biotechnology Symposium; 2017. Presenter/CPP campus representative.

	• **Shelton Murinda** attended the Annual General Meeting of the American Society for Microbiology (ASM), 2016.
2015-2016	• **Shelton Murinda**, attended and presented at the USDA National Integrated Water Quality program (NIWQP), AFRI Foundational Water Sciences and AFRI-Renewable, Energy, Natural Resources and Environment (RENRE) Foundational Program Annual Project Directors' Meetings, 2015 • Shelton Murinda attended the Annual Southern California Conference on Undergraduate Research (SCCUR), 2015. Presented, chaired, or judged some of the sessions. • **Shelton Murinda** attended the Annual ARI Showcase, 2015. • Shelton Murinda attended the Annual CPP Student RSCA Conference, 2015. • **Shelton Murinda** attended Annual CSU Biotechnology Symposium; 2016. Presenter/CPP campus representative. • **Shelton Murinda** attended the Annual General Meeting of the American Society for Microbiology (ASM), 2015.
2014-2015	• Shelton Murinda, attended and presented at the USDA National Integrated Water Quality program (NIWQP), AFRI Foundational Water Sciences and AFRI-Renewable, Energy, Natural Resources and Environment (RENRE) Foundational Program Annual Project Directors' Meetings, 2014. • Shelton Murinda attended the Annual Southern California Conference on Undergraduate Research (SCCUR) 2014. Presented, chaired, or judged some of the sessions. • **Shelton Murinda** attended the Annual ARI Showcase, 2014. • Shelton Murinda attended the Annual CPP Student RSCA Conference, 2014. • **Shelton Murinda** attended the Annual General Meeting of the American Society for Microbiology (ASM), 2014.

Appendix Table 4.2. Grants and Sponsored Projects

AY	
2020-2021	• **Gekara, O.**, and K. Anderson. Enhancing Skills of Underrepresented Students in Feed Manufacturing Technology. Submitted to USDA NIFA-NLGCU, 2020. Project PI. Award amount **= $150,000** • **At-Taras, E.** Indicators of stress and effects on reproductive status and milk production in dairy cattle, 2021. ARI Seed Grant. Project PI. Budget requested = $10, 000. Not Funded. • **At-Taras**, E., **Brundage, C.**, Jellyman, J., Scordato E., and **A. Watson**. System for studying animal behavior remotely. SPICE Classroom Modernization Grant. Project PI. Amount awarded = **$29, 213**. • Kisor, H. and **E. At-Taras**. Effects of Age at Weaning on Salivary Cortisol Levels in Piglets CSUPERB Graduate Student Research Restart Grant. Role: Faculty Advisor. Amount funded= **$7,000**. • Li, Y., **Gekara, O**., **Han, H**., **At-Taras**, **E.** et al. "Zero-Waste" Solution for total utilization of pomegranate pomace. Description: A joint, multi-disciplinary grant effort initiated by departments within the Don B Huntley College of Agriculture in collaboration with Nutraberry®, Washington State. Role: Contributors/Researchers - investigation of pomegranate pomace on health status in beef and dairy cattle. Pom Wonderful Grant. . Budget requested: **$2,000,000. Not Funded**. • Xu Yang, Aaron Fox, **Shelton Murinda,** Gabriel Davidov-Pardo, Pre-harvest Application of Commercial Bacteriophages to Enhance Fresh Produce Safety in Urban Agriculture Settings. Agricultural Research Institute. $55,000. 2021-2022. • **Han, H**., J. Jellyman, E. At-Taras. Wine pomace supplementation in dairy cows. (**Role: PI**) (**Amount: $10,000**) (Agency: USDA ARI) • Aliyazucuiglu, Bhandari, **Han**. Cattle Monitoring and Tracking using UAVs. (**Role: Co-PI**) (**Amount: $20,000**) (Agency: SIRG)
2019-2020	• **Gekara, O.**, G. Barding, Jr., **C. Brundage**, M. Chaichi, and **Hyungchul Han**. Determine the effect of annual grass/legume mixtures on performance of weanling calves, 2019. Submitted to California State University Agricultural Research Institute. Project PI. Award Amount **= $62,780** • Adler-Moore, J., **C. Brundage**, and **O. Gekara**. Liposomal Aspergillus Vaccine Administered by Injection or In Ovo for Prevention of Aspergillosis in Poultry, 2019. Submitted to California State University Agricultural Research Institute. Project Co-PI. Award Amount = **$22,680** • Venkitanarayanan, K., M. Darre, Y. Luo, A. Johnny, A. Fanatico, **O. Gekara**, D. Donoghue, H. Goodwin, A. Donoghue, C. Owens, A. Pascatore, J. Jacob, and K. Arsi. Novel microbubble technology to reduce contamination of poultry products and fresh produce for small and medium veteran farmers, 2019. Submitted to USDA-NIFA-AFRI. Sub Award PI. Award Amount = **$32,527** • **Brundage, C**., O. Mora, **O. Gekara**, Lin, W., and L. Gossage. Using Drone and Geospatial Mapping Technologies to Track and Monitor Movement, Behaviors, and Health of Cattle in a Pasture Setting, 2019. Submitted to California State University Strategic Interdisciplinary Research (SIRG) Grant program. Project Co-PI. Budget **= 25,000. Not Funded.** • SoCal Farm to Table: Experiential Learning and Leadership Development in Direct Marketing, Food Safety, Urban and Community Agriculture. Aaron Fox, Eileen Cullen, **Shelton Murinda,** Xu Yang, David Edens, Stephen Archambault, Isabel Bustamante, Heather Boyd, Rachel Surls. USDA-NIFA-HIS. $250,000. 2020–2024. • **Han, H.,** J. Jellyman. Maternal overnutrition alters ghrelin and growth hormone secretion of offspring in sheep. (**Role: PI**) (**Amount; $15,000**) (Agency: CSSUPERB) • **Han, H**.Teacher Scholar grant* (**Role: PI**) (**Amount: $6,483**) (Agency: Provost's office) • **Han, H**. Development of needless drug delivery system. (**Role: PI**) (**Amount: $5,000**) (Agency: RSCA) • **Han.,** J. Jellyman, E. At-Taras. Wine pomace supplementation in dairy cows. (**Role: PI**) (**Amount: $10,000**) (Agency: USDA ARI) • Aliyazucuiglu, Bhandari, **Han**. Cattle Monitoring and Tracking using UAVs. (**Role: Co-PI**) (**Amount: $20,000**) (Agency: SIRG)

	• **Han, H**., Faculty travel grant. (**Role: PI**) (**Amount: $1,500**) (Agency: CSUPERB) • Jellyman, J., C.M. Brundage, A. Steele, **H. Han**. A Circadian Pathway to Better Beef (**Role: Co-PI**) (**Amount: $50,000**) (Agency: USDA ARI) • **Han. H**. Respiration Chambers for animal gas emission. (**Role: PI**) (**Amount: $25,000**) (Agency: SPICE) • **Han. H**., Equipment grant (Title: Real Time PCR for undergraduate classes) (**Role: PI**) (**Amount: $18,000**) (Agency: Rotary) • **Han**., K Ma., Generation of antibody producing bacteria (**Role: PI**) (**Amount: $5,000**) (Agency: Cal Poly Pomona Project Hatchery)
2018-2019	• **Gekara, O.**, G. Barding, Jr., **C. Brundage**, and M. Chaichi. Enhancing Research Skills of Underrepresented Students: Summer Research Experience. Submitted to USDA NIFA-NLGCU, 2018. Project PI. Award Amount = **$150,000** • Donoghue, D., H. Goodwin, A. Donoghue, J. Burke, **O. Gekara**, S. Jose, A. Fanatico, and M Hale. Beefing Up Livestock, Poultry and Agroforestry Enterprises for Military Veteran Farmers, 2018. Submitted to USDA-NIFA-BFRDP. Budget = $743,963. Sub Award PI. Sub Award Amount **= $15,000** • Venkitanarayanan, K., M. Darre, Y. Luo, A. Johnny, A. Fanatico, **O. Gekara**, D. Donoghue, H. Goodwin, A. Donoghue, C. Owens, A. Pascatore, J. Jacob, and K. Arsi. Novel microbubble technology to reduce contamination of poultry products and fresh produce for small and medium veteran farmers, 2018. Submitted to USDA-NIFA-AFRI. Sub Award Budget **= $32,527. Not Funded.** • **Han.**, J. Jellyman. Maternal obesity during pregnancy programs offspring endocrine regulation of appetite and metabolic physiology*. (**Role: PI**) (**Amount: $659,437**) (Agency: Department of Defense research grant) • **Han. H,** J. Jellyman Active ghrelin concentration in offspring from overfed ewes during early to mid-gestation. (**Role: PI**) (**Amount: $14,980**) (Agency: CSUPERB grant for Research Development Grant Program). • Southerland C., **H. Han**. Wine residue (Cap) supplementation in horse. (**Role: PI**) (**Amount: $9,916**) (Agency: USDA ARI) • **Han. H**., Development of therapeutic agent using probiotics. (**Role: PI**) (**Amount: $500,000**) (Agency: Korea; International collaborative research funding proposal to private investment company) • **Han. H**. Wine pomace supplementation and methane production in sheep. (**Role: Co-PI**) (**Amount: $9,956**) (Agency: USDA ARI) • Jellyman, J, A. Steele, C.M. Brundage, **H. Han**. Improving feed efficiency in beef cattle. (**Role: Co-PI**) (**Amount: $110,250**) (Agency: USDA ARI) • **Han., H**. Generation of fistulated cows. (**Role: PI**) (**Amount: $10,720**) (Agency: SPICE Classroom Renovation grant) • Gekara, O., **Han. H**. *Determine the effect of annual grass/legume mixtures on performance of weanling calves. (**Role: Co-PI**) (**Amount: $62,780**) (Agency: ARI)* • **Han, H**. Professional development award (**Role: PI**) (**Amount: $1,500**) (Agency: College of Agriculture)
2017-2018	• Donoghue, A. M., D. J. Donoghue, C. Owens, K. Arsi, A. Upadhyaya, I. Upadhyaya, T. Vukina, A. C. Fanatico, M. Darre, K. Venkitanarayanan, Y. Luo, **O. Gekara**, A. Pascatore, A. Kollanoor-Johnny, and W. Martin. One-two Punch for Organic Poultry Processing: Knocking Out Foodborne Pathogens with Plant Antimicrobials, 2017. Submitted to USDA NIFA-OREI. PI. Budget = $1,998,748. Sub Award PI. Sub Award Amount **= $50,000** • Food Safety on California Urban Farms: Harnessing biological soil amendment microbial activity without increasing risk of microbial foodborne illness. Eileen Cullen, **Shelton Murinda.** Agriculture Research Institute (ARI). $60,000. 2017-2020.
2016-2017	• **Gekara, O**. Forage annuals as alternatives to hay and concentrate supplements for cattle. Submitted to Cal Poly Pomona President's Scholarship & Creative Activity, 2016. PI. Budget = **$9,970. Not Funded.** • Equipping Quality Urban Agriculture Leaders (EQUAL): Food Safety Training Customized for Urban and Community Food Production Systems. USDA NIFA Food Safety Outreach Pilot Project Program FSMA. Eileen Cullen, Shelton Murinda, Harmit Singh. $60,000 2016-2017.

	• Microalgae for a Synergistic Approach to Agricultural Nutrient Recovery. Shelton Murinda, Marcia Murry, Ali Sharbat, Stephan Osborne. Strategic Interdisciplinary Research Grant (SIRG) $19,833. 2016-2017.
2015-2016	
2014-2015	• Production of Animal Feed from Dairy Waste Nutrients. Shelton Murinda, Trygve Lundquist, Marcia Murry, A. Mark Ibekwe, Gregory Schwartz. CSU System Agriculture Research Institute (ARI). $450,000. 2014-2017. • Algae for conversion of manure to animal feed: Evaluation of advanced nutritional value, toxicity, and zoonotic pathogens. Shelton Murinda, Trygve Lundquist, Marcia Murry Ewers, A. Mark Ibekwe USDA AFRI NIFA. $499,500, 2013-2016. • Rapid Detection of Foodborne Pathogen E. coli 0157:H7 with Tapered Fiber Optic Biosensors within Microfluidic Channels. Ertan Salik, Shelton Murinda, Wei-Jen Lin. Strategic Interdisciplinary Research Grant Program, SIRG. $19,250, 2013-2014. • Provost's Teacher Scholar Program (support for summer grant writing). Can manure nutrients be recycled into microalgae-based animal feeds both safely and affordably? $11,000. 2013-2014.

Appendix Table 4.3. Journal Publications

AY	Manuscripts submitted/published
2020-2021	• Schwartz, G., Ibekwe, A. M., Lundquist, T., **Murinda, S. E**., Murry, M. A. Utilization of Semi-Continuous Algae Culture for the Treatment of Recycled Dairy Lagoon Wash Water. Biochemical Engineering, 2021; doi: 10.2174/2212711907666210622153521. • Abasiofiok Mark Ibekwe, **Shelton Murinda**, Stanley Park, Amarachukwu Obayiuwana, Marcia Murry, Gregory Schwartz, Trygve Lundquist. 2020. Comparative use of Quantitative PCR (qPCR), Droplet Digital PCR (ddPCR), and Recombinase Polymerase Amplification (RPA) in Detection of Shiga Toxin-producing E. coli (STEC) in Environmental Samples. Water. 12, 3507; doi:10.3390/w12123507.
2019-2020	• Bryan, W. B., D. J. Mata, and **O. J. Gekara**. 2019. Manure and Management Affect Grassland Production and Soil Quality in Organic Lamb Production. Agrosyst. Geosci. Environ., 2:190058. doi: 10.2134/age2019.07.0058. • Abasiofiok Mark Ibekwe, **Shelton Murinda.** 2019. Linking Microbial Community Composition in Treated Wastewater with Water Quality in Distribution Systems and Subsequent Health Effects. *Microorganisms*. doi: 10.3390/microorganisms7120660. • **S. E Murinda,** I. Mark Ibekwe, Nora G. Rodriguez*, Karina L. Quiroz*, Alexander P. Mujica*, Kayla Osmon*. 2019. Shiga toxin-producing *Escherichia coli* in mastitis: an international perspective. *Journal of Foodborne Pathogens and Disease*. doi: 10.1089/fpd.2018.2491. • Caldera, E., B Weigel, V. N. Kucharczyk, K. S. Sellins, S. L. Archibeque, J. J. Wagner, **H. Han**, J W. Spears and T. E. Engle. 2019. Trace mineral source influences ruminal distribution of copper and zinc and their binding strength to ruminal digesta. *J. Anim. Sci., 97:1852-1864.* • Velasquez-Munoz, A. Manriquez, D. Paudyal, S, Solano, G., **Han, H.**, Callan, R., Ryan, E.P, Pinedo P. 2019. Effect of a mechanical grooming brush on the behavior and health of recently weaned heifer calves. *BMC Veterinary Research. 12:284.* • Kahng E, **Brundage CM**. 2019. Comparing alternatives to canine rectal thermography at the axillary, auricular and ocular locations. Open Veterinary Journal Vol. 9(4): 301–308. 302 • **Brundage CM**. 2019. Benefits of a Discipline-Specific Undergraduate Research Club. Scholarship and Practice of Undergraduate Research. Vol. 3, Iss. 3, (Spring 2020): 45-46. DOI:10.18833/spur/3/3/4 • Lopez A, **Brundage CM.** 2019. Wound Photobiomodulation Treatment Outcomes in Animal Models. Journal of Veterinary Medicine. Vol. 2019. doi.org/10.1155/2019/6320515 • Watson AH, **Brundage CM**. 2019. Photobiomodulation as an inflammatory therapeutic following dental prophylaxis in canines. Photobiomodulation, Photomedicine and Laser Surgery. 37(5):276-281.doi: 10.1089/photob.2018.4614. • Kwon CJ, **Brundage CM**. 2019. Quantifying body surface temperature differences in canine coat types using infrared thermography. Journal of Thermal Biology. May; 82: 18-22
2018-2019	• Abasiofiok M. Ibekwe, **Shelton E. Murinda.** 2018. Continuous Flow Constructed Wetlands for the Treatment of Swine Waste water. Int. J. Environ. Res. Public Health. 15, 1369; doi:10.3390/ijerph15071369. • Velasquez-Munoz, A. Manriquez, D. Paudyal, S, **Han, H.**, Callan, R., Ryan, E.P, Pinedo P. 2019. Effect of prebiotic supplementation with stabilized rice bran in milk of pre-weaned organic Holstein calves. •
2017-2018	• A. Mark Ibekwe, **Shelton E. Murinda**, Marcia A. Murry, Gregory Schwartz, Trygve Lundquist. 2017. Microbial Community Structures in Algae Cultivation Ponds for Bioconversion of Agricultural Wastes from Livestock Industry for Feed Production. Science of the Total Environment. 580:1185-1196. •
2016-2017	• A. Mark Ibekwe, Jincai Ma, **Shelton E. Murinda**. 2016. Bacterial Community Composition and Structure in an Urban River Impacted by different Pollutant Sources. Science of the Total Environment. 566-567:1176-1185. doi: 10.1016/j.scitotenv.2016.05.168. • A.M Ibekwe, J. Ma, **Shelton Murinda,** and G B Reddy. 2016. Bacterial Community Dynamics in Surface Flow Constructed Wetlands for the Treatment of Swine Waste. Science of the Total Environment. 544:8–76; doi.org/10.1016/j.scitotenv.2015.11.139. • A.M Ibekwe, **Murinda, Shelton,** Reddy, Gudigopura, DebRoy, Chitrita. 2016. Potential

	Pathogens, Antimicrobial Patterns, and Genotypic Diversity of Escherichia coli Isolates in Constructed Wetlands Treating Swine Wastewater. FEMS Microbiology Ecology. doi:10.1093/femsec/fiw006. • Faramarzi, B., Salinger A., Kaneps, A., Nout-Lomas, Y.S., **Greene, H.M**. and Dong, F. Quantitative analysis and development of the foot in Arabian foals from birth to one year of age. Vet Comp Orthop Traumatol. 2017 Nov;30(6):403-412.
2015-2016	• John Miller, Angelica Castaneda, Kun Ho Lee, Martin Sanchez, Adrian Ortiz, Ekrem Almaz, Zuleyha Almaz, **Shelton Murinda**, Wei-Jen Lin, Ertan Salik. 2015. Biconically tapered fiber optic probes for rapid label-free immunoassays. Biosensors. 5:158-171; doi:10.3390/bios5020158. • **Shelton E. Murinda**, Robert F. Roberts, Elaine M. Kunze, and Kamal A. Rashid. 2015. Use of interactive laser-scanning imaging cytometry (ILIC) for real-time cytotoxicity assessment of bacteriocins against cultured mammalian cells. BioProcessing Journal. 13(4): 21-32. http://dx.doi.org/10.12665/J134.Murinda. • Allison L. Fisher, **Holly M. Greene**, Yvette S. Nout-Lomas. Un-conventional Lactate-Guided Conditioning Program Improves Fitness and Alters Muscle Enzyme Activity but not Inflammatory Response in Arabian Horses. *Comparative Exercise Physiology*, 12(4), 183-192, 2016. • Nout-Lomas, Yvette; Page, Krista; Kang, Hyun Gu; **Greene, Holly**. Objective Assessment of Gait in Xylazine-Induced Ataxic Horses. *Eq. Vet. J*, 2016.
2014-2015	• **Shelton E. Murinda**, A. Mark Ibekwe, Syaizul Zulkaffly, Andrew Cruz, Stanley Park, Nur Razak, Farah Md Paudzai, Liana Ab Samad*, Khairul Baquir, Kokilah Muthaiyah, Brenna Santiago, Amirul Rusli, and Sean Balkcom. 2014. Real-time isothermal detection of Shiga toxin-producing *Escherichia coli* using recombinase polymerase amplification. Foodborne Pathogens and Disease. 2014. 11:529-536. • Ashlee A. Hauss, Cortney K. Stablein, Allison L. Fisher, **Holly M. Greene**, and Yvette S. Nout. Validation of the Lactate Plus Lactate Meter in the Horse and Its Use in a Conditioning Program. *J. of Eq. Vet. Sci*. 34:9, 1064-1068, 2014

Appendix Table 4.4. Abstracts for meetings/conferences

AY	Abstracts presented at professional meetings
2020-2021	• Oliver C. Sycip, **Cord M. Brundage**, Mohammad R. Chaichi, **Ondieki J. Gekara**. Performance of hair lambs maintained on stockpiled permanent pasture mixed with Cleome gynandra L. at multiple stocking densities. Joint Annual Meeting of American & Canadian Societies of Animal Science held in Louisville, Kentucky, July 14-17, 2021 • Castellano, L., Mariscal, A., Molina, C., Orta, D., Steaffens, and **E. At-Taras**. Feline behavior. DBH College of Agriculture Virual RSCA Showcase. May 7th, 2021. • Montiel, C., Olive, C., Chen, R., and **E. At-Taras**. Dog behavior and magnetic positioning during defecation. DBH College of Agriculture Virual RSCA Showcase. May 7th, 2021. • Downing, C., Munoz, E., and **E. At-Taras**. Equine behavior. DBH College of Agriculture Virual RSCA Showcase. May 7th, 2021. • Fowler, A., Hameed, Y., Ceron, A., and **E. At-Taras**. What are the birds thinking? DBH College of Agriculture Virual RSCA Showcase. May 7th, 2021. • Chipeco-Rubia. H., **H. Han**. Citamine B12 Supplement effect on Desert Tortoise weight and behavior. Kellogg Honors Conference.
2019-2020	• Sycip, O., J. Davis, J. Pawluk, G. Sun, G. Barding, M. Chaichi, and **O. Gekara**. 2020. Performance of goat kids fed sorghum sudangrass and pearl millet regrowth. Agricultural Research Institute Showcase, Kellogg West Conference Center, Cal Poly Pomona, February 7, 2020 • Larson, K., K. Chan, **O. Gekara**, and G. Barding. 2020. Quantifying flavonoids at different growth stages of the plant *Cleome gynandra*. Agricultural Research Institute Showcase, Kellogg West Conference Center, Cal Poly Pomona, February 7, 2020 • Kisor, H. and **E. At-Taras**. Effects of age at weaning on salivary cortisol levels in pigs. 8th Annual CPP Student RSCA Conference, March 7th, 2020 • Joe McHugh**, Fatimah Ansari*, Amera Kchech*, **Shelton E. Murinda**, Marcia Murry, Gregory Schwartz, Trygve Lundquist, A. Mark Ibekwe. Production of Algae Feeds from Dairy

	Waste. 18th Annual ARI Showcase. Cal Poly Pomona, Pomona, CA. Showcase, February 7, 2020. • **Murinda S,** Murry M, Ibekwe A.M, Lundquist T, Schwartz G. Production of algae animal feed from dairy waste nutrients. ARI PI Meeting, Sacramento, CA. October 25, 2019. • **Murinda S.E,** McHugh J**, Castillo L.M.P*, Kchech A**, Murry M, Schwartz G., Lundquist T., Ibekwe M.A. Production of algae feeds from dairy wastewater. ARI PI Meting, Sacramento, CA. October 25, 2019. • Karina L Quiroz*, Nora G Rodriguez*, **Shelton Murinda**, Mark Ibekwe, Stanley Park. Celebration of Research – Agriculture Student Research, Scholarship & Creative Activities Showcase. College of Agriculture (Cal Poly Pomona, Pomona, CA, March 5, 2019. [Karina & Nora's presentation was awarded First Place Prize]. • Lesly Palacios**, Joe McHugh**, Alona Leka*, Karuel Asada*, Urval Patel*, Imani Cooper*, Gregory Barding, Marcia Ewers, **Shelton E. Murinda**, Amera Kchech**, Mark Ibekwe, Gregory Schwartz, Trygve Lundquist. Community Dynamics, Biochemical Composition and Safety of Microalgae grown in Dairy Manure Wastewaters. Research, Scholarship & Creative Activities (RSCA) Conference. Cal Poly Pomona, Pomona, CA. March 1, 2019. • Ma., K, **H. Han**. Project Hatchery: Molecular Engineering of Antibodies (Spring 2020) • Souterland. C., **H. Han**. Student RSCA Conference Title: Activity, Appetite and growth of market lambs on red wine pomace 8th Annual CPP Student RSCA Conference, March 7th, 2020 • Mora. A., **H. Han**. Student RSCA Conference Title: Changes in horse's fecal microbiota fed a diet incorporated with grape pomace. 8th Annual CPP Student RSCA Conference, March 7th, 202 • Moran. M., **H. Han.** Student RSCA Conference Title: Meat packing plant size and its potential effects on the microbial contamination of raw beef products. 8th Annual CPP Student RSCA Conference, March 7th, 2020 • Atamian. S., **H. Han**. Capstone Project presentation. Title: Environmental and Cellular Responses to Aging.(Spring 2020) • Holznecht N, **Brundage CM**, Adler-Moore J. 2019. Establishing a Pulmonary Aspergillosis Model in SPF Chickens. Poultry Science Association 2019 Annual Meeting. Abstract 3214890 • Smith B, Brito K, Daniels A, Diaz M, Dinh T, Fuerte A, Ocampo M, Perez A, Trinh A, Velazquez E, Vasquez D, Jellyman J, Steele A, **Brundage CM**. 2019. Effects of Time-Restricted Feeding on Activity Patterns and Growth in Steers. 14th Annual College of Science Research Symposium, Cal Poly Pomona. Abstract: 45 • Bharadwaj G, Velazquez E, Nguyen H, Mendoza M, **Brundage CM**, Steele A, Jellyman J. 2019. Tri-axial accelerometers for quantification of activity levels in calves. 14th Annual College of Science Research Symposium, Cal Poly Pomona. Abstract: 1 • **Brundage, CM**, Philips J, Barrantes, G. 2019. Interpersonal Oral Communication: Assessment of Student Outcomes. WSCUC's 2019 Academic Resource Conference: Presentation #118 • **Brundage, CM**, Watson AH, Kwon, C. 2019. Incorporating Ultrasonography into the Health Science Classroom. FASEB Journal: 6165 • Kwon, C, **Brundage, CM**. 2019. Determining Changes in Thermal Patterns in Canines based on Coat Type using Infrared Thermographic Imaging. FASEB Journal: 6509 • Watson, AH, **Brundage, CM**. 2019. Effect of Photobiomodulation on Erythema and Edema following Dental Prophylaxis in Dogs. FASEB Journal: 6023 • Ravel, M, **Brundage, CM**. 2019. An Economic Approach to Wound Healing Using Honey Products. 7th Cal Poly Pomona Student Research, Scholarship & Creative Activities Conference. Poster #64 • Christensen, R, Taylor, A, **Brundage, CM**. 2019. An Analysis of Various Equine Gaits to Determine How a Discipline for Horses Can Be Selected. 7th Cal Poly Pomona Student Research, Scholarship & Creative Activities Conference. Poster #65 • Foyil, B, **Brundage, CM**. 2019. Optimizing swine Ovugel (triptorelin) ovulation synchronization with supplemental isotonic sodium chloride solution. 7th Cal Poly Pomona Student Research, Scholarship & Creative Activities Conference. Poster #12 • Lopez, A, **Brundage, CM**. 2019. Low- Level-Laser Therapy in a Mouse Incisional Wound Model. 7th American society. Poster #63

	• Markson, JT, Ancona, JA, **Brundage, CM**. 2019. Evaluating the effect of a temperature on egg hatchability in a BSL-2 poultry facility. 7th Cal Poly Pomona Student Research, Scholarship & Creative Activities Conference. Poster #19 • Bechtol, KN, **Brundage, CM**. 2019. Characterizing immunologic response to 5mg/kg and 8mg/kg IM SID dosing of Dexamethasone SP in Aspergillus infected broiler chickens. 7th Cal Poly Pomona Student Research, Scholarship & Creative Activities Conference. Poster #21 • Bharadwaj, G, Velazquez, E, Nguyen, H, Mendoza, M, **Brundage, CM**, Steele, A, Jellyman, J. 2019. 3-axial accelerometers for quantification of activity levels in calves. 7th Cal Poly Pomona Student Research, Scholarship & Creative Activities Conference. Poster #26 • Lackey, K.M., **Greene, H.M**., Brundage, C.M. Comparing the effect of in-vitro versus in-vivo fertilization on horse (*Equus ferus caballus*) gestation lengths. Creative Activities& Research symposium, Cal Poly Pomona, August 2019.
2018-2019	• Garcia, K., J. Davis, J. Pawluk, R. Smith, A. Solis, M. Chaichi, and **O. J. Gekara.** 2019. Performance of lambs fed sorghum mature sudangrass or pearl millet mixed with cowpea. Western Section of American Association of Animal Science Meeting, Boise, Idaho, June 11-13, 2019 • Karuel Osada*, Lesly Palacios**, Urval Patel*, Alona Leka*, Gregory Barding, Marcia Ewers, **Shelton E. Murinda**, Joe McHugh**, Amera Kchech*, Mark Ibekwe, and Gregory Schwartz. Community Dynamics, Biochemical Composition and Safety of Microalgae grown in Dairy Manure Wastewaters. 2018 Southern California Conferences for Undergraduate Research. Nov. 17, 2018, Pasadena City College, CA. • Karina L Quiroz*, Nora G Rodriguez*, **Shelton Murinda**, Mark Ibekwe, Stanley Park. Determination of the Water Quality of a Constructed Wetland Monitoring Fecal Indicator Bacteria. 2018 Southern California Conferences for Undergraduate Research. Nov. 17, 2018, Pasadena City College, CA. • Lesly Palacios**, Amera Kchech**, Gregory Barding, Marcia Murry, Shelton Murinda, A. Mark Ibekwe, Gregory Schwartz, Trygve Lundquist. Determining Proximate Composition of Algae Biomass to Assess Nutritional Value and Safety. 8th Algal Biomass, Biofuels and Bioproducts Conference, Seattle, Washington. June 11-13, 2018. • Lesly Palacios**, Amera Kchech**, Gregory Barding, Marcia Murry, **Shelton Murinda**, A. Mark Ibekwe, Gregory Schwartz, Trygve Lundquist. Determining Proximate Composition of Algae Biomass to Assess Nutritional Value and Safety 7th Algal Biomass, Biofuels and Bioproducts Conference, Seattle, Washington. June, 2018. • Park, Stanley, A. Mark Ibekwe, **Shelton E. Murinda**. Quantification of E. coli O157 in Environmental Samples using Recombinase Polymerase Amplification and Quantitative PCR followed by Droplet Digital PCR. 99th Annual Meeting, American Association of Advanced Science, AAAS, Pacific Division, Cal Poly Pomona, June 12-15, 2018. • Ibekwe, A. Mark, **Shelton E Murinda**. Water Quality and Food Safety: Co-management Approach. 99th Annual Meeting, American Association of Advanced Science, AAAS, Pacific Division, Cal Poly Pomona, June 12-15, 2018. • **Murinda, Shelton** E., A. Mark Ibekwe. Application of Recombinase Polymerase Amplification to Enhance Food Safety. 99th Annual Meeting, American Association of Advanced Science, AAAS, Pacific Division, Cal Poly Pomona, June 12-15, 2018. • Patricia Galvan*, PI: Dr. **Shelton Murinda**. Determination of the Prevalence of Major Mastitis-Causing Pathogens in California Dairy Farms Using Polymerase Chain Reaction (PCR). 6th Annual Cal Poly Pomona Student Research, Scholarship & Creative Activities (RSCA) Conference. Cal Poly Pomona, Pomona, CA. March 2, 2018. • Leo Little Dog*, PI: Dr. **Shelton Murinda.** Recombinase Polymerase Amplification for Rapid, Real-Time, Isothermal Detection of Shiga-Toxin Producing E. coli at Point-of-Care. 6th Annual Cal Poly Pomona Student Research, Scholarship & Creative Activities (RSCA) Conference. Cal Poly Pomona, Pomona, CA. March 2, 2018. • **Murinda, Shelton** E, Marcia Murry, A. Mark Ibekwe, Gregory Schwartz, Trygve Lundquist. Algae for conversion of manure nutrients to animal feed: Evaluation of advanced nutritional value, toxicity, and zoonotic pathogens. USDA-NIFA NIWQP and AFRI Project Directors' Annual Meeting. Jan 29-31, 2018. Washington, DC. • Student RSCA Conference. Title: Probiotics in the equine diet; Hindgut health and colic prevention. (Spring 2019) • Watson, AH, **Brundage, CM**. 2019. Therapeutic Effect of Photobiomodulation Therapy in Canines Following Dental Prophylaxis. 31st Annual CSU Biotechnology Symposium.

	• Markson JT, Ancona, JA, Bechtol, KN, **Brundage CM**. 2018. Evaluating the effect of a cooling period on egg hatchability in a BSL-2 poultry facility. Southern California Conferences for Undergraduate Research. Poster #1.2 • Chacon CM, **Brundage CM**. 2018. Percent Accuracy of Vent Sexing and Wing Sexing Chicks. Southern California Conferences for Undergraduate Research. Poster #2.1 • Barker, N, **Brundage, CM**. 2018. Bioimpediance technology: Use and repeatability in canines. Southern California Conferences for Undergraduate Research. Poster #14.1 • Pontes, H, Denny, N, **Brundage CM**. 2018. Hypochlorous Acid Solution Treatment for Wound Healing. Southern California Conferences for Undergraduate Research. Poster #19.1 • Ngo, I, Davis, J, **Brundage, CM**. 2018. Arabian horse foal information as a bioassay for environmental and husbandry changes. Southern California Conferences for Undergraduate Research. Poster #21.2 • Youngquist, T, **Brundage, CM.** 2018. Inflammation and Wound Healing Following Hypochlorous Acid Treatment in Post-Surgical Canine Patients. Southern California Conferences for Undergraduate Research. Poster #29.2 • Chang, R, Kwon, C, **Brundage, CM**. 2018. Thermographic Image Evaluation of Canine Limbs. Southern California Conferences for Undergraduate Research. Poster # 31.2 • **Brundage CM.** 2018. Stop tail chasing: Using assessment in the design of GE and degree program courses. Cal Poly Pomona 2018 Fall Conference: Stories of Successful Learning • Markson J, Tessler C, **Brundage CM**. 2018. Establishing chicken egg incubation protocol for a new vaccine testing facility. 4th Annual Creative Activities and Research Symposium. Bio & AG Science. • Kwon C, Chang RJ, **Brundage CM**. 2018. Thermographic evaluation of Canine torso thermal patterns. 4th Annual Creative Activities and Research Symposium. Bio & AG Science. • Chang RJ, Kwon C, **Brundage CM**. 2018. Thermographic image evaluation of Canine limbs. 4th Annual Creative Activities and Research Symposium. Bio & AG Science. • Watson AH, **Brundage CM**. 2018. Influence of Age on the Therapeutic Effects of Photobiomodulation following Canine Dental Prophylaxis. 4th Annual Creative Activities and Research Symposium. Bio & AG Science. • Kwon C, Chang R, **Brundage CM**. 2018. Thermographic evaluation of Canine torso thermal patterns. 4th Annual Creative Activities and Research Symposium. Bio & AG Science. • **Brundage CM**. 2018. Including Ultrasonography in Physiology Instruction. Physiology Majors Interest Group 2018 Conference. • Watson AH, **Brundage CM**. 2018. Influence of Gender and Size on the Efficacy of Low-Level-Laser Therapy following Canine Dental Prophylaxis. 99th AAAS Pacific Division Annual Meeting • Kwon C, **Brundage CM**. 2018. Humidity level effect on surface temperature using infrared thermography in a canine model. 99th AAAS Pacific Division Annual Meeting • Pontes H, Denny N, **Brundage CM**. 2018. Use of pig-ear-notching to evaluate the external microenvironment of acute wounds using hypochlorous acid. 13th Annual College of Science Research Symposium, Cal Poly Pomona • Ngo I, **Brundage CM**. 2018. Impact of temperature and precipitation on Arabian foal development. 45th Western Regional Honors Council Conference, Science Poster • Lewis D, Gilli-Elewy H, **Brundage CM**, Shah-Fairbank S. 2018 Assessment Initiatives at Cal Poly Pomona. 22nd Annual Assessment Conference, Mihaylo College of Business and Economics. California State University Fullerton • **Brundage CM**. 2018. Planting seeds and cultivating: Growing a culture of assessment in a college of agriculture. 22nd Annual Assessment Conference, Mihaylo College of Business and Economics. California State University Fullerton • **Brundage CM**. 2018. Cats and dogs: Finding balance in GE and degree courses with the help of assessment. 20th CSU symposium on University Teaching #4 • Eliel A, **Brundage CM**. 2018. Economical silicone alternative for veterinary surgery practice. 6th Cal Poly Pomona Student Research, Scholarship & Creative Activities Conference. Biological & Agricultural Sciences #21 • Watson AH, **Brundage CM**. 2018. Effects of photobiomodulation on post-operative dental healing in canines. 6th Cal Poly Pomona Student Research, Scholarship & Creative Activities Conference. Biological & Agricultural Sciences #22 • Horgan A, **Brundage CM**. 2018. Doctorate programs: A comparison of veterinary school with optometry school from a prospective student's view. 6th Cal Poly Pomona Student

	Research, Scholarship & Creative Activities Conference. Biological & Agricultural Sciences #23 • Nelson C, Zhgun T, **Brundage CM**. 2018. Circadian and anticipatory feed behavior in domestic sheep (*Ovis aries*). 6th Cal Poly Pomona Student Research, Scholarship & Creative Activities Conference. Biological & Agricultural Sciences #24 • Kwon C, **Brundage CM**. 2018. Evaluating expected temperature interval ranges in healthy canines. 6th Cal Poly Pomona Student Research, Scholarship & Creative Activities Conference. Biological & Agricultural Sciences #25 • Biligiri D, Watson AH, **Brundage CM**. 2018. Is your best friend too old for laser treatment? 6th Cal Poly Pomona Student Research, Scholarship & Creative Activities Conference. Biological & Agricultural Sciences #26 • Pontes H, Denny N, **Brundage CM**. 2018. Use of pig-ear-notching to evaluate the wound treatment effects of hypochlorous acid. 6th Cal Poly Pomona Student Research, Scholarship & Creative Activities Conference. Biological & Agricultural Sciences # 27 • Castellanos J, Olvera C, Ramirez J, Ramirez R, **Brundage CM**. 2018. Monitoring for anthelmintic resistance in horses using the modified McMaster egg-count technique. 6th Cal Poly Pomona Student Research, Scholarship & Creative Activities Conference. Biological & Agricultural Sciences #28 • Duveneck M, Malinchak L, Ramirez R, Christensen, **Brundage CM**. 2018. Skeletal Anatomic Reconstructionists. 6th Cal Poly Pomona Student Research, Scholarship & Creative Activities Conference. Biological & Agricultural Sciences # 29 • Clock B, Watson AH, **Brundage CM**. 2018. Laser photomodulation decreases the likelihood of wound dehiscence in laboratory mice. 6th Cal Poly Pomona Student Research, Scholarship & Creative Activities Conference. Biological & Agricultural Sciences #30 • Glore S, Kelley B, Sanchez E, **Brundage CM**. 2018. Development and execution of a veterinary medical massage training workshop. 6th Cal Poly Pomona Student Research, Scholarship & Creative Activities Conference. Health, Nutrition & Clinical Sciences #37 • Jin Y, Fukushima C, **Brundage CM**. 2018. Pre-clinical Assessment of treatment side effects from trazodone HCL in Rabbits. 6th Cal Poly Pomona Student Research, Scholarship & Creative Activities Conference. Health, Nutrition & Clinical Sciences #38 • Pontes H, Tran A, **Brundage CM**. 2018. Commercial tri-axial accelerometry: An economic innovation for monitoring animal activity. 30th Annual CSU Biotechnology Symposium. • Kuhlman KC, Fukushima CM, **Brundage CM.** 2018. Trazodone HCl provides sedation and improves handling in rabbits (*Oryctolagus cuniculus*). 30th Annual CSU Biotechnology Symposium.
2017-2018	• **Gekara, O. J.**, J. Onyilagha, and G. Wangila. 2017. Performance of goat kids suckling does fed supplement at different times. J. Anim. Sci. Vol 95 (E-Suppl. 4):335-336 • Joe McHugh**, Fatimah Ansari*, Amera Kchech*, **Shelton E. Murinda**, Marcia Murry, Gregory Schwartz, Trygve Lundquist, A. Mark Ibekwe. Production of Algae Feeds from Dairy Waste. 17th Annual ARI Showcase. Cal Poly Pomona, Pomona, CA. December 1, 2017. • Fatimah Ansari* Joe McHugh**, Amera Kchech*, **Shelton E. Murinda**, Marcia Murry, Gregory Schwartz, Trygve Lundquist, A. Mark Ibekwe. Universal Detection of Cyanobacteria and Their Toxins Using PCR for Safe Algae-based Feed Production. 17th Annual ARI Showcase. Cal Poly Pomona, Pomona, CA. December 1, 2017. • Joe McHugh**, Isis Janikarn-Urena*, Natalie Eugenio*, Amera Kchech**, **Shelton E. Murinda**, Gregory Schwartz, Marcia Murry, Mark Ibekwe, Trygve Lundquist. Production of Algae Feeds from Dairy Waste. Inaugural Annual Agricultural Research Institute (ARI) Principal Investigator Meeting. Sacramento, CA. September 7, 2017. • Marcia A. Murry, Lesly M. Palacios Castillo*, Kristen M. Bush*, Alejandra Avila*, Greg Barding, **Shelton Murinda**. Proximate Composition of Algae Biomass to Access Nutritional Value as a Feed Supplement. Southern California Conference for Undergraduate Research (SCCUR). California State Polytechnic University, Pomona. November 18, 2017. • Fatimah Ansari*, Joe McHugh**, Amera Kchech, **Shelton E. Murinda**, Marcia Murry, Gregory Schwartz, Trygve Lundquist, Mark Ibekwe. Universal Detection of Cyanobacteria and Their Toxins Using PCR for Safe Algae-based Feed Production. Southern California Conference for Undergraduate Research (SCCUR). Cal Poly Pomona, CA. November 18, 2017. • Patricia Galvan*, **Shelton Murinda**, Leo Little Dog*. Determination of the Prevalence of Major Mastitis-Causing Pathogens in California Dairy Farms Using Polymerase Chain Reaction (PCR). Southern California Conference for Undergraduate Research (SCCUR).

	California State Polytechnic University, Pomona. November 18, 2017. • Vu Luu*, Rebecca Rosas*, Michelle Douglas*, Broc Sandelin, **Shelton Murinda**. Monitoring of Pathogenic E. coli on Petting Zoo Animals at California State University Polytechnic – Pomona. Southern California Conference for Undergraduate Research (SCCUR). California State Polytechnic University, Pomona. November 18, 2017.
2016-2017	• Kirk, J., R. Lawrence, **O. Gekara**, J. Onyilagha, and U. Adamu. 2016. Determine nutritional and anti-parasitic benefits of *Cleome gynandra* for goats. J. Anim. Sci. Vol. 94 (E-Suppl. 2):198-199. • Patricia Galvan*, Nyles Peterson, Henry Siegel, **Shelton Murinda**. Use of PCR for Detection of Mastitis-Causing Pathogens Isolated from Bovine Quarter Milk Samples. Southern California Conference for Undergraduate Research (SCCUR). UC Riverside, CA. November 12, 2016. • Janilkarn-Urena, I. *, N. Eulogio, M.A. Murry, **S.E. Murinda**, A.M. Ibekwe, G. Schwartz, T. Lundquist. Bioprocess Engineering of Native Algae Strains to Optimize Bioremediation coupled to Feed Production. Southern California Conference for Undergraduate Research (SCCUR). UC Riverside, CA. November 12, 2016. • Joe McHugh**, **Shelton E. Murinda**, Gregory Schwartz, Marcia Murry, A. Mark Ibekwe, Trygve Lundquist. Production of Algae Feeds from Dairy Waste. 16th Annual ARI Showcase. Cal Poly Pomona, Pomona, CA. November 3, 2016. (ORAL) • Sharon Wu*, Joe McHugh**, Alyssa Sancio*, Isis Janilkarn-Urena*, Natalie Eulogio*, Amera Kchech*, **Shelton E. Murinda**, Gregory Schwartz, Marcia Murry, A. Mark Ibekwe, Trygve Lundquist. Production of Algae Feeds from Dairy Waste. 16th Annual ARI Showcase. Cal Poly Pomona, Pomona, CA. November 3, 2016. • Janilkarn-Urena, I. *, N. Eulogio*, M.A. Murry, **S.E. Murinda**, A.M. Ibekwe, G. Schwartz, T. Lundquist. Bioconversion of agricultural wastes from the livestock industry for biofuel and feed production. 1st International Conference: Bioresource Technology for Bioenergy, Bioproducts and Environmental Sustainability. Sitges, Spain. October 23-26, 2016. • Patricia Galvan*, **Shelton Murinda**. Use of PCR for Detection of Mastitis-Causing Pathogens Isolated from Bovine Quarter Milk Samples. Creative Activities Research Symposium. Cal Poly Pomona, Pomona, CA. August 17, 2016. • **Shelton Murinda**, Marcia Murry, Gregory Schwartz, Trygve Lundquist, A. Mark Ibekwe. Algae for Conversion of Manure Nutrients to Animal Feed: Evaluation of advanced nutritional value, • toxicity, and zoonotic pathogens. 2016 Agriculture and Food Research Initiative/National Integrated Water Quality Annual Project Directors Meeting. Washington DC. October 12-13, 2016. • J. McHugh**, A. Sancio, **S.E. Murinda,** G. Schwartz, M. Murry, A.M. Ibekwe, T. Lundquist. Detection of cyanobacteria and their toxins for safe algae-based feed production. The 6th International Conference on Algal Biomass, Biofuels and Bioproducts. 26 - 29 June, 2016. Paradise Point, San Diego. CA. • W. Shires*, S. Atmadja*, G. Schwartz, **S. Murinda**, M. Murry, A.M. Ibekwe, T. Lundquist. Algae for conversion of manure nutrients to animal feed: Development of an algae production model. The 6th International Conference on Algal Biomass, Biofuels and Bioproducts. 26 - 29 June, 2016. • Paradise Point, San Diego, CA. • I. Janilkarn-Urena*, N. Eugenio, M.A. Murry, **S.E. Murinda**, A.M. Ibekwe, G. Schwartz, T. Lundquist. Bioprocess Engineering of Native Algae Strains to Optimize Bioremediation coupled to Feed Production. The 6th International Conference on Algal Biomass, Biofuels and Bioproducts. 26 - 29 June, 2016. Paradise Point, San Diego, CA. • A. M. Ibekwe, **S. Murinda**, M. Murry, G. Schwartz, T. Lundquist. Cyanobacterial and Microalgae Community Structures in Algae. Cultivation Reactors for Biofuel Production. The 6th International Conference on Algal Biomass, Biofuels and Bioproducts. 26 - 29 June, 2016. Paradise Point, San Diego, CA. • A. Mark Ibekwe, Jincai Ma, **Shelton E. Murinda**. Bacterial Community Composition and Structure in an Urban River Impacted by Different Pollutant Sources. 115th Annual General Meeting of the American Society for Microbiology. June 16–20, 2016. Boston, MA. • Sharon Wu*, Joseph McHugh*, Alyssa Sancio*, **Shelton E. Murinda**, Gregory Schwartz, Marcia Murry, A. Mark Ibekwe, Trygve Lundquist. Detection of cyanobacteria and their toxins for safe algae-based feed production. May 27, 2016. College of Science Symposium Cal Poly Pomona, CA. • Joseph McHugh**, Alyssa Sancio*, **Shelton E. Murinda**, Gregory Schwartz, Marcia

	Murry, A. Mark Ibekwe, Trygve Lundquist. Detection of cyanobacteria and their toxins for safe algae-based feed production. American Society for Engineering Education PSW Conference. April 21-23, 2016. Cal Poly Pomona, CA. • Christian Garrido*, Angela Liu*, Adrian Ortiz*, Renault Ong*. Faculty Mentor: Dr. Ertan Salik, Dr. Shelton Murinda, and Dr. Wei-Jen Lin. Development of fiber optic biosensors for rapid detection of methicillin-resistant Staphylococcus aureus. 4th Annual CPP Student RSCA Conference, March 4, 2016, Cal Poly Pomona, CA. • Alyssa Sancio*, Sharon Wu*, Yash Patel*. Faculty Mentor: Dr. **Shelton Murinda**. Universal Detection of Cyanobacteria and Their Toxins Using PCR for Safe Algae-based Feed Production. 4th Annual CPP Student RSCA Conference. March 4, 2016, Cal Poly Pomona, CA. • Natalie Eulogio*, Isis Janilkarn-Urena*. Faculty Mentor: Dr. Marcia Murry-Ewers, Dr. **Shelton Murinda.** Characterization of Native Microalgae for Bioremediation coupled to Feed Production. March 4, 2016, Cal Poly Pomona, CA. • Patricia Galvan*, Leanna Little Dog*, Anthony Chew*. Faculty Mentor: Dr. **Shelton Murinda**. Use of PCR for Detection of Mastitis-Causing Pathogens Isolated from Bovine Quarter Milk Samples. March 4, 2016, Cal Poly Pomona, CA. • Joe McHugh**, Alyssa Sancio*, Natalie Eugenio*, **Shelton E. Murinda**, Gregory Schwartz, Marcia Murry, Mark Ibekwe, Trygve Lundquist. Universal Detection of Cyanobacteria and Their Toxins Using PCR. 28th Annual CSU Biotechnology Symposium. California State University Program on Education and Research in Biotechnology (CSUPERB). January 7-9, 2016. Garden Grove, CA. • Kwon C, **Brundage CM.** 2017. Canine thermography. Center for Applied Biotechnology Studies Convention (CABSCon2) #09 • Watson AH, **Brundage CM.** 2017. Therapeutic value of photobiomodulation. Center for Applied Biotechnology Studies Convention (CABSCon2) #23 • Kelley B, Glore S, Jung H, Orrick S, Sanchez E, Tao C, Wagstaff T, **Brundage CM**. 2017. Observing the sensitivity of topical *Melaleuca alternifolia* on the epidermis of swine. Southern California Conferences for Undergraduate Research. Poster #2.39 • Clock B, Watson AH, **Brundage CM**. 2017. Assessing the efficacy of laser photomodulation in laboratory mice wound healing. Southern California Conferences for Undergraduate Research. Poster #2.61 • Ngo I, **Brundage CM**. 2017. Impact of temperature and precipitation on Arabian foal development. Southern California Conferences for Undergraduate Research. Poster #2.71 • Munoz M, Osorio B, Rodriguez A, **Brundage CM**. 2017. Dermestid Beetles. Southern California Conferences for Undergraduate Research. Poster #2.84 • Kuhlman KC, Jin Y, Fukushima C, **Brundage CM**. 2017. Trazodone Hydrochloride improves laboratory rabbit tractability. Southern California Conferences for Undergraduate Research. Poster #3.48 • Ngo IM, **Brundage CM**. 2017. Comparing the gestation length and birth size of Cal Poly Pomona Arabian foals (2012 vs. 2017). 3rd Annual Creative Activities and Research Symposium. Bio & AG Science #1. • Pontes H, **Brundage CM**. 2017. Classifying *Ovis aries* behavior with a tri-axial accelerometer. 3rd Annual Creative Activities and Research Symposium. Bio & AG Science #2. • Tran A, **Brundage CM**. 2017. Interpreting accelerometry data: Assessing the limitations of utilizing a "FitBark" device in animal science research. 3rd Annual Creative Activities and Research Symposium. Bio & AG Science #3. • Fukushima CM, Kuhlman KC, Tessler C, Jin Y, Alderson J, **Brundage CM.** 2017. Trazadone hydrochloride improves laboratory rabbit handling. 5th Cal Poly Pomona Student Research, Scholarship & Creative Activities Conference. UL #2907 • Yamamoto A, Kuhlman KC, Fukushima CM, Tessler C, Jin Y, Alderson J, **Brundage CM.** 2017. Perceptions of rabbit behavior during handling varies with veterinary experience. 5th Cal Poly Pomona Student Research, Scholarship & Creative Activities Conference.UM #230
2015-2016	• Patricia Galvan*, William Chiu*, Brian Huie*, Jerrick Joya*, Nyles Peterson, Henry Siegel, **Shelton Murinda**. Detection of Bovine Mastitis Using Pathogen Specific PCR. Southern California Conference for Undergraduate Research (SCCUR). Harvey Mudd College, Claremont, CA. November 21, 2015. • Christian Garrido*, Angela Liu*, Adrian Ortiz*, Renault Ong*, Matthew Fonda*, **Shelton Murinda**, Wei-Jen Lin, and Ertan Salik. Development of fiber optic biosensors for rapid

detection of Methicillin-Resistant Staphylococcus aureus Southern California Conference for Undergraduate Research (SCCUR). Harvey Mudd College, Claremont, CA. November 21, 2015.

- April Aquino*, **Shelton Murinda**. Antibiotic Sensitivity of Bacterial Pathogens Isolated from Bovine Mastitis Milk. Southern California Conference for Undergraduate Research (SCCUR). Harvey Mudd College, Claremont, CA. November 21, 2015.
- Alyssa Sancio*, Joseph McHugh**, **Shelton E. Murinda**, Gregory Schwartz, Marcia Murry, A. Mark Ibekwe. Production of Safe Algae Animal Feed from Dairy Waste Nutrients: Cyanobacteria and Cyanotoxin Detection. Southern California Conference for Undergraduate Research (SCCUR). Harvey Mudd College, Claremont, CA. November 21, 2015.
- Joseph McHugh**, Alyssa Sancio*, **Shelton E. Murinda**, Gregory Schwartz, Marcia Murry, A. Mark Ibekwe, Trygve Lundquist. Production of Algae Feeds from Dairy Waste. 16th Annual ARI Showcase. Cal Poly Pomona, Pomona, CA. November 7, 2015. 15th Annual ARI Showcase. Cal Poly Pomona, CA.
- **Shelton Murinda**. Real-time Isothermal Detection of Shiga Toxin-producing E. coli (STEC) Using Recombinase Polymerase Amplification (RPA). Schmid College of Science and Technology Science Forum Series. Chapman University, Orange, CA. November 4, 2015. (Invited Lecture).
- **Shelton Murinda**, Marcia Murry, A. Mark Ibekwe, Gregory Schwartz. Algae for conversion of manure nutrients to animal feed: Evaluation of advanced nutritional value, toxicity, and zoonotic pathogens. USDA National Institute of Food and Agriculture National Integrated Water Quality, and Agricultural and Food Research Initiative (USDA-NIFA NIWQP and AFRI) Annual Project Directors' Meeting. July 28-29, 2015. Greensboro.
- April Aquino* (Animal Science, Senior). Faculty Mentor: Dr. **Shelton E. Murinda**. Antibiotic Sensitivity of Bacterial Pathogens Isolated from Bovine Mastitis Samples. 16th Annual Ronald McNair Scholar Undergraduate Summer Research Symposium. Cal Poly Pomona. June 5, 2015.
- Christian Garrido* (Biotechnology, Senior). Faculty Mentors: Dr. Ertan Salik and Dr. Shelton Murinda. Rapid detection of Methicillin-Resistant Staphylococcus aureus using genetically immobilized fiber optic biosensors. 16th Annual Ronald McNair Scholar Undergraduate Summer Research Symposium. Cal Poly Pomona. June 5, 2015.
- Mark Ibekwe, **Shelton Murinda**, Marcia Murry, Gregory Schwartz, Trygve Lundquist. Impact of Different DNA Extraction Methods on Total Bacterial and Cyanobacterial Community Structure in Algae Cultivation Reactors. 115th Annual General Meeting of the American Society for Microbiology. New Orleans. May 30 - June 2, 2015.
- Joseph M. McHugh**, Alyssa Sancio*, Kailynne Atkinson*, Jaclyn Gonzalez*, **Shelton E. Murinda**, Gregory Schwartz, Marcia Murry, Mark Ibekwe, Trygve Lundquist. Universal Detection of Cyanobacteria and Their Toxins Using PCR/qPCR. 10th Annual Research Symposium, College of Science, Cal Poly Pomona, Pomona, CA. May 29, 2015.
- John Miller*, Angelica Castaneda*, Kun Ho Lee*, Martin Sanchez*, **Shelton Murinda**, Wei-Jen Lin, and Ertan Salik. 2014. Biconically tapered fiber optic dip probe for rapid label-free immunoassays. Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications XIV (Israel Gannot, ed.) Proceedings of SPIE (International Society for Optics and Photonics) 8938:893815-1— 893815-7.
- April Aquino* (Animal Science, Senior). Faculty Mentor: Dr. **Shelton E. Murinda**. Antibiotic Sensitivity of Bacterial Pathogens Isolated From Bovine Mastitis Samples. 3rd Cal Poly Pomona Student Research Conference. March 6, 2015, Cal Poly Pomona, Pomona, CA.
- Christian Garrido*, Adrian Ortiz*, Martin Sanchez*, and Matthew Fonda* (Biotechnology, Senior). Faculty Mentors: Dr. Ertan Salik and Dr. **Shelton Murinda**. Rapid detection of Methicillin-Resistant Staphylococcus aureus using genetically immobilized fiber optic biosensors. 3rd Cal Poly Pomona Student Research Conference. March 6, 2015, Cal Poly Pomona, Pomona, CA.
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Appendix Table 4.5. Book/Book Chapter

2020-2019	• Marcia A. Murry, **Shelton E. Murinda**, SuTing Huang**, A. Mark Ibekwe, Gregory Schwartz, Trygve Lundquist. 2019. Chapter 12. Bioconversion of agricultural wastes from the livestock industry for biofuel and feed production. In: Advanced Bioprocessing for Alternative Fuels, Biobased Chemicals, and Bioproducts: Technologies and Approaches for Scale-Up and Commercialization. (M. Hosseini, Ed.) Woodhead Publishing Series in Energy. Elsevier Inc., Frisco, CO, USA. p225-247. https://doi.org/10.1016/B978-0-12-817941-3.00012-7
	• Cord Brundage. Animal Anatomy and Physiology Laboratory Manual, Kendall Hunt Publishing Company, Jun 12, 2019;156 pages. • Singh, Harmit and **Holly M. Greene**. Food Safety Reforms in the United States: The Food Safety Modernization Act. Food Safety and Protection. CRC Press/Taylor & Francis Group, 2017, Eds: V Ravishanker Rai and Jumuna A Bai

**MS student; *undergrad student

Appendix 5 – Assessment plan

Appendix Table 5.1. Overall assessment plan

Overall Assessment Plan for B.S. Animal and Veterinary Science

Program learning Goals/Outcomes	**Student Learning Outcomes(SLOs)**	**Courses where each SLO is assessed.**	**Evidence:** Assessment activity (signature assignment) used to measure each SLO.	**Criteria:** Assessment tool used to measure outcome success	**Benchmark/Goal:** How assessment data will be reported as evidence SLO performance criteria have been met	**Designated personnel** to collect, analyze, and interpret student learning outcome data for the program	**Schedule** for SLO data dissemination	**Closing the loop strategies**
PLO 1	*SLO1. Students will apply conceptual and technical knowledge of domestic animals (e.g. animal health, animal physiology, animal nutrition, animal genetics, and use of biotechnology) to solve animal science problems. (PLO 1)*	AVS 1112, 1113, 1114L, 1115L, 2101, 2211, 3305, 3311, 3327, 3333, 3350, 4214, 34402, 4430, 4610	Capstone Assessment Examination	Student performance on each question and by subject area Student survey	75% will meet or exceed on student performance on each question reported by question and data aligned by subject area	Course instructor will organize and facilitate assessment and distribute results to Department Assessment Team. Department Assessment Team will analyze data	Assessment data will be evaluated in a three-year review cycle. Annual reports will be provided to the Academic Programs and Planning Office for feedback. Feedback will be used to improve the assessment plans for the following year/cycle.	The Department Assessment Team and Department Chair will review the data and will identify where improvement is needed. Feedback from the Academic Programs and Planning Office will be used to improve the assessment plans for the following year/cycle.
PLO 1,3	*SLO2. Students will communicate effectively in interpersonal and professional settings (PLO 1, 3)*	AVS 1000, 1113, 2101, 3333, 4402, 4430, 4473, 4610	GWT, Course literature supported writing (all) and class presentation (all but AVS 1000)	GWT scale, Oral and Written communication rubrics. Student survey	Report on percentage of students at the introductory, developing and mastery level in each course and the number that meet or exceed a minimum level for each SLO	Course instructor will grade assessment using rubric and will distribute results to the Department Assessment Team. Department Assessment Team will analyze data		
PLO 1,2,3	*SLO3. Students will demonstrate critical thinking and problem solving skills necessary to solve complex, interdisciplinary problems which impact animals, people, and their environments. (PLO 1, 2, 3)*	AVS 1112, 1113, 114L, 1115L, 2101, 2211, 3305, 3311. 3333, 4214, 4402, 4430, 4473	Course case problem	Critical Thinking rubric Student survey				
PLO 1,2	*SLO4. Students will evaluate ethical responsibilities of professionals in animal science industries. (PLO 1, 2)*	AVS 1000, 1112, 1113, 2211, 3305, 3311, 3327, 3333, 3350, 4430, 4610	Post discussion reflection (all but AVS 4610) Capstone Assessment examination (AVS 4610)	Department developed Ethical Awareness rubric. Student survey				
PLO 1,3	*SLO5. Students will collaborate in teams to develop leadership and team building skills (PLO 1, 3)*	AVS 1000, 1113, 1114L, 115L, 2101, 3333, 33504402, 4430, 4473, 4610	Group Presentation	Department developed Team Collaboration rubric. Student survey				

Appendix Table 5.2. Timeline for assessment plan

Student Learning Outcome	Academic Year					
	AY 18-19	AY 19-20	AY 20-21	AY 21-22	AY 22-23	AY 23-24
SLO1. Students will apply conceptual and technical knowledge of domestic animals (e.g. animal health, animal physiology, animal nutrition, animal genetics, and use of biotechnology) to solve animal science problems. (PLO 1)		AVS 4610 Direct: Capstone Assessment (examination). Student performance on each question reported by question and data aligned by subject area. Evaluated by department faculty, Department Assessment Team and Department Chair. Administered each semester. Aggregated results reviewed every three years to close the loop			AVS 4610 Direct: Capstone Assessment (examination). Student performance on each question reported by question and data aligned by subject area. Evaluated by department faculty, Department Assessment Team and Department Chair. Administered each semester. Aggregated results reviewed every three years to close the loop.	
SLO2. Students will communicate effectively in interpersonal and professional settings (PLO 1, 3)	Direct: GWT, Course level assessment (AVS 1100, AVS 1112, AVS 4430, AVS 4610) using oral and written communication rubrics by course instructors. Report on percentage of students at the introductory, developing and mastery level in each course and the number that meet or exceed a minimum level for each SLO. Data acquired each semester. Aggregated results reviewed every three years to close the loop.			Direct: GWT, Course level assessment (AVS 1100, AVS 1112, AVS 4430, AVS 4610) using oral and written communication rubrics by course instructors. Report on percentage of students at the introductory, developing and mastery level in each course and the number that meet or exceed a minimum level for each SLO. Data acquired each semester. Aggregated results reviewed every three years to close the loop.		

Student Learning Outcome	Academic Year					
	AY 18-19	AY 19-20	AY 20-21	AY 21-22	AY 22-23	AY 23-24
SLO3. Students will demonstrate critical thinking and problem solving skills necessary to solve complex, interdisciplinary problems which impact animals, people, and their environments. (PLO 1, 2, 3)		Direct: Course level assessment (AVS 2101, AVS 4402, AVS 4473) using critical thinking rubric by course instructors. Report on percentage of students at the introductory, developing and mastery level in each course and the number that meet or exceed a minimum level for each SLO. Data acquired each semester. Aggregated results reviewed every three years to close the loop.			Direct: Course level assessment (AVS 2101, AVS 4402, AVS 4473) using critical thinking rubric by course instructors. Report on percentage of students at the introductory, developing and mastery level in each course and the number that meet or exceed a minimum level for each SLO. Data acquired each semester. Aggregated results reviewed every three years to close the loop.	
SLO4. Students will evaluate ethical responsibilities of professionals in animal science industries. (PLO 1, 2)			Direct: Course level assessment (AVS 1100, AVS 1112, AVS 3350, AVS 4610) by course instructors. AVS 4610 Capstone Assessment (examination). Evaluated by instructors using ethical awareness rubric. Report on percentage of students at the introductory, developing and mastery level in each course and the number that meet or exceed a minimum level for each SLO. Data acquired each semester. Aggregated results reviewed every three years.			Direct: Course level assessment (AVS 1100, AVS 1112, AVS 3350, AVS 4610) by course instructors. AVS 4610 Capstone Assessment (examination). Evaluated by instructors using ethical awareness rubric. Report on percentage of students at the introductory, developing and mastery level in each course and the number that meet or exceed a minimum level for each SLO. Data acquired each semester. Aggregated results reviewed every three years.

Student Learning Outcome	Academic Year					
	AY 18-19	AY 19-20	AY 20-21	AY 21-22	AY 22-23	AY 23-24
SLO5. Students will collaborate in teams to develop leadership and team building skills (PLO 1, 3)			Direct: Course level assessment (AVS 1112, AVS 4430, AVS 4610). Evaluated by instructors using leadership and team building rubric. Report on percentage of students at the introductory, developing and mastery level in each course and the number that meet or exceed a minimum level for each SLO. Data acquired each semester. Aggregated results reviewed every three years to close the loop.			Direct: Course level assessment (AVS 1112, AVS 4430, AVS 4610). Evaluated by instructors using leadership and team building rubric. Report on percentage of students at the introductory, developing and mastery level in each course and the number that meet or exceed a minimum level for each SLO. Data acquired each semester. Aggregated results reviewed every three years to close the loop.