The Department of Veterinary Integrative Biosciences (VIBS) offers graduate degree programs aimed at educating students to advance biomedical science through original research and to disseminate that knowledge for the protection and promotion of animal and human health. The department awards the interdepartmental MS and PhD degrees in Biomedical Sciences (with specialties in cell/molecular biology, developmental biology/embryology, toxicology, epidemiology, reproduction, and neuroscience). Also managed and awarded by the department are the interdepartmental MS degree in Science and Technology Journalism and the departmental MS degree in Veterinary Public Health-Epidemiology.

Many of the department faculty participate in University-wide graduate training programs in Neuroscience, Reproductive Biology, Genetics, Toxicology, and Biotechnology.

In addition to developing research expertise in their specialty, students have the opportunity to learn anatomy, public health practices, and genomics in a variety of domestic species, wildlife species, and laboratory animals. Training in anatomy spans histology, histochemistry, neuroanatomy, and state-of-the-art interactive laser microscopy. Training in public health emphasizes epidemiology, food safety, food toxicology and control of zoonotic diseases. Training in genomics emphasizes genetics of health and disease, phylogeny of mammalian species, bioinformatics and comparative genomics.

The Master of Science in Science and Technology Journalism is a distinctive program to prepare students for careers as science and technology writers, reporters and editors in the public media, government, industry, academia and other sectors. It also can serve as a foundation for doctoral study.

The Master of Science in Veterinary Public Health-Epidemiology is designed to serve the needs of veterinarians wishing to go into some aspects of government service, military veterinary personnel seeking advanced training in public health and students with a career goal of academia or research.

Students prepare degree plans that fit their area of study and professional or research goals in consultation with a committee of graduate faculty members led by a faculty mentor/chairperson. The general procedural rules are those specified in this catalog. More details on core course requirements, degree plans, and administrative matters are available in the college’s "Graduate Student Handbook."

Faculty

Abbott, Louise C, Professor
Vet Integrative Biosciences
DVM, Washington State University, 1988
PHD, University of Washington, 1982

Andersson, Leif B, Professor
Vet Integrative Biosciences
PHD, Swedish University of Agricultural Sciences, 1984

Arosh, Joe A, Professor
Vet Integrative Biosciences
DVM, Universite Laval, 2004

Arosh, Sakhila B, Associate Professor
Vet Integrative Biosciences
PHD, Laval University, 2002

Bergthorsson, Ulfar, Visiting Associate Professor
Vet Integrative Biosciences
PHD, University of Rochester, 1998

Budke, Christine M, Associate Professor
Vet Integrative Biosciences
PHD, Philosophisch-Naturwissenschaftliche Fakultat der Universitat Basel, 2004
DVM, Purdue University, 2001

Burghardt, Robert C, Professor
Vet Integrative Biosciences
PHD, Wayne State University, 1976

Cai, Jing, Associate Professor
Vet Integrative Biosciences
PHD, University of Hong Kong, 2006

Cannon, Marvin S, Visiting Professor
Vet Integrative Biosciences
PHD, The Ohio State University, 1969

Chiu, Weihsueh A, Professor
Vet Integrative Biosciences
PHD, Princeton University, 1998

Cummings, Kevin J, Associate Professor
Vet Integrative Biosciences
PHD, Cornell University, 2010
DVM, Cornell University, 1996

Curley, Kevin O, Instructional Assistant Professor
Vet Integrative Biosciences
PHD, Texas A&M University, 2012
DVM, Cornell University, 1996

Dees, William L, Senior Professor
Vet Integrative Biosciences
PHD, Texas A&M University, 1982

Frank-Cannon, Tamy C, Clinical Assistant Professor
Vet Integrative Biosciences
PHD, Texas A&M University, 2005
DVM, Texas A&M University, 1996

Gaddy, Dana, Professor
Vet Integrative Biosciences
PHD, Baylor College of Medicine, 1991

Gastel, Barbara J, Professor
Vet Integrative Biosciences
MD, Johns Hopkins University, 1978
Hamer, Sarah A, Associate Professor
Vet Integrative Biosciences
DVM, Michigan State University, 2011
PHD, Michigan State University, 2010

Hartberg, Yasha M, Lecturer
Vet Integrative Biosciences
PHD, State University of New York at Binghamton, 2016

Herman, Cheryl L, Clinical Associate Professor
Vet Integrative Biosciences
DVM, University of Saskatchewan, 1987

Hiney, Jill K, Research Assistant Professor
Vet Integrative Biosciences
PHD, Texas A&M University, 1996

Hoffman, Anton G, Clinical Professor
Vet Integrative Biosciences
PHD, Texas A&M University, 1992
DVM, Texas A&M University, 1986

Johnson, Gregory A, Professor
Vet Integrative Biosciences
PHD, University of Wyoming, 1997

Johnson, Larry, Professor
Vet Integrative Biosciences
PHD, Colorado State University, 1978

Katju, Vaishali, Associate Professor
Vet Integrative Biosciences
PHD, Indiana University, 2004

Keefe, Lisa M, Instructional Assistant Professor
Vet Integrative Biosciences
PHD, Purdue University, 2013

Kim, Sun J, Research Assistant Professor
Vet Integrative Biosciences
PHD, Sogang University, 2006

Klemm, William R, Senior Professor
Vet Integrative Biosciences
PHD, University of Notre Dame, 1963
DVM, Auburn University, 1958

Kneese, Dana A, Lecturer
Vet Integrative Biosciences
DVM, Texas A&M University, 2013
PHD, Texas A&M University, 2009

Ko, Gladys Y, Associate Professor
Vet Integrative Biosciences
PHD, Kent State University, 1996

Ko, Michael L, Research Assistant Professor
Vet Integrative Biosciences
PHD, Kent State University, 1997

Kornegay, Joe N, Professor
Vet Integrative Biosciences
PHD, University of Georgia, 1982

Langford, Candice L, Research Assistant Professor
Vet Integrative Biosciences
PHD, Texas A&M University, 2006

Li, Jianrong, Associate Professor
Vet Integrative Biosciences
PHD, University of Hawaii at Manoa, 1997

Li, Qinglei, Associate Professor
Vet Integrative Biosciences
PHD, Harbin Medical University, 2001

Lyczak, Kristin C, Clinical Assistant Professor
Vet Integrative Biosciences
DVM, Colorado State University, 2003

Mouneimne, Roula, Research Professor
Vet Integrative Biosciences
PHD, Lyon I University, 1984

Murphy, William J, Professor
Vet Integrative Biosciences
PHD, The University of Tulsa, 1997

Nghiem, Peter P, Assistant Professor
Vet Integrative Biosciences
PHD, The George Washington University, 2014
DVM, Texas A&M University, 2008

Norman, Keri N, Assistant Professor
Vet Integrative Biosciences
PHD, Texas A&M University, 2016

Phillips, Timothy D, Professor
Vet Integrative Biosciences
PHD, University of Southern Mississippi, 1975

Pine, Michelle D, Clinical Associate Professor
Vet Integrative Biosciences
PHD, Texas A&M University, 2002
DVM, University of Missouri-Columbia, 1991

Porter, Weston W, Professor
Vet Integrative Biosciences
PHD, Texas A&M University, 1997

Qian, Yongchang, Research Associate Professor
Vet Integrative Biosciences
PHD, Shanghai Institutes for Biological Sciences, 1990

Raudsepp, Terje, Professor
Vet Integrative Biosciences
PHD, Swedish University of Agricultural Sciences, 1999

Rijnkels, Monique G, Research Assistant Professor
Vet Integrative Biosciences
PHD, Leiden University, 1997

Ritter, Nicola L, Instructional Assistant Professor
Vet Integrative Biosciences
PHD, Texas A&M University, 2016

Roy Sarkar, Tapasree, Research Assistant Professor
Vet Integrative Biosciences
PHD, Purdue University, 2008
Ruoff, Lynn M, Clinical Professor
Vet Integrative Biosciences
DVM, Colorado State University, 1975

Russell, Leon H, Senior Professor
Vet Integrative Biosciences
PHD, Texas A&M University, 1965
DVM, University of Missouri, 1956

Rusyn, Ivan I, Professor
Vet Integrative Biosciences
PHD, University of North Carolina at Chapel Hill, 2000
MD, Ukrainian State Medical University, 1994

Samollow, Paul, Senior Professor
Vet Integrative Biosciences
PHD, Oregon State University, 1979

Shi, Liheng, Research Assistant Professor
Vet Integrative Biosciences
PHD, Osaka University, 2001

Skow, Loren C, Senior Professor
Vet Integrative Biosciences
PHD, Texas A&M University, 1976

Tayce, Jordan D, Instructional Assistant Professor
Vet Integrative Biosciences
DVM, Texas A&M University, 2008

Taylor, Robert J, Research Professor
Vet Integrative Biosciences
PHD, Texas A&M University, 1987

Tiffany-Castiglion, Evelyn, Professor
Vet Integrative Biosciences
PHD, The University of Texas Medical Branch at Galveston, 1979

Venkatraj, Vijayanagaram S, Clinical Associate Professor
Vet Integrative Biosciences
PHD, New York University, 1992

Welsh, Christabel J, Professor
Vet Integrative Biosciences
PHD, London University, 1981

Masters

• Master of Science in Veterinary Public Health - Epidemiology (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/veterinary-medicine-biomedical-sciences/veterinary-integrative-biosciences/veterinary-public-health-epidemiology-ms)

Courses

VIBS 601 Anatomy
Credits 4. 2 Lecture Hours. 6 Lab Hours.
Topographical dissection of one of the following domestic animals: horse, ox, dog or cat. May be taken more than once but not to exceed 12 hours of credit toward a graduate degree.
Prerequisite: VIBS 912 or 305 or equivalent.

VIBS 602 Histology
Credits 4. 2 Lecture Hours. 6 Lab Hours.
Molecular phenomena placed in context with tissues, organs and organ systems; cell and tissue structures visualized by light microscopy and electron micrographs for functional relationships; clinical correlations reveal relevance of histology in specific disease states; conceptual thinking exercises facilitate problem-solving skills.
Prerequisite: Graduate classification.

VIBS 603 NRSC 603 Neuroanatomy
Credits 4. 2 Lecture Hours. 6 Lab Hours.
Gross, developmental and microscopic anatomy of nervous system of selected laboratory and domestic animals.
Prerequisite: Approval of instructor.
Cross Listing: NRSC 603/VIBS 603.

VIBS 604/NRSC 604 Biomedical Neuroendocrinology and Endocrine Disorders
Credits 3. 3 Lecture Hours.
Prerequisite: Approval of instructor.
Cross Listing: NRSC 604/VIBS 604.

VIBS 605 Chemical Hazard Assessment
Credits 3. 3 Lecture Hours.
Chemical and biological methods for testing hazardous chemicals and complex mixtures; chemical analysis; microbial bioassays; developmental toxicity; enzyme induction; mammalian cell culture.
Prerequisite: Graduate classification.

VIBS 606/NRSC 605 Neuroanatomical Systems
Credits 3. 3 Lecture Hours.
Emphasis on major neural systems that govern identifiable physiological functions, behavior and neurodegenerative disease; whole-brain anatomy is approached from a "systems" perspective, wherein components of defined functional systems are described in terms of their location, inputs and outputs, and physiological /behavioral significance in health and disease.
Prerequisite: Approval of instructor.
Cross Listing: NRSC 605/VIBS 606.

VIBS 607 Applied Epidemiology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
An introductory course of the application of epidemiological concepts to the study of disease occurrence in populations of lower animals and man. The purpose of epidemiology is to identify the host, agent and environmental determinants and dynamics of disease spread that provide the basis for successful preventive medicine and public health programs.

VIBS 608 Epidemiology Methods I
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Epidemiology concepts and methods used in the investigation of determinants of health or disease in populations; stressing basic methods for experimental design, conduct and analysis of both observational and experimental studies.
Prerequisite: STAT 651 or equivalent.
Prerequisites: VIBS 609 or equivalent. (Offered in alternate years.)

VIBS 610 Epidemiologic Methods II and Data Analysis
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Principles and methods for the analysis of data from epidemiologic studies including the purpose of data analysis and role of statistics, sampling distributions, probability distributions, analysis of crude, stratified and matched data, and the use of linear and logistic regression methods.
Prerequisites: VIBS 608 and STAT 651 or approval of instructor.

VIBS 611 Tumor Cell Biology and Carcinogenesis
Credits 3. 3 Lecture Hours.
Basic principles of tumor biology; role of gene-environment interactions; molecular mechanisms regulating cancer initiation and progression; therapeutic treatment of cancer.
Prerequisites: BIMS 320/GENE 320 or equivalent; graduate classification.

VIBS 620 Cytogenetics
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Principles and concepts in molecular evolution, population genetics, and evolutionary genomics; applications of quantitative approaches (computation, statistics, and mathematics) in analyzing large and complex biological data sets; algorithm design and development of scientific software using high-level high-performance computer languages; emerging techniques for integrative data analysis, and the assumptions, advantages, and limitations of these techniques.
Prerequisites: BIOL 451 or GENE 320/BIMS 320/BIMS 320/GENE 320 or equivalent; approval of instructor.

VIBS 622 Endocrine Toxicology
Credits 3. 3 Lecture Hours.
Principles and concepts in molecular evolution, population genetics, and evolutionary genomics; applications of quantitative approaches (computation, statistics, and mathematics) in analyzing large and complex biological data sets; algorithm design and development of scientific software using high-level high-performance computer languages; emerging techniques for integrative data analysis, and the assumptions, advantages, and limitations of these techniques.
Prerequisites: BIOL 451 or GENE 320/BIMS 320/BIMS 320/GENE 320 or equivalent; approval of instructor.

VIBS 624/VTPP 624 Endocrinology
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Neuroendocrine control of puberty menstruation, ovulation, pregnancy, labor, lactation, female reproductive cycles, male reproductive functions, thyroid and parathyroid, adrenal and kidney, diabetes, obesity, sleep, memory, learning and aging, and their endocrine disorders; overview on biosynthesis, transport and signaling of peptide and neuropeptide hormones, steroids and prostaglandins.
Prerequisites: Graduate classification; approval of instructor.

VIBS 625/ENTO 625 Methods in Vector-Borne Disease Ecology
Credits 3. 1 Lecture Hour. 5 Lab Hours.
Methodological understanding of how vector-borne disease are studied in the field and the laboratory; hands-on exploration of the ecology of disease systems in a one health framework; concepts of design, execution, and presentation of research projects; outdoor field work and bio-safety level 2 laboratory.
Cross Listing: ENTO 626/VIBS 626.

VIBS 626 Optical Microscopy and Live Cell Imaging
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Principles and practice of optical microscopy for life sciences; applications with fixed samples and live cells using digital microscopy, confocal and multiphoton microscopy, TIRF and laser capture microscopy equipment; applications with fluorescence probes of cellular function.
Prerequisites: Approval of instructor.
VIBS 633 Animal Diseases in Comparative Medicine  
Credits 3. 3 Lecture Hours.  
Study of major zoonotic diseases, including frequency of occurrence, clinical signs, diagnosis, epidemiology, bioterrorism concerns and the prevention or control in animals and humans.  
Prerequisite: Graduate classification.

VIBS 640/NRSC 640 Neurobiology  
Credits 1 to 5. 1 to 5 Lecture Hours.  
Biology of the mammalian central nervous system with emphasis on cellular and molecular interactions; contemporary research topics in areas such as neuron-glia interactions, neuroimmunology, neuroendocrinology, developmental neurobiology and neurogenetics; extensive readings from primary literature.  
Prerequisites: Undergraduate or graduate cell biology, genetics and biochemistry or approval of instructor.  
Cross Listing: NRSC 640/VIBS 640.

VIBS 641 Principles of Human Health Risk Assessment of Chemicals  
Credits 3. 3 Lecture Hours.  
Principles of toxicology and environmental health with the basic concepts and approaches for conducting human health risk assessment of chemicals; use of different types of data and analysis approaches to conduct both qualitative and quantitative assessments of exposure, human health hazard, dose-response, and risk from chemicals in the environment; introduction to how risk assessment informs risk management decisions such as pollution regulations or hazardous waste cleanups.  
Prerequisites: Graduate classification in toxicology, public health and related disciplines; VTPP 673, VIBS 670, PHEO 605, PHEO 610, PHEB 600, PHEB 605, or equivalent, or concurrent enrollment; PHEB 602, PHEB 603, STAT 651, or equivalent; or approval of instructor.

VIBS 645 Practice of Evaluating Human Health Risks of Chemicals  
Credits 3. 3 Lecture Hours.  
Basic principles of toxicology and environmental health with real-life examples of how diverse types of information are integrated for the purpose of judging what chemical exposures may pose a risk to human health; the complex process of qualitative evaluation and quantitative estimation of the risks that chemicals in the environment may pose to humans; integration of knowledge across epidemiology, toxicology, exposure assessment and other disciplines necessary to paint a comprehensive picture of what chemicals may pose hazard, what level of exposure may be considered safe, and what are the mechanisms of the adverse effects of exposures to a particular hazardous agent.  
Prerequisites: BICH 601, BICH 602, VTPP 625, or similar; VTPP 673, VIBS 670, or similar; and VIBS 641.

VIBS 650 Education in a Veterinary Medical and Biomedical Environment  
Credits 1 to 3. 1 to 3 Lecture Hours.  
Philosophical, stylistic and methodological consideration for designing, planning implementing and evaluating effective veterinary medical and biomedical teaching and learning. Orientation for graduate school.  
Prerequisite: Graduate classification.

VIBS 655 Methods of Specialized Journalism  
Credits 3. 3 Lecture Hours.  
Writing and placement of magazine and journal articles in specialized areas of media content such as agriculture, ecology, science, business, education, natural resources; individual projects directed to student’s field of interest.

VIBS 657 Issues in Science and Technology Journalism  
Credits 3. 3 Lecture Hours.  
Current issues, fundamental concepts in science and technology journalism, communication theory, science and journalism components, philosophy and literature of the field.

VIBS 658 Research Methods in Science and Technology Journalism  
Credits 3. 3 Lecture Hours.  
Research methods including theory, hypothesis formulation, design, data collection, data analysis, measurement and report writing. Qualitative and quantitative methods. Research topics.

VIBS 660 Reporting Science and Technology  
Credits 3. 3 Lecture Hours.  
Gathering, writing and editing complex information, translation techniques, interpretation and analysis, literary and organizational devices and measurement of readability.

VIBS 663 Biomedical Reporting  
Credits 3. 3 Lecture Hours.  
Sources of biomedical information, specialized information-gathering skills, key biomedical vocabulary/concepts, audiences, outlets, translation/interpretation, research, ethical issues.

VIBS 664 Risk and Crisis Reporting  
Credits 3. 3 Lecture Hours.  
Assessment and analysis of environmental and health risk, analytical procedures, interpretation of risk factors, reporting science crisis events.

VIBS 670 Environmental Toxicology  
Credits 3. 3 Lecture Hours.  
Toxic effects of drugs and chemicals on major mammalian organ systems and ecological receptors; general principles of toxicokinetics and toxicodynamics; case studies of toxic effects of environmental exposures.  
Prerequisite: VIBS 602 or approval of instructor.

VIBS 681 Seminar  
Credit 1. 1 Lecture Hour.  
Review and discussion of current scientific work in one of the department's areas of specialization (anatomy, cellular and molecular biology, epidemiology, food safety, genetics, informatics, neuroscience, public health concepts, reproduction/developmental biology, toxicology, zoonoses).

VIBS 684 Professional Internship  
Credits 1 to 4. 1 to 4 Other Hours.  
A directed internship in an organization to provide students with on-the-job training with professionals in settings appropriate to the student's professional objectives.  
Prerequisite: Approval by committee chair.

VIBS 685 Directed Studies  
Credits 1 to 4. 1 to 4 Other Hours.  
Research problem in one of the department's areas of specialization (anatomy, cellular and molecular biology, epidemiology, food safety, genetics, informatics, neuroscience, public health concepts, reproduction/developmental biology, toxicology, zoonoses, science and technology journalism).

VIBS 688 Epidemiological Modeling of Infectious Diseases  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Concepts of mathematical modeling of infectious diseases; steps and methods for the development and analysis of models.  
Prerequisite: Graduate classification.
VIBS 689 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.
Selected topics in one of the department’s areas of specialization (anatomy, cellular and molecular biology, epidemiology, food safety, genetics, informatics, neuroscience, public health concepts, reproduction/developmental biology, toxicology, zoonoses, science and technology journalism).

VIBS 690 Theory of Research
Credits 3. 3 Lecture Hours.
Theory and design of research related to current biomedical problems especially those involving study of animal disease; philosophical perspectives underlying historical advances in research pertaining to the study, prevention and treatment of disease.
Prerequisite: Graduate classification.
Cross Listing: VTTP 690 and VPAT 690.

VIBS 691 Research
Credits 1 to 23. 1 to 23 Other Hours.
Research reported by writing of thesis or dissertation as partial requirement for MS or PhD degree.
Prerequisite: Approval of department head.

VIBS 910 Small Animal Anatomy
Credits 4. 2 Lecture Hours. 6 Lab Hours.
Nomenclature, structures and principles of functional anatomy of dogs and cats; emphasis on topographical, radiographic and functional anatomy of structures with clinical importance.
Prerequisite: Enrollment in first year of professional DVM curriculum.

VIBS 911 Histology
Credit 1. 1 Lecture Hour.
Clinical application of histological content; basic tissues and major organ systems of common domestic species; normal microscopic appearance of cells, tissues and organs with the introduction of normal tissue and organ cytology; content correlates gross anatomy, microscopic anatomy and the physiological state of common domestic species.
Prerequisite: Enrollment in first year of professional DVM curriculum.

VIBS 912 Clinical Anatomy of Large Animals
Credits 3. 2 Lecture Hours. 4 Lab Hours.
Gross and topographical anatomy of domestic livestock including equine, ruminant, porcine and avian gross anatomy through use of cadavers, models and images; emphasis on structures of clinical importance, relationships to common medical and surgical procedures and functions in the animal body.
Prerequisite: Enrollment in first year of professional DVM curriculum.

VIBS 913 Microscopic Anatomy II
Credits 4. 2 Lecture Hours. 6 Lab Hours.
Developmental anatomy of domestic animals with special emphasis on structural congenital defects; functional neuroanatomy and clinical neurology of domestic animals; essential clinical skills for the theory and practice of veterinary neurology.
Prerequisite: Enrollment in first year of professional curriculum.

VIBS 694 Didactic Electives in Veterinary Anatomy
Credits 1 to 12. 1 to 12 Lecture Hours.
Elective course in veterinary anatomy (with emphasis on neuroscience, cell biology, genetics, reproduction, developmental biology, marine mammal anatomy) for professional students who wish to supplement required curriculum. May be repeated for credit.
Prerequisite: Enrollment in third year of professional curriculum.

VIBS 985 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Directed individual study of a selected problem in veterinary anatomy (with emphasis on neuroscience, cell biology, genetics, reproductive biology, developmental biology, or marine mammal anatomy) or directed individual study of advanced topics in veterinary public health or epidemiology (with emphasis on food safety, toxicology, informatics, or zoonoses). May be repeated for credit.
Prerequisite: Matriculation in veterinary professional curriculum.
VIBS 989 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of veterinary anatomy (with emphasis on neuroscience, cell biology, genetics, reproductive biology, developmental biology or marine mammal anatomy) or selected topics in veterinary public health, epidemiology, zoonoses, food hygiene and food toxicology.
Prerequisite: Matriculation in veterinary professional curriculum.