

Chris C. Calvert, Ph.D., Professor (*Animal Science*)
 Ernie Chang, Ph.D., Professor
 (*Animal Science; located at Bodega Marine Lab*)
 Alan J. Conley, Ph.D., Professor
 (*Population Health and Reproduction; School of
 Veterinary Medicine*)
 Mary E. Delany, Ph.D., Professor (*Animal Science*)
 Edward J. DePeters, Ph.D., Professor
 (*Animal Science*)
 Serge I. Doroshov, Ph.D., Professor (*Animal Science*)
 Holly B. Ernest, D.V.M., Ph.D., Assistant Professor
 (*Population, Health and Reproduction; School of
 Veterinary Medicine*)
 James G. Fadel, Ph.D., Professor (*Animal Science*)
 Thomas R. Famula, Ph.D., Professor
 (*Animal Science*)
 Russell C. Hovey, Ph.D., Associate Professor
 (*Animal Science*)
 Silas S.O. Hung, Ph.D., Professor (*Animal Science*)
 Michael L. Johnson, Ph.D., Associate Research
 Scientist (*Director, Aquatic Ecosystems Analysis
 Laboratory*); Adjunct Research Professor
 (*Department of Medicine and Epidemiology;
 School of Veterinary Medicine*)
 Ermas Kebreab, Ph.D., Professor (*Animal Science*)
 Kirk C. Klasing, Ph.D., Professor (*Animal Science*)
 Dietmar Kueltz, Ph.D., Professor
 (*Animal Science*)
 Leslie A. Lyons, Ph.D., Associate Professor
 (*Population Health and Reproduction; School of
 Veterinary Medicine*)
 Elizabeth Maga, Ph.D., Associate Researcher and
 Lecturer (*Animal Science*)
 Brenda J. McCowan, Ph.D., Associate Professional
 Researcher and Research Behaviorist (*Veterinary
 Medicine Teaching and Research Center and
 California National Primate Research Center*)
 Juan F. Medrano, Ph.D., Professor (*Animal Science*)
 Joy A. Mench, Ph.D., Professor (*Animal Science*)
 Deanne Meyer, Ph.D., Specialist in Cooperative
 Extension and Lecturer (*Animal Science*)
 Stuart Meyers, Ph.D., Associate Professor
 (*Anatomy, Physiology and Cell Biology; School of
 Veterinary Medicine*)
 James R. Millam, Ph.D., Professor (*Animal Science*)
 Frank M. Mitloehner, Ph.D., Associate Professor and
 Associate Specialist in Cooperative Extension
 (*Animal Science*)
 James D. Murray, Ph.D., Professor (*Animal Science*)
 Anita M. Oberbauer, Ph.D., Professor
 (*Animal Science*)
 James W. Olfjen, Ph.D., Specialist in Cooperative
 Extension and Lecturer (*Animal Science*)
 Peter H. Robinson, Ph.D., Specialist in Cooperative
 Extension and Lecturer (*Animal Science*)
 Jan F. Roser, Ph.D., Professor (*Animal Science*)
 Pablo J. Ross, Ph.D., Assistant Professor
 (*Animal Science*)
 Roberto D. Sainz, Ph.D., Professor
 (*Animal Science*)
 M. Cecilia Torres-Penedo, Ph.D., Associate Research
 Geneticist (*Veterinary Genetics Laboratory*)
 Cassandra B. Tucker, Ph.D., Assistant Professor
 (*Animal Science*)
 Alison L. Van Eenennaam, Ph.D., Specialist in
 Cooperative Extension and Lecturer (*Animal
 Science*)
 Catherine A. VandeVoort, Ph.D., Professor-in-
 Residence (*California National Primate Research
 Center; and Reproductive Biology, Obstetrics and
 Gynecology; School of Medicine*)
 Barry W. Wilson, Ph.D., Professor (*Animal Science*)
 Richard A. Zinn, Ph.D., Professor (*Animal Science;
 located at Desert Research and Extension Center*)

Graduate Study. The Graduate Group in Animal Biology offers programs of study and research leading to the M.S. and the Ph.D. degrees. The Animal Biology Graduate Group focuses on integrated animal biology. Each student individually tailors his/her program of study to meet individual needs. The Animal Biology Graduate Group is unique in encouraging a multidisciplinary or interdisciplinary approach involving physiology, nutrition, genetics, ecology and/or behavior within the context of organismal animal biology.

Graduate Advisers. S.S.O. Hung, E.A. Maga

Courses in Animal Biology (ABG)

Graduate Courses

200A. Integrated Animal Biology I (3)

Lecture/discussion—3 hours. Prerequisite: graduate standing; Biological Sciences 101 or the equivalent or the consent of the instructor. Natural history, management, historical and current uses, and specialized disciplinary features of model and novel animal systems used in research. Development of conceptual approaches in organismal biology to improve experimental design and interpretation of interdisciplinary research studies. Limited enrollment; first pass restricted to Animal Biology Graduate Group students.—I. (I.) Berger, DePeters

200B. Integrated Animal Biology II (3)

Lecture/discussion—3 hours. Prerequisite: course 200A. Natural history, management, historical and current uses, and specialized disciplinary features of model and novel animal systems used in research. Development of conceptual approaches in organismal biology to improve experimental design and interpretation of interdisciplinary research studies. Limited enrollment; first pass restricted to Animal Biology Graduate Group students.—II. (II.) Delany

202. Grant Procurement and Administration (2)

Lecture—1 hour; discussion/laboratory—1 hour. Prerequisite: course 200B. Pass I restricted to Animal Biology Graduate Group students. Topics include: structure of grants, attention to specifications, concise persuasive writing, and grant budgeting. Identify grant opportunities, write a persuasive research grant proposal, and administer grants. Limited enrollment.—I. (I.) Mitloehner

255. Physiology of the Stress Response (2)

Lecture/discussion—2 hours. Prerequisite: graduate student. Definition of Stress; Physiological mechanisms of adaptation to stress; Hormonal control of the systemic stress response; Mechanisms of the cellular stress response; Discussion of current trends in stress physiology and current methods for studying the stress response. (Same course as Molecular, Cellular, and Integrative Physiology 255.)—III. (III.) Kueltz

290. Seminar in Animal Biology (1)

Seminar—1 hour. Prerequisite: graduate standing. Seminar on advanced topics in animal biology. Presentations by members of the Animal Biology Graduate Group and guest speakers. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

290C. Research Conference (1)

Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Student presentations of research in Animal Biology and discussions among participating students and Animal Biology faculty. May be repeated for credit. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.)

298. Group Study in Animal Biology (1-5)

Prerequisite: graduate standing.

299. Research (1-11)

Prerequisite: graduate standing and consent of instructor. Research with a faculty member in Animal Biology Graduate Group. May be repeated for credit. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.)

Professional Courses

300. Methods in Teaching Animal Biology (2)

Lecture/discussion—2 hours. Prerequisite: graduate standing and consent of instructor. Practical experience in the methods and problems of teaching animal biology. Includes analysis of laboratory exercises, discussion of teaching techniques, grading scientific essays, preparing for and conducting discussion or laboratory sections, formulating quiz and exam questions under instructor supervision. May be repeated up to three times for credit. (S/U grading only.)—I, II. (I, II.) Famula, Oberbauer

396. Teaching Assistant Training Practicum (1-4)

Variable—3-12 hours. Prerequisite: graduate standing and consent of instructor. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Professional Course

401. Ethics and Professionalism in Animal Biology (2)

Discussion—2 hours. Prerequisite: graduate standing; first pass Animal Biology graduate group students. Case studies and discussion of ethical and professional issues for animal biologists, including the use of animals in research and teaching, patenting and intellectual property, consulting and conflict of interest, scientific integrity, dealing with the media, and mentoring relationships.—III. (III.) Mench

Animal Genetics

(College of Agricultural and Environmental Sciences)

Faculty. See under Department of [Animal Science](#), on page 150.

Major Program. See the major in [Animal Science](#), on page 150.

Related Courses. See Biological Sciences 101, 101D; Evolution and Ecology 102, 175; Genetics Graduate Group courses; Microbiology 150, 170, 215, 260, 274, 292; Molecular and Cellular Biology 121, 141, 160L, 161, 162, 163, 164, 178, 182, 221C, 257, 262, 263; Neurobiology, Physiology, and Behavior 131; Plant Biology 151, 152, 154, 161A, 161B; Plant Pathology 215X, 217; Plant Sciences 220, 221.

Courses in Animal Genetics (ANG)

Questions pertaining to the following courses should be directed to the instructor or to the Animal Science Advising Center in 1202 Meyer Hall (530) 754-7915.

Upper Division Courses

101. Animal Cytogenetics (3)

Laboratory/discussion—1 hour; laboratory—6 hours. Prerequisite: Biological Sciences 101, 102 or the equivalent. Principles and techniques of cytogenetics applied to animal systems; chromosome harvest techniques, analysis of mitosis and meiosis, karyotyping, chromosome banding, cytogenetic mapping, chromosome structure and function, comparative cytogenetics.

105. Horse Genetics (2)

Lecture—2 hours. Prerequisite: course 15 and Biological Sciences 101. Coat color, parentage testing, medical genetics, pedigrees, breeds, the gene map and genus Equus. Emphasis on understanding horse genetics based on the unity of mammalian genetics and making breeding decisions based on fundamental genetic concepts.—III. (III.) Famula

107. Genetics and Animal Breeding (5)

Lecture—4 hours; laboratory—3 hours. Prerequisite: Biological Sciences 101. Principles of quantitative genetics applied to improvement of livestock and poultry. Effects of mating systems and selection methods are emphasized with illustration from current breeding practices.—I. (I.) Medrano

111. Molecular Biology Laboratory Techniques (4)

Lecture—2 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1C, 101, 102, 103. Introduction to the concepts and techniques used in molecular biology; the role of this technology in both basic and applied animal research, and participation in laboratories using some of the most common techniques in molecular biology.—I. (I.) Kueltz, Murray, Williamson

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. Selected topics relating to animal genetics. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses**204. Theory of Quantitative Genetics (3)**

Lecture—3 hours. Prerequisite: course 107 or the equivalent. Theoretical basis of quantitative genetics and the consequences of Mendelian inheritance. Concepts used to estimate quantitative genetic differences and basis for partitioning the phenotypic variance. Offered in alternate years.—III.

206. Advanced Domestic Animal Breeding (3)

Lecture—3 hours. Prerequisite: course 107 and Animal Science 205; course 204 recommended. Procedures for the genetic evaluation of individuals to include selection indices and mixed model evaluation for single and multiple traits. Methods of estimating genetic trends. Offered in alternate years.—III. Famula

208. Estimation of Genetic Parameters (3)

Lecture—3 hours. Prerequisite: course 107 and Animal Science 205; courses 204 and 108 recommended. General methods for the estimation of components of variance and covariance and their application to the estimation of heritability, repeatability and genetic correlations are considered. Specific emphasis is given to procedures applicable to livestock populations under selection.

211. Genetic Engineering of Animals (2)

Lecture—1 hour; lecture/discussion—1 hour. Review of techniques for the genetic engineering of animals and their limitations and applications. Student-led discussions of recent papers in the field and possible future applications of genetically engineered animals in basic research and applied agricultural and medical research. Offered in alternate years. (S/U grading only.)—(III.) Murray

212. Sequence Analysis in Molecular Genetics (2)

Lecture/laboratory—2 hours. Prerequisite: Biological Sciences 101 or the equivalent; graduate standing or consent of instructor. Use of computer algorithms and online databases to analyze nucleic acid and protein sequences in molecular genetics research. Offered in alternate years.—II. Medrano

298. Group Study (1-5)

Prerequisite: consent of instructor. Lectures and discussions of advanced topics in animal genetics. (S/U grading only.)

299. Research in Animal Genetics (1-12)

Prerequisite: consent of instructor. (S/U grading only.)

Animal Physiology

See **Animal Biology**, on page 148; **Animal Science**, on page 150; **Neurobiology, Physiology, and Behavior**, on page 431; **Philosophy**, on page 446; and **Molecular, Cellular, and Integrative Physiology (A Graduate Group)**, on page 420.

Animal Science

(College of Agricultural and Environmental Sciences)

Anita M. Oberbauer Ph.D., Chairperson of the Department

Department Office. 2223 Meyer Hall (530) 752-1250;

<http://animalscience.ucdavis.edu/>

Undergraduate Advising. 1202 Meyer Hall (530) 754-7915; <http://asac.ucdavis.edu>

Master Adviser. E.J. DePeters

Advising Center for the major, minors and course offerings (including peer advising) is located in the Animal Science Advising Center in 1202 Meyer Hall (530) 754-7915. Each student will be assigned a faculty adviser through this office upon entering the major.

Graduate Advising. 1202 Meyer Hall (530) 752-2382;

<http://animalscience.ucdavis.edu/>

Bodega Marine Laboratory
P.O. Box 247, Bodega Bay, CA (707) 875-2211
<http://www.bml.ucdavis.edu/>

Faculty

Thomas E. Adams, Ph.D., Professor,
Academic Senate Distinguished Teaching Award
Trish J. Berger, Ph.D., Professor
C. Christopher Calvert, Ph.D., Professor,
Academic Senate Distinguished Teaching Award
Ernest S. Chang, Ph.D., Professor
(Biological Sciences, Bodega Marine Laboratory)
Mary E. Delany, Ph.D., Professor and Associate
Dean in CA&ES
Edward J. DePeters, Ph.D., Professor,
Academic Senate Distinguished Teaching Award,
UC Davis Prize for Undergraduate Teaching and
Scholarly Achievement
Serge I. Doroshov, Ph.D., Professor
John M. Eadie, Ph.D., Professor
James G. Fadel, Ph.D., Professor
Thomas R. Famula, Ph.D., Professor,
Academic Senate Distinguished Teaching Award
Russell C. Hovey, Ph.D., Associate Professor
Silas S. O. Hung, Ph.D., Professor
Ermas Kebreab, Ph.D., Professor
Annie J. King, Ph.D., Professor
Kirk C. Klasing, Ph.D., Professor
Dietmar Kueltz, Ph.D., Professor
Juan F. Medrano, Ph.D., Professor
Joy A. Mench, Ph.D., Professor
James R. Millam, Ph.D., Professor
Frank M. Mitloehner, Ph.D., Associate Professor and
Associate Specialist in Cooperative Extension
James D. Murray, Ph.D., Professor
Anita M. Oberbauer, Ph.D., Professor,
Academic Senate Distinguished Teaching Award
Kathryn Radke, Ph.D., Professor
Janet F. Roser, Ph.D., Professor
Pablo J. Ross, Ph.D., Assistant Professor
Roberto D. Sainz, Ph.D., Professor
Cassandra B. Tucker, Ph.D., Assistant Professor
Barry W. Wilson, Ph.D., Professor
Richard A. Zinn, Ph.D., Professor

Emeriti Faculty

Ursula K. Abbott, Ph.D., Professor Emeritus
Hans Abplanalp, Ph.D., Professor Emeritus
Gary B. Anderson, Ph.D., Distinguished Professor
Emeritus, *Distinguished Teaching Award-*
Graduate/Professional, UC Davis Prize for
Undergraduate Teaching and Scholarly
Achievement
C. Robert Ashmore, Ph.D., Professor Emeritus
Wallis H. Clark, Jr., Ph.D., Professor Emeritus
Douglas E. Conklin, Ph.D., Professor Emeritus
Graham A. E. Gall, Ph.D., Professor Emeritus
William N. Garrett, Ph.D., Professor Emeritus
Yu-Bang Lee, Ph.D., Professor Emeritus
Edward O. Price, Ph.D., Professor Emeritus
Robert W. Touchberry, Ph.D., Professor Emeritus
Wesley W. Weathers, Ph.D., Professor Emeritus

Affiliated Faculty

Steven L. Berry, D.V.M., Specialist in Cooperative
Extension and Lecturer
Francine A. Bradley, Ph.D., Specialist in
Cooperative Extension and Lecturer
Fred S. Conte, Ph.D., Specialist in Cooperative
Extension and Lecturer
Elizabeth A. Maga, Ph.D., Associate Researcher
and Lecturer
Bernard P. May, Ph.D., Adjunct Professor
Deanne Meyer, Ph.D., Specialist in Cooperative
Extension and Lecturer
Kenji Murata, Ph.D., Assistant Researcher
James W. Oljien, Ph.D., Specialist in Cooperative
Extension and Lecturer
Peter H. Robinson, Ph.D., Specialist in Cooperative
Extension and Lecturer
Alison L. Van Eenennaam, Ph.D., Specialist in
Cooperative Extension and Lecturer
Dana B. Van Liew, M.Ed., Lecturer, *Academic*
Federation Excellence in Teaching Award
Gideon Zeidler, Ph.D., Associate Specialist in
Cooperative Extension

The Major Program

The Animal Science major is devoted to the sciences central to understanding biological function of domestic and captive animals, their care, management, and utilization by people for food, fiber, companionship and recreation. Advances in science and technology, and an ever-growing human population, have increased the complexity of issues surrounding the care and management of animals. Specializations within the major allow students to develop a scientific appreciation of animals and their relationship to their environment. Graduates in Animal Science are able to advance the science and technology of animal care and management in an objective and effective manner for the betterment of animals and society.

The Program. The curriculum provides depth in the biological and physiological sciences and allows students to specialize within the broad field of applied animal science. Study begins with introductory courses in animal science, biology, chemistry, mathematics, and statistics. Students undertake advanced courses in animal behavior, biochemistry, genetics, nutrition, and physiology and the integration of these sciences to animal function, growth, reproduction, and lactation. Students complete the curriculum by choosing a specialization in either an animal science discipline (behavior, biochemistry, genetics, nutrition, or physiology) or in the sciences particular to a class of animals (aquatic, avian, companion, captive, equine, laboratory, livestock, dairy, or poultry).

Career Alternatives. A wide range of career opportunities are available to graduates. The primary goal of the major is to prepare students for graduate study leading to the M.S. and Ph.D. degrees; for continued study in a professional school such as veterinary medicine, human medicine or dentistry; for careers in research, agricultural production, farm and ranch management, or positions in business, sales, financial services, health care, agricultural extension, consulting services, teaching, journalism, or laboratory technology.

B.S. Major Requirements:

	UNITS
Preparatory Subject Matter.....	56-61
Animal Science 1, 2, 41, 41L	12
Biological Sciences 1A, 1B, 1C or 2A, 2B, 2C	14
Chemistry 2A, 2B and 8A, 8B or 118A, 118B	16-18
Plant Sciences 21 or Engineering Computer Science 15	3-4
Mathematics 16A, 16B or 17A, 17B or 21A, 21B	6-8
Plant Sciences 120 or Statistics 100	4
Note: Some professional and graduate schools may require additional preparatory	

Quarter Offered: I=Fall, II=Winter, III=Spring, IV=Summer; 2011-2012 offering in parentheses

General Education (GE) credit: ArtHum=Arts and Humanities; SciEng=Science and Engineering; SocSci=Social Sciences; Div=Social-Cultural Diversity; Wrt=Writing Experience