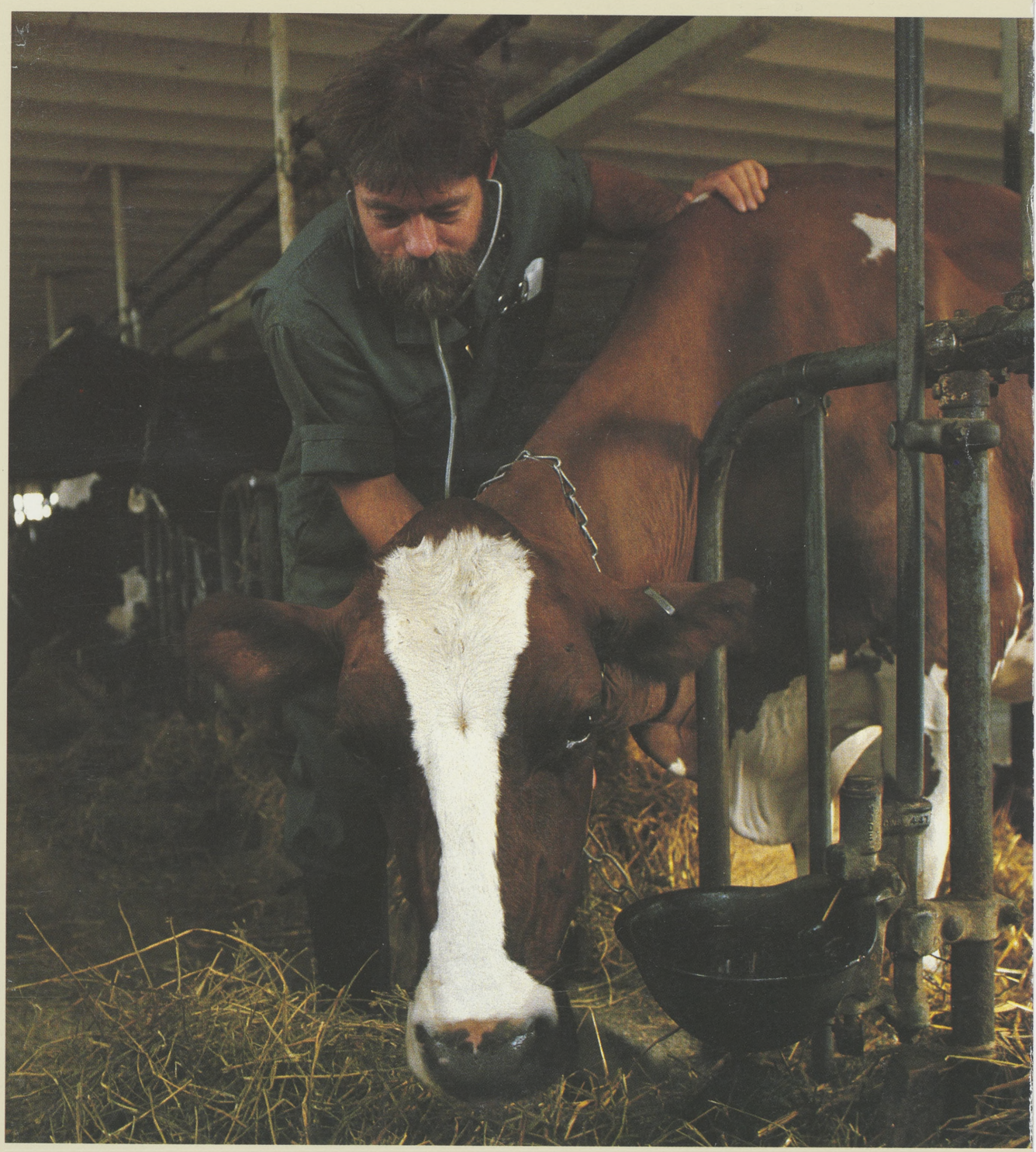
# The College of Veterinary Medicine



1990–1991

CORNELL
UNIVERSITY

**Cover: In the heart of a dairy state, veterinarians at the College of Veterinary Medicine provide veterinary medical care to many dairy herds. Herd health management and surgical and medical services are offered by the Teaching Hospital, and programs in disease surveillance and testing and quality milk promotion services are available through the Diagnostic Laboratory.**

**Opposite: The college's Equine Research Park at dawn.**

**Cornell University**
**(USPS 132-860)**

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# College of Veterinary Medicine

**Cornell University 1990–91**

*A Statutory College of the State of New York*

## Cornell Academic Calendar

| Fall Semester | 1990–91 | 1991–92 |
|---|---|---|
| Registration begins | Tuesday, August 28 | Tuesday, August 27 |
| Registration ends | Wednesday, August 29 | Wednesday, August 28 |
| Instruction begins | Thursday, August 30 | Thursday, August 29 |
| Fall recess begins | Saturday, October 6, 1:10 p.m. | Saturday, October 12 |
| Instruction resumes | Wednesday, October 10, 7:30 a.m. | Wednesday, October 16 |
| Thanksgiving recess begins | Wednesday, November 21, 1:10 p.m. | Wednesday, November 27 |
| Instruction resumes | Monday, November 26, 7:30 a.m. | Monday, December 2 |
| Last day of instruction | Saturday, December 8 | Saturday, December 7 |
| Study period begins | Sunday, December 9 | Sunday, December 8 |
| Study period ends | Wednesday, December 12 | Wednesday, December 11 |
| Final examinations begin | Thursday, December 13 | Thursday, December 12 |
| Final examinations end | Friday, December 21 | Friday, December 20 |
| **Spring Semester** | | |
| Registration begins | Thursday, January 17 | Thursday, January 16 |
| Registration ends | Friday, January 18 | Friday, January 17 |
| Instruction begins | Monday, January 21 | Monday, January 20 |
| Spring recess begins | Saturday, March 16, 1:10 p.m. | Saturday, March 14 |
| Instruction resumes | Monday, March 25, 7:30 a.m. | Monday, March 23 |
| Last day of instruction | Saturday, May 4 | Saturday, May 2 |
| Study period begins | Sunday, May 5 | Sunday, May 3 |
| Study period ends | Wednesday, May 8 | Wednesday, May 6 |
| Final examinations begin | Thursday, May 9 | Thursday, May 7 |
| Final examinations end | Friday, May 17 | Friday, May 15 |
| Commencement | Sunday, May 26 | Sunday, May 24 |

This calendar is subject to modification and is not legally binding.

In enacting this calendar, the university has scheduled classes, laboratories, and examinations on religious holidays. It is the intent of the university that students who miss those activities because of religious observances be given adequate opportunity to make up the missed work.

Produced by Media Services

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**Ithaca-Area Map**

Surrounded by the natural beauty of upstate New York, the main campus of the College of Veterinary Medicine at Cornell University occupies about twenty acres.

# The College of Veterinary Medicine

From the very beginning of the university, with the issuance of a charter in 1865, Ezra Cornell insisted that a chair of veterinary medicine be established. His experience as an owner of purebred livestock had taught him the importance of animal health, and he instructed Andrew D. White, the first president, to seek out the best-qualified person to teach courses in veterinary medicine and surgery. It was the first time that veterinary science had been granted equal rank with other sciences in an American university.

President White secured the services of James Law, and the appointment was confirmed on August 4, 1868, by the Board of Trustees. A young, well-educated Scotsman, Law had graduated from the Edinburgh Veterinary College, studied under the great teachers of the day (William Turner in human anatomy and Joseph Lister in the principles and practices of surgery), and attended veterinary schools on the Continent. He had also taught at the New Veterinary College in Edinburgh and the Albert Veterinary College in London.

When classes began on October 7, 1868, Dr. Law's office was on the second floor of Morrill Hall, the first university building to be completed. During the academic year 1869–70 a fairly complete course in veterinary medicine was taught by Professor Law to a class of about twenty. Of this group, two graduated with the Cornell degree of Bachelor of Veterinary Science. One of those individuals, Daniel E. Salmon, returned for additional study and in 1876 received the D.V.M. degree, the first to be awarded in the United States.

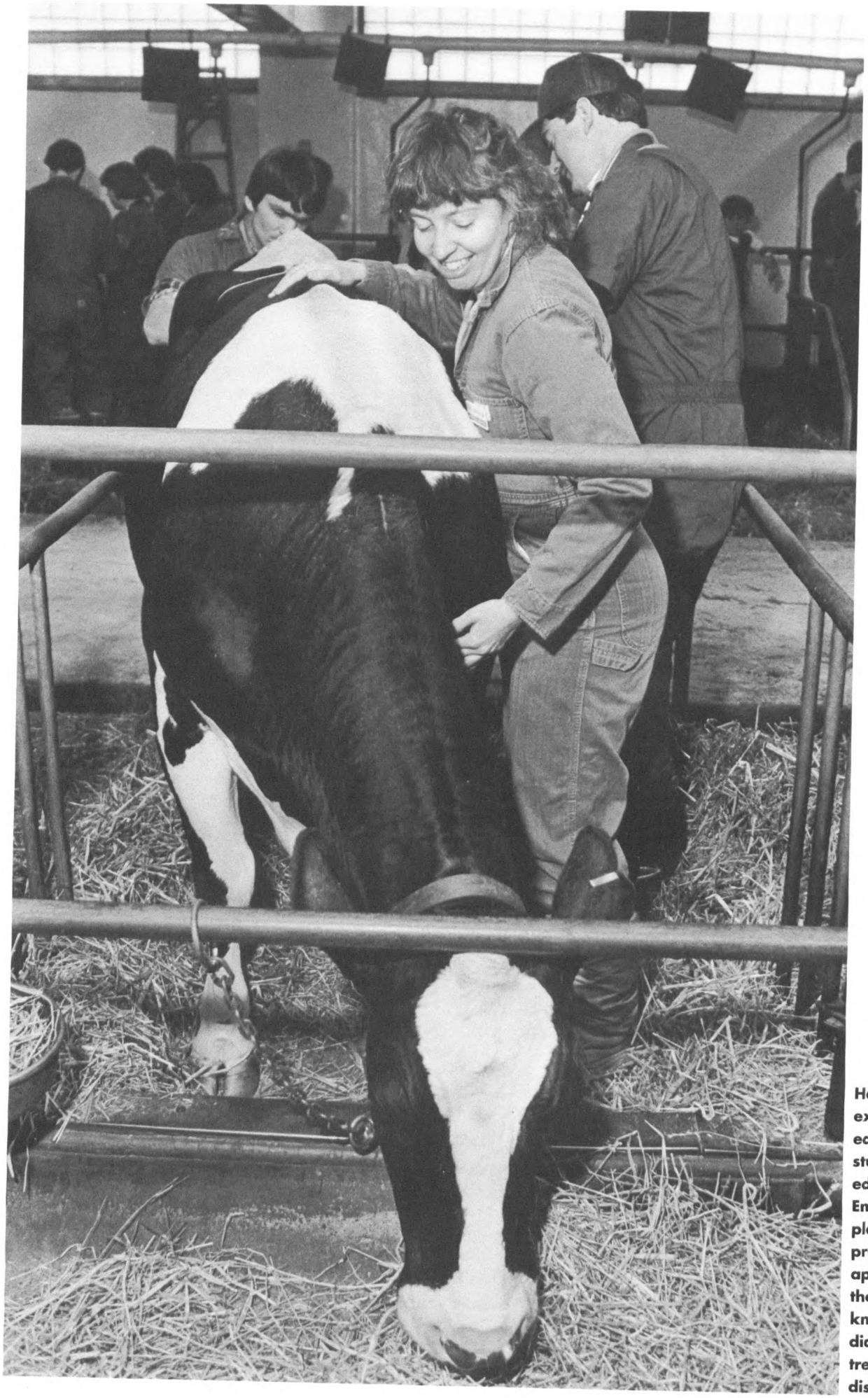
It was not until March 21, 1894, that the New York State Veterinary College was established at Cornell. It was the first contract college (later to be known as a statutory college) at Cornell, thereby setting the stage for a long and effective arrangement between the state and the university. A veterinary building (named James Law Hall some years later) was provided by the state, and the doors were opened for classes in the autumn of 1896. The school was composed of six faculty members of professorial rank, two instructors, and eleven students. The scholastic requirement for entrance was a high school diploma or its equivalent, a rather high standard for those days.

The early faculty recognized the importance of a good library and set this goal as one of their priorities. Governor Roswell P. Flower made a personal donation in 1897 to the library that now bears his name and houses an impressive collection of veterinary resource materials.

Women have played an important role in the college since its early days. Florence Kimball, the first woman to receive the D.V.M. degree in the United States, graduated from Cornell in 1910. Seven of the first eleven women to become licensed veterinarians in this country were Cornell graduates.

The college remained at its original site (at the southeast corner of East Avenue and Tower Road) until the summer of 1957. The present site was occupied in July 1957. The main group of buildings occupies about twenty acres, with ancillary facilities on Snyder Hill and elsewhere. The latest additions are the ten-story Veterinary Research Tower, dedicated June 27, 1974, and the Diagnostic Laboratory, dedicated October 17, 1978. A major expansion of college facilities is presently being constructed that will add a new teaching hospital and more space for teaching and research as well as expansion of the library.

The teaching, research, and service programs of the college are recognized as among the best in the world. Each mission supports the others and contributes to the vitality of the program as a whole. A staff of almost 900 now support the college's programs. The college's instructional activities include the professional degree (D.V.M.) program for 320 men and women; graduate programs leading to a M.S. or Ph.D. degree in the graduate Fields of Veterinary Medicine, Immunology, Physiology, Environmental Toxicology, and others for another 115 students; and intern and residency programs in the Department of Pathology and the Department of Clinical Sciences that educate about 30 D.V.M.'s for advanced work in clinical areas.



**Hands-on experience begins early in a D.V.M. student's education. Emphasis is placed on the practical applications of their basic knowledge to the diagnosis and treatment of disease.**

# Summer Programs and Opportunities

## High School Students

### Explorations in Veterinary Medicine

Cornell University Summer College offers Explorations in Veterinary Medicine, a six-week program for high school students interested in gaining realistic insights into modern veterinary medicine. Through lectures, laboratories, visits, and demonstrations, students become acquainted with the wide range of disciplines within veterinary medicine—from practice to research. Students meet professors, practitioners, and students of veterinary medicine and have a chance to talk with people involved in teaching and practice.

In addition, participating students take a freshman writing course and choose one or more courses from those offered by Summer College.

Students successfully completing the program receive a certificate from Cornell University Summer College.

For more information, write to Cornell University Summer College, Box 725, B12 Ives Hall, Ithaca, New York 14853-3901, or call 607 255-6203.

### Minority High School Student Research Apprentice Program

The Minority High School Student Research Apprentice Program is a six-week program designed to provide meaningful experience in health-related research. Assignments are made with investigators who are involved in such research, and participants are given the opportunity to assist the investigators in veterinary research laboratories. Certain assignments also allow for veterinary medical animal-related experiences. In addition, participants will be given opportunities to become familiar with the many facets of the College of Veterinary Medicine, including knowledge of the requirements and procedures for admission and an overview of career opportunities available in veterinary medicine.

The program starts in June and ends in August. Each participant receives financial support for the duration of the program. Room and board are subsidized by the College of Veterinary Medicine and are available through Cornell University.

Any minority student who is enrolled in high school during the academic year prior to the start of the program in June is eligible to apply for this program. Apprentices are selected on a competitive basis. Applications are available in January.

For additional information, contact Shenetta Selden, Admissions Officer, C-117 Schurman Hall, College of Veterinary Medicine, Cornell University, Ithaca, New York 14853-6401.

## College Students

### Minority College Students Summer Employment Opportunity Program

An eight-week program designed to provide opportunities for learning about the profession of veterinary medicine and gaining animal-related experience is available to minority college students who have demonstrated interest in a career in veterinary medicine and have completed some of the course work required for admission to a veterinary program. Any students who identify themselves as Black, Hispanic, American Indian, Alaskan Native, Asian, or Pacific Islander and are enrolled in college during the academic year prior to the start of the program are eligible to apply. Application materials and further information may be requested from Shenetta Selden, Admissions Officer, C-117 Schurman Hall, College of Veterinary Medicine, Cornell University, Ithaca, New York 14853-6401.

## D.V.M. Students

### Expanding Horizons

Grants are available on a competitive basis each summer for veterinary students interested in novel and nontraditional employment opportunities. The basic objective of these grants is to provide support for students to explore possible career alternatives with a long-range view toward expanding the spectrum of opportunities for graduate veterinarians. All veterinary students in the first three years of the curriculum who are in good academic standing are eligible to apply. Applications are evaluated by an ad hoc committee, and awards are announced by the end of March each year.

### International Projects

For the last several years the College Committee on International Programs has made funds available on a competitive basis to D.V.M. students who are interested in becoming involved in international veterinary medical projects in third-world countries. All D.V.M. students in good academic standing at the college are eligible to apply for funds. Proposals for grant money, which must include a statement of intent, information about personal

background, knowledge of third-world countries and language ability, a realistic budget, and plans for sharing the experience with the college community, are announced in the fall semester. The deadline for submission is usually near the end of February. Decisions are made by the College Committee on International Programs, and funds are administered by the director of student affairs and admissions.

## Pre-D.V.M. Advanced Pharmacology Training Program

The Department of Pharmacology is making funds available for a summer program in basic or clinical pharmacology. Students will be selected for the program on the basis of academic qualifications and potential interest in a career in pharmacology. Training, which will be for two or three successive summers, will be in basic or clinical pharmacology, pharmacokinetics, or toxicology. Students may work in a different area each summer. The work will be structured to provide formal reading, study, and research under the personal supervision of a faculty member.

The major goal of this program, which we hope to expand as we raise additional funds, is to encourage highly talented individuals to enter a career of veterinary pharmacology. The current summer stipend is $2,500.

Interested students should contact Dr. Geoffrey W. G. Sharp, chairman, Department of Pharmacology, College of Veterinary Medicine.

## NIH Summer Research Fellowships

As part of a National Health Sciences Manpower Program, the National Institutes of Health has awarded the college a training grant designed to provide introductory research experience for veterinary students during the summer months. Students selected for the program will participate actively in a research program being carried out in one of several specific college research laboratories. For more information, contact Dr. Robert M. Lewis, Department of Pathology, College of Veterinary Medicine.

**The fourth year of the D.V.M. program is devoted to training in clinical medicine, surgery, and the specialty disciplines, such as ophthalmology, radiology, anesthesiology, and dermatology.**

# Admission to the D.V.M. Program

## Director

Marcia James Sawyer
Director of student affairs and admissions
607 253-3700

## Admission Policy

The Faculty Committee on Admissions endeavors to select the best-qualified applicants, who, in its judgment, will be most able to successfully complete the veterinary medical curriculum and become competent, responsible veterinarians.

Approximately 70 percent of the eighty students admitted to each class are from New York State. The college also contracts with a number of states that do not have a veterinary school and subsidizes a limited number of positions for their qualified residents. Applicants from these states (currently Connecticut, Delaware, Maine, Maryland, New Hampshire, New Jersey, and Vermont) and from Puerto Rico are encouraged to apply. A very limited number of nonresident, noncontract positions are also available,

and those students with superior qualifications, regardless of residency, are encouraged to apply.

It is the policy of Cornell University actively to support equality of educational and employment opportunity. No person shall be denied admission to any educational program or activity or be denied employment on the basis of any legally prohibited discrimination involving, but not limited to, such factors as race, color, creed, religion, national or ethnic origin, sex, age, or handicap. The university is committed to the maintenance of affirmative-action programs that will assure the continuation of such equality of opportunity. Sexual harassment is an act of discrimination and, as such, will not be tolerated. Inquiries concerning the application of Title IX may be referred to Cornell's Title IX coordinator (coordinator of women's services) at the Office of Equal Opportunity, Cornell University, 234 Day Hall, Ithaca, New York 14853-2801 (telephone: 607 255-3976).

## Selection Criteria

In conducting its evaluation, the committee is guided by the following criteria for determining the best-qualified applicants.

### Academic Achievement and Aptitude

The need for learning large amounts of factual material means that successful applicants must have demonstrated achievement and potential for comprehension of scientific materials and an ability to solve complex problems. That ability is evaluated by examination of all college-level courses taken and by consideration of the Graduate Record Examination scores.

### Quality of the Preparatory Program

Since the curriculum leading to the Doctor of Veterinary Medicine (D.V.M.) degree is academically rigorous, the committee takes into consideration the quality of the academic program presented by the applicant for admission. Such factors as the variety and balance of courses taken, the difficulty of courses selected, and the ability to carry a heavy academic course load at a demanding institution are taken into account. As no preference is given to applicants majoring in any particular field, the choice of a major is left to the individual. Experience in teaching or research in basic sciences or areas indirectly related to human or veterinary medicine is considered in the evaluation.

### Experience, Knowledge, and Achievement in Matters Relating to Animals and the Veterinary Profession

Veterinary medicine is an animal-oriented profession. Therefore an applicant's experience in working with animals and an understanding of the veterinary profession are viewed by the admissions committee as important considerations in the selection process. Such experience could involve breeding, rearing, feeding, and showing various kinds of animals, including companion animals, livestock, laboratory animals, zoo animals, or wildlife.

The applicant should be prepared to present evidence of hands-on experience with animals and sufficient contact with the veterinary profession to enable the admissions committee to determine that the applicant has some understanding of the duties and responsibilities of a practitioner and the scope of veterinary medicine.

### Experience, Knowledge, and Achievement in Activities Unrelated to Veterinary Medicine

The well-rounded applicant demonstrates significant achievements outside of academic and veterinary-oriented activities. Therefore the committee evaluates the depth and breadth of accomplishment in extracurricular activities, community services, hobbies, and nonacademic interests of all kinds.

### Personal Characteristics

The committee endeavors to select applicants of integrity, reliability, maturity, and determination. It is important that professionals possess excellent oral and written communication skills, poise, leadership ability, and a talent for getting along with others.

### Academic Preparation

Admission to the College of Veterinary Medicine at Cornell requires a minimum of three years' preparation in an accredited college or university. An application may therefore be submitted at the beginning of the junior year if the applicant has fulfilled the requirements. This preparation does not have to be completed in a specialized college or in a designated preveterinary program. Potential applicants should enroll in an undergraduate institution with a reputation for academic excellence that offers the prerequisite courses as part of an accredited baccalaureate program. The ideal candidate has a broad education from a rigorous program that includes an introduction to the primary areas of human knowledge: the arts, humanities, social sciences, natural sciences, and mathematics. In addition to the specific prerequisite courses listed below, the admissions committee considers evidence that candidates have sought to develop the general skills, attitudes, and values of an educated person. These include (a) the ability to read with comprehension and to write and speak with clarity and precision; (b) a sense of the physical, biological, social, and historical context in which we live our lives; (c) some insight into a time and culture other than our own; and (d) the ability to work with precision, rigor, and understanding in a chosen discipline.

The following course requirements are prerequisites for admission to the professional degree program in veterinary medicine:

| | *Semester Credits* | *Quarter Credits* |
|---|---|---|
| English composition* | 6 | 9 |
| Biology or zoology (with laboratory) | 6 | 9 |
| Inorganic chemistry (with laboratory) | 6 | 9 |
| Organic chemistry (with laboratory) | 6 | 9 |
| Biochemistry | 4 | 6 |
| Physics (with laboratory) | 6 | 9 |
| General microbiology (with laboratory) | 3 | 4.5 |

*Half of this requirement may be satisfied with an oral communication course.

All prerequisite courses should be completed and documented with a letter grade of C– or better at the time of application. It is possible to apply with up to seven credits in progress at the time of application, provided that at least one semester of any two-semester series has been completed. For example, three outstanding credits of physics could be allowed, but not all six. Applicants without complete prerequisite course work may be at a disadvantage when compared to applicants who have satisfied all course requirements. All requirements must be completed prior to matriculation.

## Guaranteed Admission

A new program recently developed at the college allows highly qualified college sophomores to apply for admission and be guaranteed a position in the class following their third year of school (or, at their option, fourth). It is hoped that if students are notified of their acceptance into the program before their junior year, they will be freer to broaden their undergraduate education by choosing classes that they want to take rather than courses they feel they need to take to please the admissions committee or preserve their grade-point averages. More information on the program may be obtained by calling the Office of Student Affairs and Admissions or by sending in the postcard at the back of this catalog.

## Application Procedures

Application forms and detailed information can be obtained by writing to the Office of Student Affairs and Admissions. Application materials will be ready for distribution in August of the year preceding possible matriculation. The complete application material, application fee, and supporting documents must be submitted to the Office of Student Affairs and Admissions by November 1.

### Graduate Record Examinations

The Graduate Record Examination (GRE) general test is required of all applicants. The test must be taken no later than October of the year before desired matriculation. Scores from examinations taken more than five years before the application deadline will not be considered.

The GREs are administered by the Educational Testing Service, Box 955, Princeton, New Jersey 08540. Results of the examinations will be reported to the college if the institution code R 2549-4, College of Veterinary Medicine at Cornell, is properly entered on the test forms.

The desirable minimum score for the aptitude portion (verbal and quantitative) is 1200. The advanced biology test or other advanced tests are not required but may be included. The college does not as yet use the results of the analytical portion of the GRE.

### Deferments

Successful (accepted) applicants may apply for deferred admission because of exceptional medical or personal circumstances or to avail themselves of exceptional cultural or educational opportunities. Requests for deferred admission will be considered and granted or denied by the Basic Admissions Committee. Any applicant who wants to apply for a deferment should send a typewritten letter of explanation to the Office of Student Affairs and Admissions at the time of notification of acceptance.

### Advanced Standing

Applicants for admission with advanced standing as members of the second- or third-year class must present educational qualifications and professional accomplishments similar to those expected of students who have completed the previous year's courses here. Unless attending one of the schools or colleges of veterinary medicine accredited by the American Veterinary Medical Association, applicants must satisfactorily pass examinations in all of the work for which they desire advanced credit. No one will be admitted to any advanced class except at the beginning of the college year in September. The applicant must file a formal application and must be interviewed by the admissions committee and possibly by other faculty members. Places for admission with advanced standing are limited and depend on vacancies occurring in that particular class.

It is imperative that the admissions committee have detailed and translated summaries of veterinary medical academic programs and accomplishments for those seeking advanced placement from schools in foreign countries. Advanced standing applications are normally considered during the summer months before desired matriculation, but applications should be on file and completed as early as possible, not later than April 15.

### Further Information

Additional questions about admissions can be directed to the Office of Student Affairs and Admissions, C-117 Schurman Hall, Cornell University, Ithaca, New York 14853-6401 (telephone: 607 253-3700).

## University Requirements

Applicants accepted for admission are required to pay a registration fee and will be notified of the amount and the due date at the time of acceptance. No refunds will be made to applicants who withdraw after the due date of the fee.

Entering students must also fulfill the health requirements adopted by the Board of Trustees of Cornell University before being allowed to register.

### D.V.M./Ph.D. Programs

Interested students may begin work on a graduate program (Ph.D.) during their studies for the D.V.M. degree. Vacations are devoted to investigations and research toward the graduate degree, while the academic year is devoted to work toward the D.V.M. degree. The remainder and bulk of graduate work is completed after the D.V.M. degree is granted. Vacation stipends are available for work done during the D.V.M. studies, and a limited number of fellowships are available on a competitive basis to students when they are working on the Ph.D. program. For more information, contact the Office of Admissions, College of Veterinary Medicine, Cornell University, C-117 Schurman Hall, Ithaca, New York 14853 (telephone: 607 253-3700).

## Combined Courses

### Double Registration

Through a program of double registration it is possible for D.V.M. students who did their preveterinary work in the College of Agriculture and Life Sciences at Cornell University, and who were accepted after their third year of undergraduate study, to complete a B.S. degree while working on the D.V.M. degree. Students interested in this program should consult their undergraduate faculty advisers.

**In an applied anatomy class, D.V.M. students learn to recognize anatomical features in the living animal and models that are essential to diagnostic, surgical, obstetrical, and postmortem procedures.**

# Finances

### Director

Gloria R. Crissey
Director of financial aid
607 253-3765

### Tuition and Fees

Tuition and fees for Doctor of Veterinary Medicine degree candidates are $9,450 a year for New York State residents and $11,600 a year for nonresidents. Most students in the college do not live in university housing. The cost of room and board in Ithaca for 1990–91 is estimated at $5,750. Books, instruments, and supplies cost approximately $660 a year. An additional allowance of $3,250 should be made for clothing, laundry, local transportation, entertainment, telephone, and incidentals. These estimates are based on standard budget figures provided by the university's Office of Financial Aid and Student Employment for the purpose of allocating funds and budgeting for financial aid. Individual expenditures may exceed these figures, depending on personal preferences in housing, transportation, dining, and so on. The

amount, time, and manner of payment of tuition, fees, or other charges may be changed at any time without notice.

Students who want to pay tuition in monthly installments should contact the Office of the Bursar. Information about this plan is mailed to parents of continuing students in April of each year and to parents of incoming freshmen and transfers in May of each year.

*Courses of Study* describes university policies, student services, fee schedules, and payment procedures.

## Refund Policies

Part of the amount personally paid for tuition will be refunded if the student obtains an official certificate of leave of absence or withdrawal at the office of the dean or director of the academic division involved. Students who terminate their registration in the university in this manner during a regular term will be charged tuition from the official university registration day to the effective date of the certificate on a pro rata basis. Contact the Office of the Bursar, Cornell University, 260 Day Hall, Ithaca, New York 14853 (telephone: 607 255-2336) for details.

The university makes available tuition insurance, which provides refunds in the event of leave of absence or withdrawal for medical or emotional reasons. Applications and complete details regarding this coverage accompany the August tuition bill.

The $40 application fee for university residence halls is nonrefundable except when lack of space prevents the offer of a room assignment, in which case a full refund will be made on request.

Students who withdraw from a prepaid dining plan during a semester are eligible for a prorated refund based on the number of days the contract was in effect.

## Financial Aid

Information and guidance regarding financial aid for veterinary students is available from the college Office of Financial Aid. A description of the methods, procedures, calendar, resources, and policies can be found in the college publication *Financial Aid*, which is updated annually. Approximately 85 percent of the financial aid available for the coming year will be through self-help loan programs. The college's policy of support is based on the assumption that parents and spouses are willing to help finance the education of their family members to the extent possible.

To standardize procedures and provide uniform criteria for estimating family financial strength, the college uses the Graduate and Professional School Financial Aid Service (GAPSFAS) and federal income-tax information. The college Office of Financial Aid conducts individual need analyses, and available aid is recommended accordingly. Financial-aid packages prepared by the college Office of Financial Aid may combine loans, employment, and gifts or grants.

A veterinary student who desires financial aid should request a GAPSFAS application form from the college and should complete it by March 1 for aid beginning the following autumn. Application for financial aid does not affect the admissions evaluation process. Residents of New York State who qualify for Tuition Assistance Program (TAP) awards should apply each year to the New York State Higher Education Services Corporation, 99 Washington Avenue, Albany, New York 12255. Applications should be submitted in early summer; the deadline is March 31 of the academic year for which aid is requested.

### Loan Funds

Sources for loans to veterinary students are as follows: the Cornell Veterinary Alumni Association, the New York State Veterinary Medical Society, the family of David E. Wright '12, the National Association of Federal Veterinarians Emergency Loan Fund, the Student Emergency Loan Fund of the Auxiliary to the New York State Veterinary Medical Society, the Charles H. Webster Veterinary Fund, the Stafford Loan Program (formerly Guaranteed Student Loan), the Health Professions Student Loan Program, Perkins Loans (formerly National Direct Student Loans), and certain other loan funds administered by Cornell University. Most guaranteed loans defer interest or principal payments until the student has left school. Interest rates vary according to the source of the loan, and certain short-term loans are interest free.

Other guaranteed student loans available provide partial or no interest subsidy: Supplemental Loans for Students (SLS) and the Health Education Assistance Loan (HEAL).

### Scholarships for Veterinary Students

Veterinary students may receive help from various scholarship funds throughout the four-year course of study. The nature and extent of such assistance depends on scholastic achievements, financial need, specific criteria established by each benefactor, and recommendations of the appropriate college committees. Scholarship Committee evaluations and recommendations are completed at the end of spring semester. Scholarship stipends are credited by the university bursar for the award year. Students interested in securing other forms of financial assistance should contact the college director of financial aid.

Numerous prizes are also available for veterinary students and are subject to conditions listed under each award. Many of the prizes, awards, and scholarships were established with endowments, so the income distributed and number of awards may vary from year to year.

**Amlan Foundation Scholarship.** An award established by the Amlan Foundation in recognition of the special attributes, pleasures, and rewards from associations in the equine area. The scholarship is awarded to a

third-year student who demonstrates special interest in standardbred horses and who has shown creditable academic performance and leadership in addition to financial need.

**Stephen Arnold Memorial Scholarship.** In 1988, friends, clients, and classmates of Dr. Stephen Arnold, D.V.M. '74, established this scholarship in his memory to make funds available to students pursuing careers in veterinary medicine.

**Auxiliary to the New York State Veterinary Medical Society Scholarship.** Two scholarships are awarded each year, one to a student at the end of the sophomore year and the other available to any student. The award of these scholarships will be based on the applicants' financial need and ability to do creditable academic work. Additional awards may be made as funds are available.

**Auxiliary to the Long Island Veterinary Medical Association Scholarship.** An annual gift from the Auxiliary to the L.I.V.M.A. provides a scholarship award for an outstanding, needy student in each year's second-, third-, and fourth-year class.

**Jack Edward Baker Memorial Loan-Scholarship Fund.** An endowed fund established in 1981 by Frances Baker in honor of her "horse doctor" husband, Jack Edward Baker, D.V.M. '37. The fund is dedicated to the faculty and the high quality of veterinary training received by Jack Baker at Cornell University. Proceeds from the endowment are to be used for veterinary students in need of financial assistance.

**Mr. and Mrs. R. H. Baukhage Book Scholarship Fund.** Elizabeth Glover Jenks '48 provided funds in the name of Mr. and Mrs. R. H. Baukhage for a permanent book scholarship for a deserving student.

**Harriet G. Bird Memorial Scholarship.** Established by the Merwin Memorial Free Clinic for Animals for Massachusetts residents. The award is based primarily on the financial need of applicants who maintain satisfactory academic performance.

**The Bloch Family Scholarship.** A scholarship established in 1990 by Dr. Jack Bloch, D.V.M. '60, in memory of his parents, David and Thekla Bloch.

**The Joseph Brender Student Aid Fund.** Established by friends of Joseph Brender, this memorial loan-scholarship fund provides income for an annual scholarship award to veterinary students, with preference given to ethnic minority students.

**Central New York Junior/Amateur Horse Show Scholarship.** This fund was established in 1990 by the Canterbury Riding Club and Pony Pals, two 4-H clubs from Onondaga County, with the proceeds earned over ten years from the jointly sponsored Central New York Junior/Amateur Horse Show. The scholarship will benefit a first-year veterinary medical student with previous 4-H experience or Central New York residence.

**Charlie and Chico Memorial Scholarship.** An award dedicated to the memory of two faithful companion dogs, established by Mr. and Mrs. Alfred Morra in 1979. The scholarship is designated for a veterinary student who is from Connecticut or the New England area. It is to be given to a student who exhibits special care and concern for small animals, has definite financial need, and maintains creditable academic performance.

**The Dorothy R. Clay Scholarship Fund.** This fund was established in 1981 from the Dorothy R. Clay estate and is designed to provide scholarship aid for veterinary students.

**Veterinary College Class Scholarships.** These funds have been established by D.V.M. alumni classes to provide assistance to today's veterinary medical students at Cornell:

**Class of 1945 Scholarship** - established in 1990 as the 45th class reunion gift.

**Class of 1950 Scholarship** - Most of the members of the class of 1950 were married and had children as students. They established this scholarship in 1990 as their 40th reunion gift, to be awarded with a preference for married students with children.

**Class of 1956 Scholarship** - John Shumway, D.V.M. '56, provided the initial gifts to establish this award. With his leadership and gifts from other members of the Class of 1956, the fund will grow in future years to provide assistance for more veterinary medical students.

**Class of 1960 Scholarship** - established in 1990 as the 30th class reunion gift.

**Class of 1965 Scholarship** - established in 1990 as the 25th class reunion gift.

**Class of 1970 Scholarship** - established in 1990 as the 20th class reunion gift.

**Class of 1974 Scholarship** - This fund was begun in 1984 with gifts contributed in memory of Mark Chamberlin, D.V.M. '74, by his classmates and friends. The class intends to continue gifts to this scholarship in memory or in honor of others.

**The Marjorie Dean Cornell Scholarship in Feline Medicine.** This scholarship was established in 1986 by Marjorie Dean Cornell '39 to encourage women studying veterinary medicine who show special interest in feline medicine.

**The Ben B. and Elizabeth Cox Scholarship.** An endowment established in 1986, this scholarship is to be awarded to students of high character, strong academic record, and demonstrated financial need.

**The William A. Dennis Memorial Scholarship Fund.** In 1982 the will of Theresa A. Dennis Hart, widow of William A. Dennis, D.V.M. '26, established the William A. Dennis Scholarship Fund, with the income to be used to provide scholarships for worthy students selected by the faculty of the college.

**The William A. and Walter R. Dennis Memorial Loan-Scholarship Fund.** In 1981 Walter R. Dennis, D.V.M. '38, endowed a fund in memory of his brother, William A. Dennis,

D.V.M. '26, to benefit second-, third-, or fourth-year students interested in the practice of farm animal medicine, with preference for students from Cattaraugus, Chautauqua, Chenango, and Madison counties. Following the death of Walter R. Dennis, the college honored a request from his family that the fund be known as the William A. and Walter R. Dennis Memorial Loan-Scholarship Fund.

**Henry Winfield Dustan Memorial Scholarship.** This endowed fund was established in 1989 with a bequest from Mrs. Alice D. Kollar, a long-time friend of the college, and is named in honor of her father, Henry Winfield Dustan, D.V.M. 1898.

**The Dr. John W. and Vivian M. Earl Scholarship**. An endowed scholarship for veterinary students who have demonstrated their worthiness through their academic achievements.

**Priscilla Maxwell Endicott Scholarship.** This endowed scholarship was established in 1977 in honor of Niel W. Pieper, D.V.M. '32. The income is to be used primarily for support of Connecticut students in the college. It is awarded on the basis of creditable academic performance, personal attributes, and financial need. If the scholarship is not needed for Connecticut students, it may be used for students from other New England states.

**Equine Summer Experience Scholarship.** Established to offer increased experience to students interested in equine medical practice, this scholarship is supported by organizations in the equine industry and by equine veterinary practitioners.

**Myron G. Fincher Memorial Scholarship Fund.** Funds from this scholarship will be used to provide scholarship assistance to outstanding juniors or seniors enrolled in the College of Veterinary Medicine at Cornell. Preference will be given to students who are interested in careers in the practice of large animal medicine or in academic large animal medicine.

**Irene Heinz Given and John LaPorte Given Veterinary Scholarship.** The award is administered by the Committee on Admissions, in accordance with the intent of the trustees of the Given Foundation, to help qualified students applying for admission who might otherwise be financially unable to attend this college.

**Glens Falls Kennel Club Scholarship.** An annual scholarship established in 1990 with a gift from the Glens Falls Kennel Club, to be awarded to a third- or fourth-year veterinary student from the tricounty (Warren, Washington, Saratoga) area.

**Arthur G. Hall Scholarship.** Established in 1975 as an endowed scholarship for needy and worthy students who maintain the moral standards required by the rules and regulations of the college.

**Richard M. Hartenstein Scholarship.** This scholarship is awarded to an outstanding veterinary student from Long Island, by the Auxiliary to the Long Island Veterinary Medical Association, in memory of Richard M. Hartenstein.

**The Billy Haughton Memorial Scholarship.** Friends and relatives of Billy Haughton, one of the leading driver trainers in harness horse racing, established this scholarship following his death in 1986. Billy Haughton was a long-time friend and adviser to the college's equine programs, and thus the scholarship is awarded with a preference for students with strong interests in careers in equine medicine.

**Hill's Pet Products Scholarships.** A program developed by Hill's Pet Products to provide a scholarship for each veterinary class. The awards are based on financial need and special interest in small animal clinical nutrition.

**Jaqua Scholar Program.** The Jaqua Foundation is providing annual funding for one or two awards on the basis of academic standing, financial need, and New Jersey residence. The awards are designed for recipients who typify the foundation's concerns and objectives toward animals as personal companions and for their humane care as experimental animals in research programs.

**David Kennedy Johnston Scholarships.** Under the will of Nettie J. Huey, funds were set aside to provide scholarships to students in the College of Agriculture and Life Sciences and the College of Veterinary Medicine.

**Valentine Mott Knapp Scholarship.** This annual scholarship was established through the will of David V. Knapp as a memorial to his brother, Valentine Mott Knapp, D.V.M. '04. The award is made at the end of the third year. In awarding the scholarship, the faculty takes into consideration the ability of the applicant to do creditable academic work, the personal characteristics of the applicant with respect to professional attitude, and financial need.

**Madelyn C. Kreisler Scholarship.** Established in 1977 from the Madelyn C. Kreisler estate to provide scholarships in veterinary medicine.

**Le Schin-Wieler Empire Cat Club Scholarship.** This endowment was established in 1986 by the Le Schin-Wieler Cattery for scholarships in veterinary medicine in honor of Eberhardt E. Le Schin and John W. Wieler. Recipients are selected from the entering class who show academic worthiness and financial need and who have an interest in small animals, preferably cats. Preference is given to sons and daughters of members of the Empire Cat Club or similar cat clubs in the New York City area.

**Joel Rosenman Leventhal Memorial Scholarship.** The Joel Rosenman Leventhal Scholarship was established in 1983 as a gift from Miriam R. Leventhal in memory of her son, whose greatest aim in life was to be a veterinarian and who was a student at Cornell University when he met with a fatal accident. This scholarship is to be awarded with the expectation that the student who receives it during the first year in the College of Veterinary Medicine will continue to be supported. It is for a veterinary student

who completed undergraduate work at Cornell University.

**Germaine B. Little Student Loan Fund.** This loan-scholarship fund was established by the will of Germaine B. Little. Income from this fund is awarded annually to selected veterinary students who have demonstrated financial need.

**Miles C. Markham Scholarship.** This endowed scholarship was established in 1976 in honor of Miles C. Markham, D.V.M. '18, by his wife, Hedwig, for worthy, needy students in the college. It is awarded on the basis of general worthiness of applicants, taking into consideration their overall character, academic ability, and financial needs.

**Dr. Lykergus W. and Alma Fay Messer Memorial Scholarship.** A bequest from the estate of Alma Fay Messer established this scholarship in 1981 in honor of her husband, Lykergus W. Messer, D.V.M. '28. The income from the fund is to be used for scholarships for veterinary students in need of financial assistance.

**New York State College of Veterinary Medicine Grant.** Awarded on the basis of financial need, NYSCVM Grant funds are allocated to the college by Cornell University.

**New York State College of Veterinary Medicine Loan-Scholarship Fund.** This loan-scholarship fund was established from contributions to the college by alumni and friends. Income from the fund is offered annually as scholarship support for students with financial need.

**North Shore Animal League/Petring Scholarship Fund.** The North Shore Animal League received a bequest, in the names of Anita and Catherine Petring, for scholarships for aspiring veterinary students. The outstanding reputation of the New York State College of Veterinary Medicine at Cornell University prompted the league to select it as one of the recipients of this scholarship program.

**North Shore Animal League Scholarship-Loan Fund.** An endowment provided by the North Shore Animal League in 1983. Earnings are to be used for scholarship support of veterinary students, with preference for those having small animal interests.

**Pfizer Scholarship.** This scholarship is awarded to a student at the end of the third year whose academic achievement is adequate, whose need for the award is clear, and who shows good potential.

**Plainfield Kennel Club Scholarship.** This is an award for a veterinary student from New Jersey who is in need of financial assistance.

**Mrs. Cheever Porter Foundation, Inc., Student Loan-Scholarship Fund Scholarship.** Supportive of organizations working with animals, the Mrs. Cheever Porter Foundation endowed this scholarship in 1982.

**Wilburn H. and Florence Bean Potter Scholarship.** Wilburn H. Potter, D.V.M. '18, and Florence Bean Potter dedicated their lives to improved rural living, the practice of bovine veterinary medicine, and applied dairy cattle husbandry on their farm. Recognizing this dedication, members of the Potter family, joined by many friends, established this scholarship fund in 1986 to encourage students at the College of Veterinary Medicine at Cornell to be interested in careers in bovine medicine. The award is intended for graduates of the College of Agriculture and Life Sciences, with preference given to Cortland County residents.

**Ryman and Katherine Powell Student Fund.** This loan-scholarship fund was established by two veterinarians, Frank Powell, D.V.M. '63, and Josef Powell, D.V.M. '67, in honor of their parents. Earned income from this endowment is awarded annually in the form of a scholarship, with preference given to students from western New York State.

**Putnam Kennel Club Scholarship.** The club provides scholarship support for a deserving veterinary student from New York State whose major interests are in the small animal area.

**Merlin H. Reed Memorial Scholarship.** A gift from Ms. Lois Reed established this scholarship in memory of her brother, Merlin H. Reed. The Merlin H. Reed Memorial Scholarship is for a third-year student with a strong academic record, demonstrated financial need, and special interest and concern for small animals. Preference will be given to students from the northeastern area of New York State.

**Dorothy S. Rex Student Aid Fund Scholarship.** This endowment fund, established in 1979 by the Dorothy S. Rex estate, is designed to help educate worthy young men and women in veterinary science.

**Salsbury Scholarships.** An endowment from the Dr. J. E. Salsbury Foundation to provide funds for senior veterinary students. The awards are based on scholarship, initiative, perseverance, leadership potential, and financial need.

**Sewell-Metzger Memorial Scholarship.** An endowment provided in 1980 by the will of Dorothy Metzger is to be used for scholarship support of veterinary students who have completed three years of academic training and have demonstrated interest in small animal research, especially for the canine species.

**Silver Spurs Riding Club Scholarship.** This scholarship is provided by the Great Lakes Equine Practice of Orchard Park, New York, and is intended for the benefit of New York State residents with an interest in horses.

**Snow Valley Dog Training Club Scholarship.** This scholarship is given by the Snow Valley Dog Training Club, with preference to a student from Oswego County or adjacent counties.

**Thomas F. Tanneberger Memorial Scholarship-Loan Fund.** A fund established by the veterinary class of 1975 in honor of Thomas F. Tanneberger, D.V.M. '75, who was killed in an auto accident in 1979. Earnings are to be used to support scholarships

for veterinary students who have made outstanding athletic contributions during their lifetimes, with preference for those coming from the northern New York area.

**The Jim Dale Thomas Memorial Scholarship.** This award was established as a prize in 1965 and became a scholarship in 1969. The scholarship is awarded, for use in the fourth year, to a third-year veterinary student who has shown an interest in dairy cattle practice and has a high level of capability in this field. The award is made on the judgment of the faculty of the Department of Clinical Sciences.

**Union County Kennel Club Scholarship.** A scholarship for a third- or fourth-year veterinary student from New Jersey.

**Dr. Donald B. Wade Memorial Fund Scholarship.** An endowment established in honor of Donald B. Wade, D.V.M. '70. The award is for a veterinary student who displays academic excellence and needs financial assistance. Preference is given to students from Vermont or those who plan to practice in Vermont.

**Hilda G. and Walter D. Way Scholarship.** A scholarship established in 1984 to help a needy and deserving veterinary student.

**Colonel and Mrs. Louis G. Weisman Fund.** This endowed fund can be used for either loan or scholarship purposes at the discretion of the college. Scholarships are granted from fund earnings to students on the basis of academic performance and financial need.

**Westminster Kennel Foundation Scholarship.** The Westminster Kennel Foundation established this annual scholarship in 1987 to assist a worthy veterinary student who expresses an interest in the welfare of the dog. The recipient is invited, at the expense of the foundation, to attend the Westminster Kennel Club show.

**Hulda Ann White Scholarship.** This endowment was provided in 1984 by the will of Hulda Ann White, who was a lover of animals and wanted to benefit the College of Veterinary Medicine. Hulda White bequeathed a scholarship "to be used for the education of veterinarians for the health and welfare of all animals."

**Virginia B. Wuori Memorial Scholarship.** This scholarship was established by Virginia Wuori in appreciation of the meaningful and rewarding relationships she had with many veterinary students and the profession for a great number of years.

**Wyoming Valley Kennel Club Scholarship.** A scholarship for veterinary students in the upper two classes who need financial assistance and who come from the western New York counties of Allegany, Cattaraugus, Chautauqua, Erie, Genesee, Niagara, Orleans, and Wyoming.

**Yonkers Raceway Foundation Scholarship.** By action of the executive committee of the Yonkers Raceway Foundation, an endowed scholarship was established at the College of Veterinary Medicine to be awarded to a needy student who is a resident of New York State.

**Dr. Irving Zimmerman '35 Memorial Scholarship.** This scholarship was established in 1986 by Dr. Irving Zimmerman's family. It is to be awarded to a student who demonstrates a special interest in and aptitude for veterinary pathology, as determined by the faculty of that department.

## Prizes for Veterinary Students

These are among the prizes awarded at the college annual Honor Day Banquet held each spring.

**The American Animal Hospital Association Student Award.** An engraved plaque, a letter of commendation, a one-year membership, and a cash award are given to a senior in recognition of outstanding proficiency in small animal medicine and surgery. The nominations are made by faculty of the Medicine and Surgery Sections of the Department of Clinical Sciences who are responsible for teaching in the Small Animal Clinic.

**The American Association of Feline Practitioners Award.** This award of a recognition plaque and two years' free membership in the American Association of Feline Practitioners is given to a senior student for special interest and accomplishment in feline medicine and surgery. Selection of the recipient is made by the faculty of the Small Animal Clinic.

**The Prize of the Auxiliary of the American Veterinary Medical Association.** This prize is presented to the member of the fourth-year class who is deemed to have best advanced the standing of the College of Veterinary Medicine on the campus by special contributions of an extracurricular nature.

**The Impromed Prize.** This award, contributed by Impromed Computer Systems, is given to the third-year student who exhibits the greatest potential for and interest in the art and science of small animal diagnosis. The recipient is selected by faculty members who teach companion animal medicine. The prize consists of a copy of the computerized diagnostic program PROVIDES and twelve medical reference programs.

**The James Gordon Bennett Prize.** In 1916 James Gordon Bennett of New York City endowed this prize for the students who show the greatest humaneness in handling animals, with special reference to the use of anesthesia. Bennett was the editor of the *New York Herald* (forerunner of the *Herald Tribune*) a century ago. A man of diverse abilities and interests, he is the person who dispatched Henry M. Stanley in 1870 to find Dr. David Livingstone in Africa. Nominations are made by the faculty of the Section of Anesthesiology in the Department of Clinical Sciences.

**The Anne Besse Prizes.** A. B. Jennings of New York City endowed this prize in 1925 for the best work in large animal medicine. Nominations are made by the Section of Medicine faculty of the Department of Clinical Sciences who are concerned with teaching large animal medicine.

**The Frank Bloom Pathology Award.** This prize was established in 1978 with an endowment by Dr. Frank Bloom. Frank Bloom, a 1930 Cornell graduate, is a charter diplomate of the American College of Veterinary Pathologists as well as a diplomate of the American College of Laboratory Animal Medicine. He has practiced in Flushing, New York; taught at Downstate Medical Center; and published quite extensively. The nomination of a senior who has demonstrated special excellence in pathology is made by the Department of Pathology.

**The Gary Bolton Memorial Cardiology Award.** Funds for the endowment of this award were donated by friends and colleagues of Dr. Gary R. Bolton in memory of his outstanding contributions to the field of small animal cardiology. Gary Bolton was a member of the faculty and taught cardiology for a decade. He was also known and respected as a compassionate veterinarian who exhibited empathy for his patients and their owners. A fourth-year student who has demonstrated understanding and expertise in cardiology and an empathy for patients compatible with the philosophy of Gary Bolton is nominated by the faculty of the Small Animal Clinic for this award.

**The Charles Gross Bondy Prize.** As a memorial to his son, Richard Bondy of New York City endowed this prize in 1929 for the best work in the courses in practical medicine and surgery of small animals. Nominations are made by the faculty of the Medicine and Surgery Sections of the Department of Clinical Sciences responsible for teaching in the Small Animal Clinic.

**The A. Gordon Danks Large Animal Surgery Award.** An award initiated in 1978 by the faculty of the Section of Surgery in the Department of Clinical Sciences with responsibility for teaching in the Large Animal Clinic. It is in recognition of the outstanding contributions of professor emeritus A. Gordon Danks, the first director of student administration and admissions and at one time the chairman of the former Department of Large Animal Medicine and Surgery. It is presented to a senior student demonstrating outstanding knowledge and talent in the diagnosis and treatment of surgical problems of large animals. Basic and applied knowledge, diagnostic abilities, general surgical skills, and patient care exhibited during the clinical rotations are considered in the presentation of this award.

**The Donald D. Delahanty Memorial Prize.** This prize was established as a special memorial to Dr. Donald Delahanty, a member of the Department of Large Animal Medicine, Obstetrics, and Surgery from 1952 to 1975. The prize is given to a fourth-year student who has shown an interest in equine practice and a high level of proficiency in the field. The candidate is nominated by the faculty of the Department of Clinical Sciences concerned with the equine patient.

**The Hugh Dukes Prize in Experimental Physiology.** This prize was established by former students and friends of Dr. H. Hugh Dukes, who was a pioneer in the education of students in physiology and who served the university and college for twenty-eight years as a professor and chairman of the Department of Physiology. With a view to encouraging veterinary graduates to undertake research and teaching in physiology, the prize is awarded on the judgment of the veterinary physiology teaching faculty to a veterinary student who has done excellent work in physiology laboratory courses and shows potential for teaching and contributing new knowledge to physiology. Nominations may be made by any faculty member in the College of Veterinary Medicine.

**The Ettinger Incentive Award.** Dr. Stephen Ettinger, Class of 1964, established this award to provide encouragement to all veterinary medical students at Cornell. The award, consisting of his *Textbook of Veterinary Internal Medicine*, is given to a second-year student who has made the greatest improvement in cumulative GPA between the earlier and third semesters.

**The Myron G. Fincher Prize.** An award initiated in 1980 through an endowment from Dr. Niel W. Pieper '32, given in honor of professor emeritus Myron G. Fincher '20. It is in recognition of the many contributions to the college by Myron Fincher. Always a gentleman, he firmly demanded the best from his students and played a leading role in the instruction of large animal medicine and obstetrics for forty-five years. The award is presented to a senior student who has demonstrated the best work in courses dealing with large animal obstetrics and reproductive diseases. Both academic and practical performance are considered. Nominations are made by the Section of Theriogenology in consultation with other clinical faculty responsible for fall semester teaching.

**The Gentle Doctor Award.** The Gentle Doctor Award was originally made possible by Dr. William Hornbuckle's contribution of prize money from the Norden Distinguished Teacher Award received by him in 1979. Dr. and Mrs. Robert Kirk have recently established a permanent endowment fund for the continuation of this award. The recipient of the award is a fourth-year student who, in the opinion of the faculty of the Department of Clinical Sciences, exemplifies enthusiasm, motivation, and dedication to the delivery of excellent veterinary patient care.

**The Hill's Award for Excellence in Clinical Nutrition.** Hill's Pet Products provides bronzed plaques and cash prizes to be awarded to the three fourth-year students submitting the best essays or case reports describing the role dietary management played in the care of a patient. The essay chosen as first-place winner will also be submitted to Hill's for entry in its National Nutrition Scholar's Award competition, where matching cash awards are made to the student and to his or her college. Determination of the three best entries is made by the faculty responsible for teaching nutrition and clinical sciences.

**The Grant Sherman Hopkins Prize.** The endowment for this prize was given by Mrs. Ann Ottaway Hopkins in 1955 in memory of her husband, who had served the university and the college for forty-five years as a professor of veterinary anatomy. It is awarded on the recommendation of the faculty in the Department of Anatomy on the basis of interest, ability, perseverance, and performance in the work in that department.

**The Iams Prize.** The Iams Company provides the "Paw Print Award" plaque and a cash stipend to the student who submits the best essay on an assigned topic. The competition is open to students from all classes and the winner is selected by a committee at the college. The winning essay will also be submitted for national competition.

**The P. Philip Levine Prize in Avian Medicine.** This prize was established from donations made by friends and colleagues of Dr. P. Philip Levine in memory of his many contributions to the field of avian medicine, both nationally and internationally. Philip Levine was a longtime member of the Cornell faculty and was the first chairman of the Department of Avian Diseases. Much of his life was dedicated to the training of young people and to encouraging them to aspire to excellence. In the spirit of encouraging excellence, this prize is awarded to the third-year veterinary student who has attained the highest grade in the course on avian medicine.

**The *Merck Manual* Awards.** Merck and Company, Inc. offers copies of the *Merck Veterinary Manual*, embossed with the names of the recipients, to members of the fourth-year class who will graduate with academic distinction.

**The Jane Miller Prize.** Funds for the endowment of this prize were given by Dr. Frank H. Miller, a graduate of McGill University and a trustee of Cornell University for twenty consecutive years. As a memorial to his wife, the prize is awarded to members of the second-year class who have done the best work in veterinary physiology. Candidates are nominated by the faculty in the Department of Physiology.

**The Malcolm E. Miller Award.** In 1965 Mary Wells Miller Ewing established this award in memory of her husband, Dr. Malcolm E. Miller '34, a former professor of anatomy and the head of that department from 1947 to 1960. The recipient is to be a fourth-year student who, in the judgment of the dean, has demonstrated perseverance, scholastic diligence, and other personal characteristics that will bring credit and distinction to the veterinary profession.

**The Mary Louise Moore Prize.** Dr. Veranus A. Moore established this endowed prize as a memorial to his wife for the best work in bacteriology. Veranus Moore served as head of the Pathology and Bacteriology Department and as dean of the College of Veterinary Medicine from 1908 to 1930. Nominations are made by the Department of Microbiology, Immunology, and Parasitology.

**The Neuroanatomy-Clinical Neurology Prize.** This prize, in memory of Dr. William B. Forsythe, is to be awarded to the fourth-year student who has demonstrated the most outstanding expertise and interest in neuroanatomy and clinical neurology. The award will be made by the faculty who have primary responsibility for instruction in neuroanatomy and in clinical neurology.

**The New York State Veterinary Medical Society Prize.** This prize, which consists of an engraved plaque and a cash award, is provided annually by the society for the best senior seminar. Members of the fourth-year class are eligible to compete. Nominations are made by the Senior Seminar Committee, which judges the quality of the seminars.

**The Pharmacology Faculty Award for Outstanding Performance in Pharmacology.** Awarded to a member of the graduating class considered by the faculty of the Department of Pharmacology to have demonstrated an outstanding ability to incorporate the principles of pharmacology into the treatment, maintenance, and care of patients.

**The Phi Zeta Award.** The Alpha Chapter of Phi Zeta, the honor society of veterinary medicine, acknowledges the second-year student with the best academic record on completion of the first three semesters of study. The recipient of the award receives Ettinger's *Textbook of Veterinary Internal Medicine*, volumes one and two.

**The Philotherian Photographic Prizes.** Dr. and Mrs. Hadley C. Stephenson established this endowment. Photographs of animals submitted by students or their spouses are judged by a committee appointed by the college. The prizes are awarded on the basis of individuality of the animal, its enjoyment of its surroundings, and the emotive qualities it evokes.

**Purina Mills Award for Proficiency in Swine Medicine.** This prize is presented annually to a senior student for proficiency in swine medicine and consists of a cash award and a plaque. The outstanding student is selected by faculty members responsible for teaching swine medicine.

**The Colonel Floyd C. Sager Equine Obstetrics and Pediatrics Award.** This award, created in 1984 on the occasion of Dr. Sager's ninetieth birthday by another Cornellian who trained under him, recognizes a Cornell veterinarian whose name is synonymous with excellence in equine obstetrics and pediatrics. Following his graduation in 1917, Floyd Sager served in the Army Remount Service until after World War II. He then became the veterinarian for the world-famous Claiborne Farm in Kentucky, where he remained until his death. The senior receiving this award, in the opinion of the faculty of the Department of Clinical Sciences, has displayed outstanding aptitude in equine obstetrics and pediatrics.

**The E. L. Stubbs Award.** This prize, contributed by the Mid-Atlantic States Association of Avian Veterinarians, is to be awarded to the fourth-year

student who has demonstrated the most outstanding competence and motivation in various areas of avian medicine, including poultry, wildlife, research, and cage and aviary medicine. The award will be made by the faculty who have primary responsibility for instruction in avian diseases and clinical avian medicine, including the adviser of the Avian Clinic.

**The Anna Olafson Sussex Pathology Award.** This award was endowed in 1974 by Peter and Harriette Olafson in memory of Dr. Olafson's sister. The award is given at the end of the third year and is made on the recommendation of the people actively engaged in teaching pathology.

**The Jacob Traum Award.** Through an endowment established by friends of Jacob Traum '05, professor of bacteriology emeritus, University of California, and formerly the chief scientist at the federal Plum Island Animal Disease Laboratory, this prize is awarded to the fourth-year student who is judged by the Department of Microbiology, Immunology, and Parasitology as having exhibited in his or her scholastic career superior interest and accomplishment in bacteriology, epizootiology, pathology, and virology, including aptitude for, and expressed interest in, research on infectious diseases.

**The Upjohn Clinical Awards.** The Upjohn Pharmaceutical Company offers a prize of $500 each to the student considered to be the most proficient in the practice of large animal medicine and the student considered to be the most proficient in the practice of small animal medicine. Recipients of these awards are chosen by the faculty members of the respective departments.

**The Horace K. White Prizes.** An endowment for these prizes was originally given by Horace K. White (and later by his sons, of Syracuse, New York) for the students whose academic records for the entire veterinary course are the highest. This award, originally called the President's Prize, dates back to 1873 and is probably the longest-standing prize at Cornell. The original donor was a brother of Andrew Dickson White, the first president of the university.

**The Wild Bird Research and Rehabilitation Award.** This award, from a university endowment by the same name, is to be given to a senior veterinary student who has demonstrated concern for the rehabilitation of wild birds or who has been involved in research related to wild bird treatment and rehabilitation. Nomination is made by the director of the teaching hospital on the basis of recommendations of concerned faculty.

## Awards and Honors

**George C. Poppensiek Visiting Professorship in International Veterinary Medicine.** This professorship was named in honor of George C. Poppensiek, dean of the College of Veterinary Medicine from 1959 to 1974. Established in 1988, it is awarded each year to a veterinarian from outside North America. He or she is invited to give a general lecture and a series of seminars and meetings with faculty and students. The objective of the professorship is to expand understanding of veterinary medicine in other countries and thereby broaden the horizon of the North American veterinary community. The Committee on International Programs is charged with identifying nominees.

**The James Law Distinguished Lecturer Series.** Named after the first dean of the college and first professor of veterinary medicine at Cornell, the James Law Distinguished Lecturer Series was established in 1980. The lecture series emphasizes contemporary achievements in the field of biomedical sciences while introducing to the community a number of renowned scientists and scholars who are leaders in their fields.

## Faculty Awards

**The Beecham Award for Research Excellence.** Beecham Laboratories presents this award annually to a young investigator whose research achievements are likely to have a significant impact on our understanding of the biology or medical management of animals. Nominees must be permanent faculty or senior research associates of the New York State College of Veterinary Medicine and must have completed their formal training not more than eight years prior to being nominated. Most of the research must have been conducted at Cornell within three years of the time of nomination.

**The Norden Distinguished Teacher Award.** This award goes to a full-time member of the veterinary medical faculty who has demonstrated continued excellence in teaching. Each of the current veterinary classes submits two nominations, and a committee appointed by the dean then chooses one of those eight nominees to receive the award.


**Many more avian and exotic animal patients are being seen by veterinarians, a reflection of their increasing numbers as part of the general pet population. Here, a parrot (insert photo) is carefully monitored in the Teaching Hospital's Intensive Care Unit.**

# The Curriculum

## Use of Animals in Teaching

The college Committee on the Use of Live Animals in Teaching believes that applicants should know and understand the following before accepting a position at the college:

1. Live animals will be used for teaching in certain obligatory core courses.
2. Some of these animals will require humane euthanasia after they have been used for teaching.
3. The college conforms to the rules for the care of such animals as outlined in *Guiding Principles in the Care and Use of Animals*, as approved by the Council of the American Physiological Society, and the *Guide for the Care and Use of Laboratory Animals*, DHEW publication number 86-23 (revised 1985).
4. Each course in which animals are used receives a formal review annually by the college Committee on the Use of Live Animals in Teaching.
5. Any concerns regarding live animal use in teaching should be addressed first to the faculty member responsible for that course. Alternatively students may choose to address their concerns to the chairman of the Committee on the Use of Live Animals in Teaching, whose name may be obtained from the student affairs or dean's offices. The chairman may initiate discussion between the said committee and the faculty member responsible for a particular course without involving the student if he or she would prefer to remain anonymous.

The faculty of the college voted in favor of this legislation in March 1988. Applicants must acknowledge having read the above information by signing the application form in the designated place.

## Requirements for Graduation

The prescribed four-year curriculum leading to the degree of Doctor of Veterinary Medicine (D.V.M.), registered with the State of New York under HEGIS program #1218, is summarized in the section below. To receive this degree, candidates must successfully complete the courses named in the curriculum below, have paid all fees due, and be recommended for graduation by the college faculty.

The academic year, divided into two terms, begins in August and ends in May. At the conclusion of each term the college faculty reviews the records and conduct of students. Students whose grades are not satisfactory may be denied permission to register or graduate or may be assigned varying degrees of academic warning or probation.

## Core Curriculum

The college has a core-elective curriculum, which is summarized below.

Within each academic year, in addition to the core curriculum, a certain number of elective credits (selectives) must be taken. Selective credits taken in a given year in excess of the requirement for that year may not be carried forward to satisfy the following year's requirement; nor may fewer than the required number be taken one year and the deficiency made up the following year.

## First Year

| *Fall Term* | | | *Credits* |
|---|---|---|---|
| VETA | 500 | Gross Anatomy: Small Animal | 4 |
| VETA | 502 | Microscopic Anatomy* | |
| VETA | 504 | Neuroanatomy and Clinical Neurology* | |
| VETA | 507 | Animal Development | 3 |
| VETPH | 526 | Systems Physiology I | 6 |
| VETPH | 528 | Veterinary Ethics | 1 |
| VETCS | 568 | Foundations of Clinical Science I | 2 |
| VETCS | 581 | Animal Nutrition | 2 |
| | | | 18 |

| *Spring Term* | | | *Credits* |
|---|---|---|---|
| VETA | 501 | Gross Anatomy: Large Animal | 5 |
| VETA | 502 | Microscopic Anatomy (continued) | 3.5 |
| VETA | 504 | Neuroanatomy and Clinical Neurology (continued) | 2.5 |
| VETA | 508 | Anatomy of the Fish and Bird | 0.5 |
| VETMI | 515 | Veterinary Immunology | 2 |
| VETPH | 527 | Systems Physiology II | 5 |
| VETCS | 569 | Foundations of Clinical Science II | 2 |
| | | | 20.5 |
| | | Selectives (to be taken either fall or spring) | 2† |

*Begins in the fall term and continues through spring term.
†Students who are required to take Animal Nutrition are excused from taking selectives in the first year. Those not taking nutrition must complete two credits of selective coursework.

## Second Year

| *Fall Term* | | | *Credits* |
|---|---|---|---|
| VETMI | 510 | Veterinary Parasitology | 4 |
| VETMI | 516 | Infectious Diseases I | 4 |
| VETMI | 517 | Infectious Diseases II | 2 |
| VETPR | 528 | Pharmacology I | 4 |
| VETPA | 535 | Veterinary Pathology I | 4 |
| VETCS | 545 | Epidemiology | 2 |
| | | | 20 |

| *Spring Term* | | | *Credits* |
|---|---|---|---|
| VETMI | 518 | Infectious Diseases III | 2 |
| VETPR | 529 | Pharmacology II | 2 |
| VETPA | 536 | Veterinary Pathology II | 4.5 |
| VETCS | 561 | Theriogenology I | 3 |
| VETPA | 571 | Clinical Pathology | 3 |
| VETCS | 579 | General Medicine and Surgery | 4 |
| | | | 18.5 |
| | | Selectives (to be taken either fall or spring) | 4 |

## Third Year

| *Fall Term* | | | *Credits* |
|---|---|---|---|
| VETA | 505 | Applied Anatomy | 1 |
| VETCS | 548 | Anesthesiology | 1 |
| VETAV | 555 | Avian Diseases | 2 |
| VETCS | 562 | Theriogenology II | 3 |
| VETCS | 563 | Large Animal Medicine and Surgery | 5 |
| VETCS | 566 | Radiographic Techniques | 1 |
| VETCS | 567 | Clinical Nutrition | 2 |
| VETCS | 583 | Small Animal Medicine and Surgery | 5 |
| | | | 20 |

| *Spring Term* | | | *Credits* |
|---|---|---|---|
| VETA | 506 | Applied Anatomy | 1 |
| VETCS | 520 | Preventive Medicine in Animal Health Management | 1 |
| VETCS | 531 | Regulatory Medicine | Req.* |
| VETPA | 539 | Laboratory Animal Medicine | 1 |
| VETCS | 564 | Large Animal Medicine and Surgery | 6 |
| VETCS | 582 | Large Animal Surgical Exercises | 2 |
| VETCS | 584 | Small Animal Medicine and Surgery | 7 |
| VETCS | 586 | Small Animal Surgical Exercises | 2 |
| | | | 20 |

Selectives (to be taken either fall or spring) 4

*The abbreviation "Req." indicates that a course (or its equivalent) is required for graduation, but no formal credit is awarded for that course.

## Fourth Year

| *Required* | | | *Credits* |
|---|---|---|---|
| VETPA | 540 | Pathology Service | 2 |
| VETCS | 572 | Senior Seminar | 1 |
| VETCS | 574 | Large Animal Surgery Service | 4 |
| VETCS | 575 | Ambulatory Medicine Service | 4 |
| VETCS | 578 | Clinical Anesthesia Service | 2 |
| VETCS | 580 | Radiology Service | 2 |
| VETCS | 589 | Small Animal Medicine Service | 4 |
| VETCS | 591 | Small Animal Surgery Service | 4 |
| VETCS | 593 | Ophthalmology Service | 2 |
| VETCS | 594 | Large Animal Medicine Service | 2 |
| VETCS | 598 | Dermatology Service | 2 |
| | | | 29* |
| *Elective* | | | |
| VETCS | 547 | Practice Management | 2 |
| VETPA | 549 | Laboratory Animal Medicine | 2 |
| VETCS | 570 | Theriogenology | 4 |
| VETCS | 596 | Opportunities in Vet. Med. | 2–4 |

*A total of 4 additional credits must be completed. These may be obtained either by repeating one of the required rotations or by taking one or more of the elective courses listed.

## Special Veterinary Interests

Every veterinary student is required to complete the core veterinary curriculum and a certain number of selective courses before graduation. Students with special species or career interests have available to them courses, selectives, and clubs centered around those interests.

## Special Veterinary Interests

| *Interest* | *Selective Courses* | *Clubs* | *Fellowships* | *Other* |
|---|---|---|---|---|
| **Horses** | Equine Lameness<br>Advanced Equine Surgical Techniques<br>Theriogenology<br>Equine Foot Care<br>Shoeing<br>Equine Herd Health<br>Problems in Equine Behavior<br>Veterinary Dermatology<br>Bottom Line<br>Postmortem Pathology | AAEP<br>ISVP<br>Equine Neonatal ICU | Danks Award<br>Delahanty Award<br>Equine Summer Experience<br>Colonel Floyd C. Sager Equine Obstetrics and Pediatrics Award<br>Yonkers Raceway Foundation<br>Silver Spurs Riding Club | Equine Metabolism Unit<br>Equine Research Park<br>New York State CEM Quarantine Station<br>Equitation Center |
| **Cattle** | Advanced Large Animal Internal Medicine<br>Mastitis<br>Dairy Herd Health and Management<br>Infectious Diseases of Cattle<br>Bottom Line<br>Poisonous Plants<br>Pathology of Nutritional Diseases<br>Postmortem Pathology | AABP | | Large animal morning rounds<br>Show and tell<br>R-barn palpation herd |

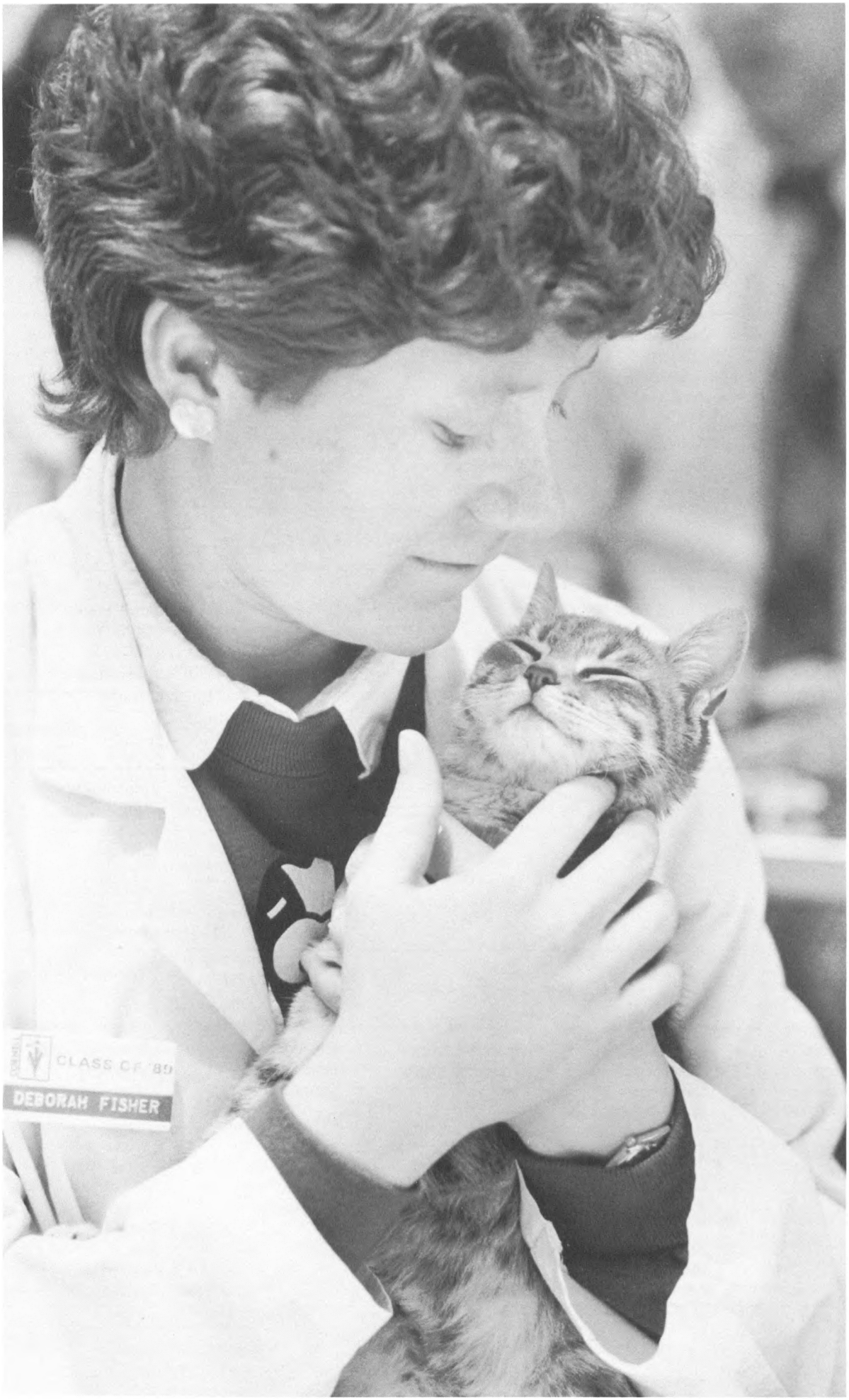
| | | | | |
|---|---|---|---|---|
| **Cats and dogs** | Small Animal Infectious Diseases<br>Problems in Dog and Cat Behavior<br>Poisonous Plants<br>Veterinary Dermatology<br>Special Problems in Small Animal Medicine<br>Special Problems in Small Animal Surgery<br>Autotutorial courses in feline disease and breeds of cats | AAHA<br>AAFP | American Association of Feline Practitioners Award for Outstanding Work in Feline Medicine and Surgery | Cornell Research Laboratory for Diseases of Dogs, James A. Baker Institute for Animal Health<br>Cornell Feline Health Center |
| **Sheep and goats** | Goats: Management and Diseases<br>Health Program for Sheep<br>Postmortem Pathology<br>Bottom Line<br>Externship Senior Year | AASGP | | A fair number of college work-study or non–college work-study positions in animal science and physiology |
| **Exotic animals** | Diseases of Common Exotic Pets<br>Diseases of Aquarium Fishes<br>Wildlife Pathology<br>AquaVet I and II | AAZV<br>Association of Avian Veterinarians | National AAZV scholarships for zoological research | Weekly rounds at Ross Zoo<br>Externships at zoos<br>AAZV conference |
| **Laboratory animals** | Introduction to Lab Animal Medicine<br>Special Topics in Laboratory Animal Medicine<br>Public Policy and Laboratory Animal Science<br>Animal Models to Explore Physiologic and Pathologic Mechanisms<br>Clinical Rotation in Lab Animal Medicine<br>Medical Primatology<br>Laboratory Animal Pathology | | | |
| **Overseas** | Veterinary Medicine in Developing Nations | VIDA | Expanding Horizons International Committee | Many offerings on campus |
| **Fish** | Diseases of Aquarium Fishes<br>Fish Health Management<br>Diseases of Aquatic Animals<br>AquaVet I and II | | | |
| **Caged birds** | Diseases of Common Exotic Pets<br>Parasites of Avian Species | Avian Clinic<br>AAV<br>AAZV | P. Philip Levine Prize<br>Avian Rehabilitation Award | Avian Clinic<br>Ornithology Laboratory<br>Peregrine falcon barns |
| **Wildlife** | Diseases of Common Exotic Pets<br>Wildlife Pathology | AAZV<br>VIDA | Expanding Horizons | |

## Teaching Hospital Rounds

### Fall/Spring Terms

| *Time* | *Monday* | *Tuesday* | *Wednesday* | *Thursday* | *Friday* |
|---|---|---|---|---|---|
| 7:30–7:55 | SAC Surgery | SAC Medicine Patient Rounds (D-215) | LAC Medicine Patient Rounds (D-215) | LAC Surgery Patient Rounds (LAC) | Patient Rounds (LAC) |
| 8:00 | Pathology | Surgical Student Seminar Series (C-207) | Surgery Rounds Pathology Seminar (E-215) | Necropsy (530-VRT) | Pathology Seminar (E-215) |
| | | Anesthesia Resident Rounds | Diagnostic Pathology Journal Club (E-215) | Medicine Rounds (530-VRT) | |
| | | | Anesthesia Resident Rounds | | |
| 12:00 | | | | | Cardio-pulmonary Rounds (D-215) (biweekly) |
| 12:20 | | | Pathology Bottom Line (C-207) | | |
| 12:30 | | | | Cell Pathology Seminar Series (biweekly) or Histopathology Group Meeting (biweekly) | Neurology/ Ophtho Rounds (LAC) |
| 3:30 | | | | | Show and Tell (Necropsy Laboratory) |
| 4:30 | Anesthesia Teaching Rounds | Show and Tell (Necropsy Laboratory) | Senior Seminar (Auditorium) | Anesthesia Teaching Rounds | Show and Tell (Necropsy Laboratory) |
| | | (SA Induction Area) | | (SA Induction Area) | |
| | | Anesthesia Teaching Rounds (SA Induction Area) | Anesthesia Teaching Rounds (SA Induction Area) | | Anesthesia Teaching Rounds (SA Induction Area) |

*Room locations subject to change.*




**Annually, more than 3,400 cats receive medical or surgical care in the Teaching Hospital's Small Animal Clinic. Students at the college who are interested in feline health recently formed a student chapter of the American Association of Feline Practitioners.**

# Student Life

## Housing and Dining

### Off-Campus Housing

The majority of D.V.M. students live off campus. Information on housing that is currently available is posted on a board at the Off-Campus Housing Office, 103 Barnes Hall. Because changes of available accommodations occur daily, it is not practical to prepare lists. If possible, a student should plan to visit Ithaca well in advance of residence in order to obtain suitable quarters off campus.

### On-Campus Housing

The graduate residences are conveniently situated and provide a comfortable multicultural atmosphere for study, recreation, and socializing. The new Maplewood Park apartments, near the Veterinary College on the southeast side of campus, house 308 single graduate students and 90 student families. Schuyler House, located in a residential area within walking distance of campus and downtown shopping areas, accommodates 140 graduate men and women. Two coeducational small residences, 112 Edgemoor and The Oaks, are situated on the west side of campus and together house approximately 70 graduate students. Thurston Court, a small apartment building situated on the north side of Fall Creek Gorge, accommodates 21 students.

Room assignments are made in the order in which applications are received. The housing contract for Maplewood Park and Thurston Court apartments is for a twelve-month period beginning August 15. In the other graduate residences, the contract period is for the academic year. Requests for information and applications should be directed to the Housing Assignment Office, 1142 North Balch Hall, Ithaca, New York, 14853-1401. Telephone: 607-255-5368.

### Student Family Housing

The university maintains apartments for approximately 420 student families in three different complexes. Hasbrouck and Pleasant Grove apartments, situated on the north side of campus, have one- and two-bedroom unfurnished apartments. The family units in Maplewood Park are furnished and have one bedroom and a study. Requests for further information and applications should be directed to the Student Family Housing office, Cornell University, 40 Hasbrouck Apartments, Ithaca, New York 14850-2662.

### Dining Services

Breakfast and lunch are available in the cafeteria on the first floor of the Veterinary Research Tower. Vending machines are also located at various places throughout the college.

Those students who plan to live on campus may want to participate in the Co-op dining program. Additional information on the various plans available may be obtained from Cornell Dining, 233 Day Hall.

## Activities and Organizations

### SCAVMA

Most of the students attending the College of Veterinary Medicine at Cornell belong to the student chapter of the American Veterinary Medical Association (SCAVMA). Membership benefits include a subscription to JAVMA (Journal of the American Veterinary Medical Association); a voice in the national organization, SAVMA (Student American Veterinary Medical Association); and participation in many activities throughout the year. To begin the year, SCAVMA sponsors a picnic to welcome first-year students and, to end the year, holds a farewell picnic for graduates. In between, SCAVMA sponsors lectures, wet labs, and social events. Fundraising includes an annual auction, dog washes, and the selling of veterinary school T-shirts and hats. A yearly service project is helping the county with its rabies clinic. In the spring several students attend the national SCAVMA symposium, which is held at a different school of veterinary medicine each year.

*Cornell Chapter of SCAVMA, 1990–91*
President: Betsy Graham '92
Vice president: Edward Arrington '93
Secretary: Hayley Weston '92
Treasurer: Eric Evans '92
Advisers: Dr. William Hornbuckle; Marcia Sawyer, director of student affairs and admissions

Students with interests in specific areas can also join one of the many organizations active in the college. Each of these groups meets to discuss its particular interests and sponsors lectures, trips, and workshops. Currently, the groups represented at the college are:

AAV, Association of Avian Veterinarians

AAEP, American Association of Equine Practitioners

AABP, American Association of Bovine Practitioners

AAZV, American Association of Zoo Veterinarians

AAHA, American Animal Hospital Association

VIDA, Veterinarians Interested in Developing Areas

VICA, Veterinary Inter-cultural Association

AAFP, American Association of Feline Practitioners

AVAR, Association of Veterinarians for Animal Rights

The Veterinary Players, a theater group

### College Committees

Students are also members of the following college committees:
Faculty-Student Liaison Committee
Honor Board
Financial Aid Advisory Board
Student Curriculum Committee

### Honor Societies

There are three honor societies for which students of the College of Veterinary Medicine are eligible.
**Phi Zeta.** Founded in 1925 by the students of the New York State Veterinary College at Cornell University, Phi Zeta strives for the constant advancement of the veterinary profession, higher educational requirements, and superior scholarship. The object of the society is to recognize and promote scholarship and research pertaining to the welfare and diseases of animals.
**Sigma Xi.** Any student or research staff member is eligible for membership in Sigma Xi, the Scientific Research Society of North America. It is the responsibility of the Admissions Committee of Sigma Xi to select for membership those individuals whose research aptitude or achievement deserves special recognition.
**Phi Kappa Phi.** The society of Phi Kappa Phi was founded in 1897 and soon became a national organization. Its primary objective is to recognize and encourage superior scholarship in all fields of study. Good character is essential for those elected to membership.

### Fraternities

Two veterinary fraternities have houses in Ithaca. They are Alpha Psi and Omega Tau Sigma. The fraternities are coeducational and encourage all students to join whether or not they live at the house.

### Open House

Each year students at the college participate in the planning and presentation of Open House. On a Saturday in April the college is opened to the public and offers displays and exhibits, tours, films, and instruction on many aspects of veterinary medicine geared to various age groups. Several thousand people take advantage of the opportunity.

## Counseling

### Academic

Each student has an academic adviser who is a member of the faculty and can advise on matters related to the student's academic career. The relationship is an informal one but can be very important in cases where students are experiencing academic difficulty.

### Personal

The director of student affairs is available to counsel students in matters of a personal or crisis nature. The director may at times refer the student for more in-depth therapy to the university Psychological Service or to any number of other offices depending on the problem. There are many support services available at the university to help students deal with problems. For example, among the workshops offered each term are those dealing with time management, assertiveness training, stress management, and study skills.

## Health Services

The Department of University Health Services provides medical care for all full-time undergraduate and graduate students enrolled at Cornell University in Ithaca. Gannett Health Center, at 10 Central Avenue, adjacent to Willard Straight Hall, is open twenty-four hours a day during the school year and is available for overnight care and urgent outpatient services outside of normal working hours. Normal hours are Monday through Friday from 8:30 a.m. to 11:30 a.m. and from 1:00 p.m. to 4:30 p.m. and Saturday from 8:30 a.m. to 12:00 noon.

The center's medical staff, under the supervision of the medical director, consists of attending physicians and health associates from the university staff and consulting physicians and surgeons from the Ithaca area. All medical records are strictly confidential.

For a medical appointment, a student should call 255-6958 or go to the center. For an appointment with Psychological Services, a student should call 255-5208 or go to the offices at the center. A doctor is on call for urgent problems twenty-four hours a day (telephone: 255-5155).

General medical care, psychological services, gynecological care, and overnight and after-hours care are provided at Gannett Health Center without additional cost. Laboratory service, X rays, physical therapy, limited consultations, allergy shots, drugs, and other services provided on-site may be charged for. There is a fee for all services off-site. Students may call 255-4082 for additional information.

### Student Accident and Sickness Insurance Plan

Cornell sponsors a health insurance plan underwritten by a private insurance company to supplement the services outlined above. This plan may be waived if the student has other health insurance or is willing to accept the financial risk of no insurance. The university plan does not cover preexisting conditions. Students are urged to carefully consider the comprehensive benefits available for a relatively modest fee before waiving the plan. The plan covers most services available at the center for which a fee may be charged. It also covers services not available on campus, such as hospital care and consultations. Further, it provides for expenses relating to illness or accidents outside Ithaca during the

academic year and vacation periods. Families of students are eligible for coverage and must enroll annually. Information about this insurance may be obtained by calling 607 255-6363 or by visiting Gannett Health Center, where a representative of the insurance company has an office.

### Health Care Plan for Student Spouses

The University Health Services provides health care for student spouses on a prepaid or fee-for-service basis. The fee schedule and other information about this service is available at the front desk and in the Student Insurance Office.

### Emergency Health Service

Students requiring after-hours or urgent care should call the health center at 255-5155 to receive instructions on the proper course of action to follow.

## Conduct of Students

The standards of conduct expected of a Cornell veterinary student are defined by various university regulations and by the College of Veterinary Medicine Student Honor Code. The code was established in recognition of the importance of ethics, honor, and integrity in an individual's training for the profession. It places the responsibility for ethical and professional conduct on the students and is implemented by the Student Administrative Board, which is granted initial jurisdiction by the faculty. It is each student's responsibility to become familiar with the contents of the code and to abide by it throughout his or her involvement with the college.

## Placement

The placement service, a part of the Office of Student Affairs and Admissions, offers valuable information to students attending the College of Veterinary Medicine at Cornell. Alumni and other practitioners seeking associates also benefit from this service.

Employment opportunities for permanent positions, summer jobs, and externships are solicited from all over the country and stored on the central veterinary college computer. Students gain access to this information by using terminals available to them. The student may select employment type, practice type (small, large, or mixed), and location desired to be viewed on the screen or printed on a remote printer in the Office of Student Affairs and Admissions.

Workshops on such topics as job seeking, salary negotiation, and the purchase of insurance; compilation of national and state board information; and the collection and distribution of employment statistics are additional services provided by the office.

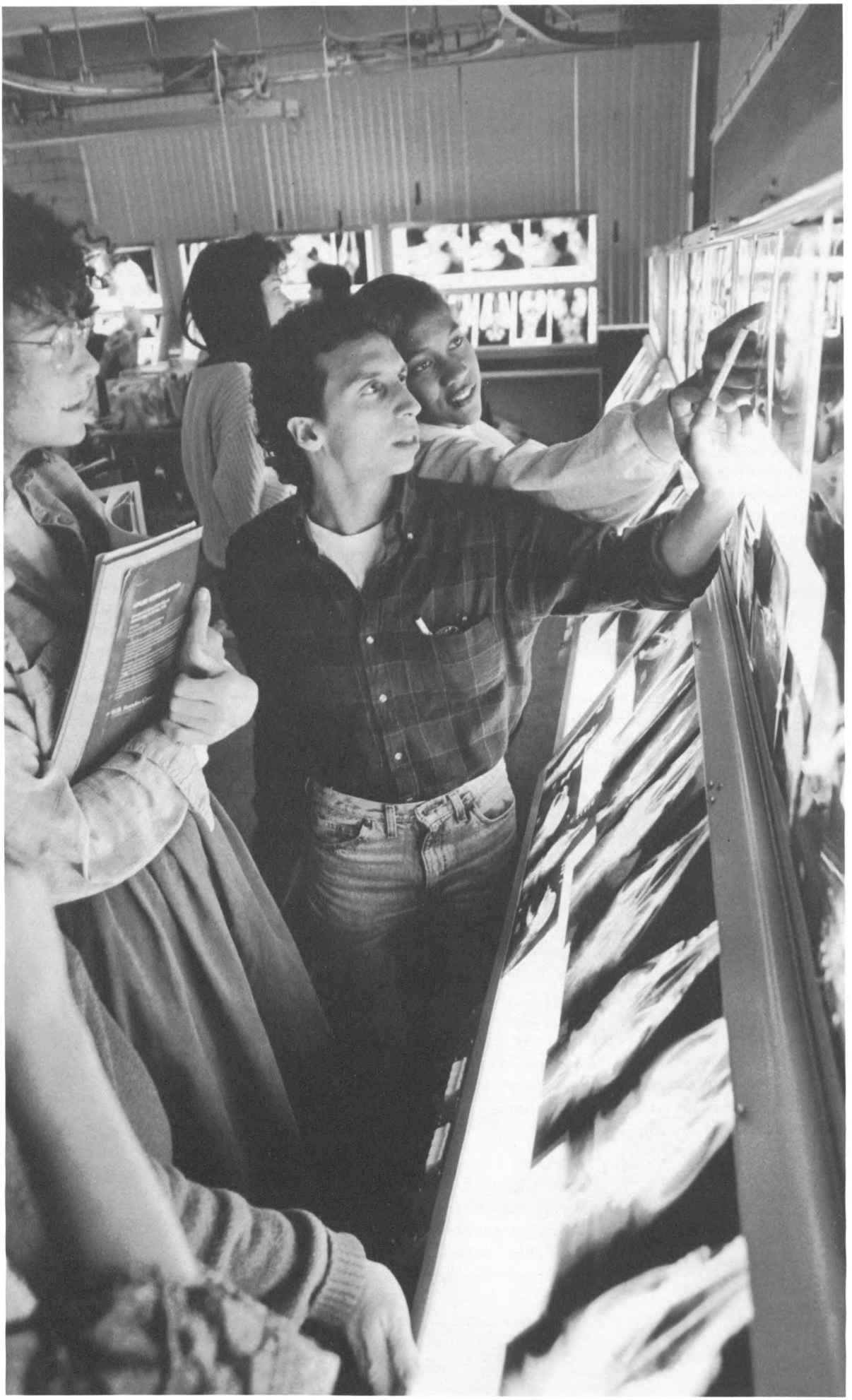
## Services for Persons with Disabilities

Cornell University is committed to assisting those persons with disabilities who have special needs. A brochure describing services for persons with disabilities may be obtained by writing to the Office of Equal Opportunity, Cornell University, 234 Day Hall, Ithaca, New York 14853-2801. Other questions or requests for special assistance may also be directed to that office.

## Legal Requirements to Practice

Before graduates can practice veterinary medicine in the United States, they must obtain a license from the state or states in which they locate their practices. This license is generally issued by the department of education or the department of agriculture of the state on the basis of an examination by a veterinary licensing board. Some states issue licenses without examination, based upon reciprocity, when the applicant has been licensed in other states.

In New York the licensing agency is the State Education Department. All inquiries should be addressed to the Executive Secretary of the State Board for Veterinary Medicine, Room 3041, Cultural Education Center, Albany, New York 12230. Application for the examination must be filed at least sixty days before the scheduled date and must be accompanied by a fee. Other details are available from the State Board of Examiners.



**The first three years of the D.V.M. program combine lectures with laboratory courses. Here, students view radiographs of horses' skulls.**

# D.V.M. Students

## Fourth Year Class of 1991

Abdella, Michael
Angelos, Stephen
Baum, Frederick, III
Baxendell, Kathryn
Block, Gary
Broadwell, Mary Louise
Brown, Sharon
Cammarata, Ronald
Caputo, Richard
Carpenter, Jean
Cesaratto, Dorie
Chang, Laura
Coger, Laurie
DeFrancesco, Teresa
Diaz, Hector
Duddy, Pamela
Dugan, James
Durham, Tracy
Essick, Linda
Fennell, Allison
Fischer, Karen
Floetenmeyer, Rosemarie
Fogelson, Melissa
Gagliardi, John
Gamez-Citron, Carol
Gemperle, Heidi
Giovengo, Susan
Glaser, Bari-Sue
Graves, Thomas
Guazzo, Andrea
Hines, Brooke
Hurley, Karyl
Johnson, Justine
Jones, Kathleen
Kane, Suzanne
Kaplan, Bruce
Kendall, Anne
Kopp, Kaye
Kuzmickas, Patricia
Lang, Andrew
Langdon, Cynthia
Lee, Robert
Leroux, Annette
Lisciandro, Gregory
Luddy, Paul
Luke, Carol
Lulkin, Erik
McCann, Margaret
McLaughlin, Steven
McNeill, Robert
Malloy, Kelly
Mammato, Barbara
Manyin, Eileen Cutting
Marx, James
Meddleton, Mark
Miller, Rebecca
Nachbar, Scott
Neno, Susan
Newman, Alexandra
O'Brien, Karen
Orzeck, Richard
Pantano, Dana
Rasweiler, William
Redfield, Jon
Ribarich, Cynthia
Rosenfeld, Andrew
Rotmistrovsky, Richard
St. Leger, Judy
Schaedler, Jean
Shane, Randie
Sorrell-Griffin, Laurie
Staehr, Richard
Stanz, Kimberly
Tanneberger, Anthony
Thorndyke, Julie
Vitulli, Michelle
Voell, Andrew
Volel, Laurence
Walker, David
Welsch, Susan
Yousey, Steven
Zimits, Elizabeth

## Third Year Class of 1992

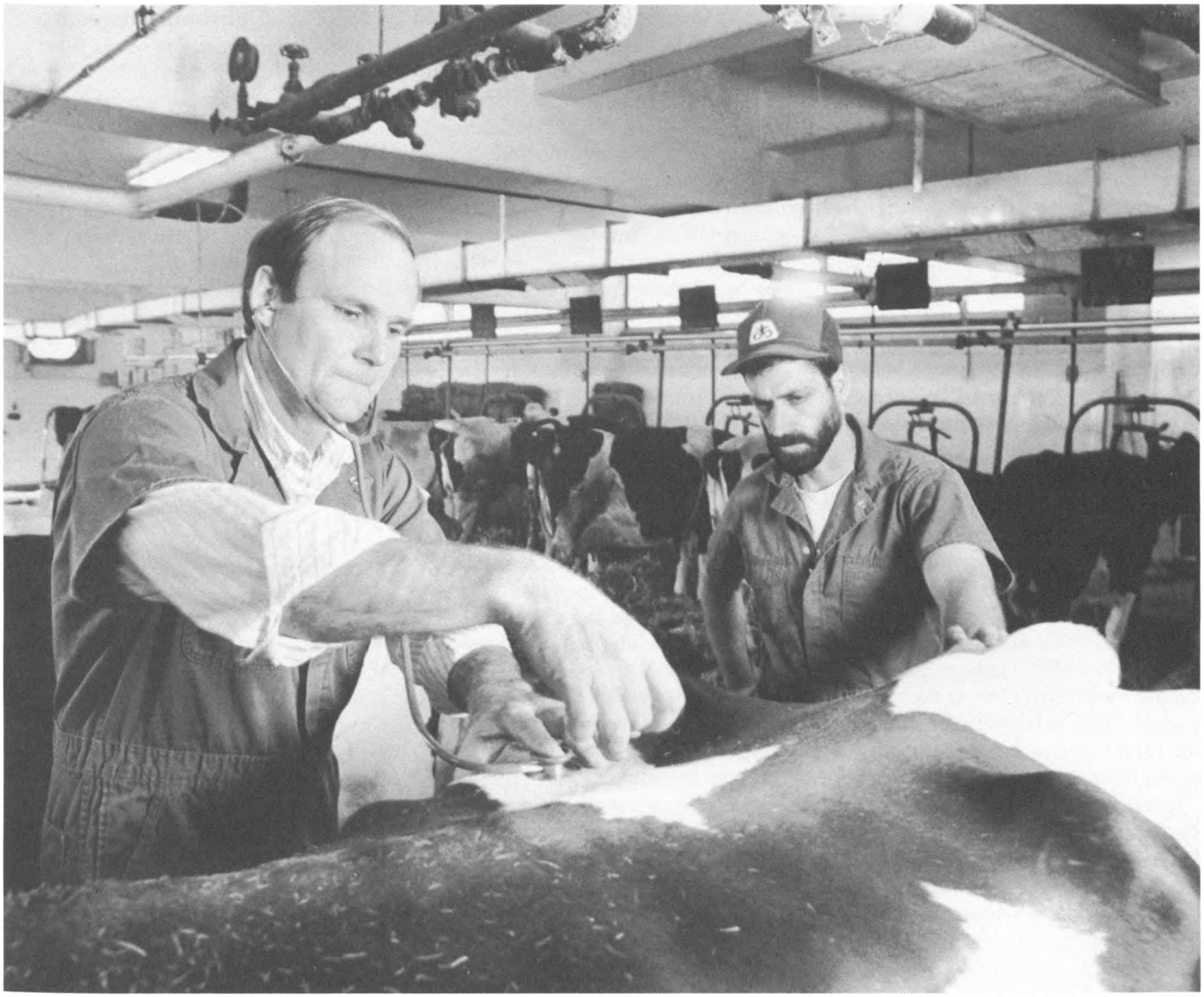
Adler, Amy J.
Amaro, Maria
Angelos, John A.
Ball, Michael A.
Barcala, Roberto P.
Berian, Claire A.
Bogart, Silke
Bregman, Susan L.
Bukowski, Michael P.
Bull, Jennifer K.
Chary, Dorothy N.
Cilli, Janet M.
Colon, Elia
Conner, Deborah L.
Cook, Gabriel D.
Couret, Karmen I.
Culbert, Laura
Darrigrand, Ruth A.
Davis, Valerie L.
Delaney, Mari A.
De Muynck, Gary M.
Denver, Mary C.
Deyhim, Carol J.
Di Stephan, Janine M.
Evans, Eric R.
Fernandez, Miguelina
Galvis, Pilar
Glick, Lauren S.
Gold, Richard C.
Graham, Mary E.
Greenberger, Leah J.
Hazel, Alison M.
Heinzerling, Heidi M.
Hillman, Jeanne M.
Hunter, Linda S.
Kantrowitz, Lawrence B.
Kelly, Michael P.
Kleps, Nora A.
Klohnen, Andreas
Kornreich, Bruce G.
Leverenz, Nancy E.
Licari, Louis G.
McKenna, Antigone M.
Maher, Valerie E.
Marsico, Lisa A.
Monachelli, Margaret T.
Morrisey, James K.
Muffoletto, Bonnie L.
Nezezon, Joel M.
Nowak, Mark S.
Peck, Penny M.
Pini, Maria T.
Polehinke, Thomas A.
Posner, Lysa P.
Purcell, Karen A.
Radlinsky, Maryann G.
Ramos, Lillian
Reid, Richard
Rodgers, Robinson R.
Saunders, Katherine
Schanbacher, Barbara J.
Schottman, Kate
Seagren, Mary Ann
Silbiger, Mark H.
Spaulding, Barry W.
Stummer, Margaret R.
Sullivan, Thomas C.
Surman, Vivien
Tapley, Kathleen
Trachtenberg, David K.
Triana, Maria S.
Vannerson, Lesley A.
Vrba, Janine
Waldow, Dorraine
Weston, Hayley S.
Willimann, Reinemarie T.
Wilson, Christine S.
Wohl, Deborah D.
Yagoda, Chahna

## Second Year Class of 1993

Altschul, Martina
Arrington, Edward
Bartlett, Steven
Bergendorff, Kim
Berger, Allan
Beyer, Michael
Boehringer, Michelle
Brush, Michelle
Bryant, Nelva
Butler, Emily
Cella, Janine
Childers, Pamela
Collier, Karyn
Côté, Etienne
Cronin, Carin
DeLorenzo, Kenneth
Diggle, Edmund, III
Eirmann, Laura
Famigletti, Nancy
Fleckenstein, Polly
Fornes, Mary Lee
Fournier, Jeanne
Freedman, William
Gantt, Kenneth
Gosson, Gloria
Greenberg, Kim
Gurshman, Rebecca
Heller, Ruth
Herzog, Maria
Hoffman, Dwight
Hornig, Linda
Howlett, Brian
Jamrosz, Gregory
Joseph, Sara
Karp, Beth
Kearns, Karen
Kelleher, Roberta
Kim, Carol
Knezevich, Mary
Kreis, Cathy
LaPoint, Jeffrey
Leister, Mary
Lettis, Kimberly
Lormore, Michael
Manwarren, Trenna
Marrero, Marisol
Marschman, Kristin
McNamara, Paul
Mignemi, Donna
Moks, Pamela
Ofsie, Susan
O'Leary, Lisa
Pagliaro, Michael
Plotkin, Michael
Puerto, David
Rassnick, Kenneth
Reiss, Adam
Richards, Amy
Robinson, Timothy
Rocchio, Christopher
Romano, Virginia
Rubenstein, Jennie
Rummel, David
Santisi, David
Sarna, Carolyn
Schunk, Kristina
Scrivani, Peter
Sikora, Nancy
Smith, Miranda
Thode, Barbara
Valdes, Richard
Waddell, Lori
Wells-Eisenhaure, Hannah
Wilson, Georgette
Wratten, Wayne
Young, Sandra
Zelinski, Karen

## First Year Class of 1994

Adelsohn, Deborah
Appel, Leslie
Arasukavalar, Prema
Balacich, Michele
Barry, Amanda
Bertoldo, Jon
Bowers, Jeremy
Brown, Cynthia
Brown, Thomas
Buchholz, Lawrence
Calyer, Lauren
Carpenter, Kelli
Cho, Jane
Cockburn, Tregel
Collins, Brian
Corcoran, Pamela
Cromie, Bonny
Daly, Holly
Das, Helena
Dattner, Michael
Davies-Brown, Fiona
Dezan, Jeanette
DiGovanni, Maria
Dobbin, Nancy
Fagraeus, Charlotte
Fernandez, Luis
Fischman, Suzanne
Flores, Anthony
Focacci, Mark
Freiman, Schlomo
Friedhofer, Ann
Gardner, Jennifer
Goggin, Justin
Goldman, Elizabeth
Goodman, Leah
Griffin, Mary
Hanchett, Lori
Hernandez, Tracy
Herrema, Jeffrey
Hulse, Michelle
Impellizeri, Joseph
Jarvis, Emily
Jones, L. Kathy
Kelly, Khayya
Koren-Roth, Yossi
Lee, David
Lewis, Jane
Lucia-Jandris, Patricia
Maldonado, Cristina
McArthur, Deborah
McAvoy, Sandra
Moyle, Robin
Nichols, Elizabeth
Northrup, Nicole
Pacy, John
Padilla, Anthony
Petrillo, Susan
Pizano, Sara
Potter, Adam
Rath, Amy
Richter, Julie
Riskin, Gregory
Rosaly, Charles
Schoenborn, William
Schwartz, Beth
Schwartz, Debra
Smith, Charla
Smith, Julia
Solomon, Robin
Sparks, Jennifer
Sponseller, Brett
Stotts, J. Douglas
Thall, Emily
Tighe, Ellyn
Tobin, Regina
Walcoff, Jeffrey
Wicinski, Joseph
Willsey, Amy
Zabell, Ari
Zane, Suzanne



**Ambulatory clinicians take veterinary medicine on the road, visiting more than 40,000 patients annually. Fourth-year students accompany clinicians on farm calls.**

# The Graduate School

## Graduate Education

Graduate education at the College of Veterinary Medicine is administered by the Graduate School at Sage Graduate Center. Applicants of superior academic accomplishment who hold a baccalaureate or equivalent degree may enter the Graduate School of Cornell University and pursue study for the degree of M.S. and Ph.D. in the College of Veterinary Medicine.

Graduate student programs are individualized and frequently fall within the graduate Fields of Veterinary Medicine, Physiology, or Immunology. To a lesser extent graduate students at the college have pursued studies in other graduate fields: Animal Science, Biochemistry, Molecular and Cell Biology, Environmental Toxicology, Microbiology, Neurobiology and Behavior, Nutrition, and Zoology.

Each graduate field contains several areas of concentration. Some of the major areas within the Field of Veterinary Medicine also require graduate students to have completed the D.V.M. degree. A description of each field, complete with any special requirements and areas of concentration, is contained in the current Graduate School catalog and in *Peterson's Graduate Programs in the Biological, Agricultural, and Health Sciences.*

**Combined D.V.M./Ph.D. program.** Up to two graduate assistantships are reserved each year for students aspiring to the combined D.V.M./Ph.D. degree. Candidates may apply for these assistantships before admission to the college, but an award is conditional on the individual's acceptance into the D.V.M. program. At the end of the first semester of the junior year the candidate must (1) produce evidence of sustained interest in an academic career: (2) identify a college faculty member willing to serve as the student's special committee chairman; and (3) provide evidence of acceptance by the Graduate School.

Information on graduate education at the College of Veterinary Medicine at Cornell can be obtained from the Graduate Studies Office, Cornell University, E-104 Schurman Hall, Ithaca, New York 14853-6401 (telephone: 607 253-3276).

## Admission

Applicants are encouraged to communicate with one or more faculty members in whose graduate field or subject area the student is interested. Appropriate faculty members may be identified by referring to the Graduate School catalog or communicating with the graduate faculty representative of the selected field. Personal interviews with faculty members are especially encouraged before application. Applicants from countries outside the United States must submit a Test of English as a Foreign Language (TOEFL) score of 550 or greater if their native language is not English. This standard applies to all fields.

Application for admission must be made to the Graduate School, Cornell University, Sage Graduate Center, Ithaca, New York 14853-6201, where appropriate forms are available. Information and forms may also be obtained from the college's Graduate Studies Office. Although applications for admission to the Graduate School may be submitted any time throughout the year, most students matriculate in the fall and should have their applications submitted by March 1. Spring-term applications should be submitted by October 1.

## Financial Support

Most graduate students receive financial support from various sources in the form of fellowships and graduate research or teaching assistantships. Seldom is a student admitted to the graduate fields without clarification and identification of funding for the duration of the graduate program.

Research assistantships and teaching assistantships are available within the different departments of the college, with the exception of approximately twenty rotating assistantships reserved for applicants with the D.V.M. degree that are awarded on a competitive basis by the college. These fellowships are funded at a level that is comparable to that of other schools and will support a Ph.D. student for three years and an M.S. student for two years.

The exact number of rotating assistantships varies each year. Two of these are reserved for the combined D.V.M./Ph.D. degree program. During their D.V.M. studies successful candidates for the combined program will receive financial support at current work-study rates when they conduct relevant research during vacations. They will not receive tuition support. Once students have been awarded the D.V.M. degree and are enrolled as full-time students in the Graduate School, they will receive free tuition (currently worth $8,000 a year) and a minimum salary of $17,475 a year with yearly increments. Decisions on the awards are made in early spring of the year prior to fall matriculation.

Financial needs of prospective graduate students are usually discussed early, when applicants communicate with graduate faculty, and an indication of financial need is part of the application for admission to the Graduate School. Students should complete the appropriate section of the form and should note that eligibility for Graduate School fellowships requires completion of the application by January 15. These are awarded in university-wide competition, and only the strongest of candidates may be nominated by each field.

## Graduate Record Examinations

The requirement that applicants take the Graduate Record Examination (GRE) general test is variable among the graduate fields, and the importance of this requirement should be confirmed with the appropriate field. For applicants to the Field of Veterinary Medicine, the requirement for GRE scores may be waived for those from countries outside the United States if evidence of superior academic performance (e.g., high class rank) as an undergraduate is provided with the application. GRE scores are, however, always helpful in the determination of eligibility. Scores on the general test (verbal and quantitative) are expected to be in the 1200 or higher range, and some fields (e.g., physiology) also require that the advanced subject test be taken.

Applicants for graduate training should arrange to have GRE scores sent directly to the Graduate School, correctly coded (at registration for the test) with Cornell Graduate School number 2098.

## Graduate Students 1990-91

### Field of Veterinary Medicine

Field representative: Professor John F. Timoney
C-324 Schurman Hall
607 253-3391

Augustin-Voss, Hellmut (Germany), D.V.M.

Barr, Margaret, B.S., D.V.M.

Bastida-Corcuera, Felix (Spain), D.V.M.

Bezek, David, B.S., D.V.M.

Binienda, Zbigniew (Poland), D.V.M.

Burns, Gilbert, B.A., D.V.M.

Carberry-Goh, Karen, B.S., D.V.M., M.V.P.M.

Carter, Alison, B.S.

Chandratilleke, Dhammapali (Sri Lanka), B.V.Sc., M.S.

Chang, Shwe-Fen (Taiwan), B.S., M.S.

Cleveland, Patricia, A.B.

Coleman, Barbara, B.S., M.S.

Correa, Maria (Uruguay), D.V.M., M.S.

Crameri, Flavio (Switzerland), D.V.M.

Ding, Jiabing (P.R. China), B.S., M.S.

Dore, Monique (Canada), D.V.M., M.Sc.

El-Sabban, Marwan (Lebanon), B.Sc.

Feltham, Joanna, B.A.

Fevereiro, Miguel (Portugal), D.V.M.

Foley, George, B.S., D.V.M.

Glaser, Amy L., B.A., D.V.M.

Hackett, Susan, B.S., D.V.M.

Harman, Jane, B.S., D.V.M., M.S.

Hendrickson, Dean, B.A., D.V.M.

Hodgson, Anne M. (Canada), B.Sc., M.Sc.

Hsu, Hui-Min (Taiwan), D.V.M.

Hu, Liang-biang (P.R. China), B.S., M.S.

Ilott, Martin (England), B.Sc., D.V.M.

Johnson, Robert, B.S., D.V.M.

Jure, Maria (Uruguay), B.S., D.V.M.

Karaca, Kemal (Turkey), D.V.M., M.Sc.

Kenny, Kevin (Ireland), M.V.D.

Levine, Susan, B.S., D.V.M., M.S.

Lima, Miguel (Portugal), D.V.M.

Lin, Dah-Sheng (Taiwan), B.V.M., M.S.

Martineau, Daniel (Canada), D.V.M., M.Sc.

Mauldin, Glenna (Canada), B.S., D.V.M.

McGroddy, Kathleen, B.S.

Min, Churl-Ki (Korea), B.S., M.S.

Ngichabe, Christopher (Kenya), B.V.M., M.Sc.

Ning, Yangmin (P.R. China), B.M., M.M.

Obasanjo, Iyabo (Nigeria), D.V.M., M.P.V.M.

Ohashi, Kazuhiko (Japan), D.V.M., M.S.

Olsen, Christopher, B.S., D.V.M.

Perdrizet, John, B.A., D.V.M.

Platko, Joseph, B.S., M.S.

Poulet, Frederique (Belgium), D.V.M.

Poulopoulou, Cornelia (Greece), B.S.

Rehder, Renata (Brazil), D.V.M.

Reiser, Raoul, B.S.

Renshaw, Randall, B.S.

Revah, Irma (Mexico), D.V.M., M.P.V.M.

Reynolds, Arleigh, B.S., D.V.M.

Saliki, Jeremiah (Cameroon), D.V.M.

Schultz, Bruce, B.S., M.S.

Sirois, Jean (Canada), D.V.M., M.Sc.

Slater, Margaret, B.A., D.V.M.

Stafford, Grace, A.B.

Steinberg, Howard, B.A., M.S., V.M.D.

Todhunter, Rory (Australia), B.V.Sc., M.S.

Volpini, Lucy, B.A., D.V.M.

Wandaka, Fred (Kenya), B.V.M.

Ward, Jeffrey, B.A., D.V.M.

Weiser, Irene B., B.S., D.V.M.

Willard, James M., B.A., B.S., M.S.

Winand, Nena, B.S., M.S., D.V.M.

Xu, Yuhong (P.R. China), M.D.

Ziegra, Cynthia, V.M.D.

### Field of Physiology

Field representative: Professor John Wootton
818 Vet Research Tower
607 253-3276

Baustian, Mark, B.S., M.S.

Bay, Anik (Canada), B.Sc.

Cai, Qiang (P.R. China), M.D., M.S.

Calnek, David, B.A.

Dobrov, Tamara, B.A.

Franco, Elizabeth, B.A.

Matamoros, Roberto (Honduras), D.V.M., M.S.

Medville, Karen, B.A., M.S.

Oviedo, Agueda, B.S.

Pacioretty, Linda, B.S., M.S.

Perez, Jose (Spain), D.V.M.

Reisner, llana, B.A., D.V.M.

Sadowsky, Drew, B.A.

Shen, Linming (P.R. China), B.S., M.S.

Stock, Angelika (Germany), D.V.M., Ph.D.

Tang, Shaohua (P.R. China), M.D., M.S.

Tian, Xiuchun (P.R. China), B.S., M.S.

Tomasi, Ana (Argentina), M.D.

Turzillo, Adele, B.A.

Watanabe, Mari (Japan), M.D.

Wimsatt, Jeffrey, B.S., D.V.M.

Zhang, Dai-Wei (P.R. China), M.B.

### Field of Immunology

Field representative: Professor Rodney R. Dietert
216 Rice Hall
607 255-7789

Borschel, Richard, B.S., M.A.

Boschwitz, Jeffrey, B.S.

Ellis, Laurie, B.S.

Elzer, Philip, B.S., M.S.

Grunig, Gabriele (Germany), D.V.M.

Hanson, Laura, B.S.

Jia, Wei (P.R. China), D.V.M., M.S.

Llana, Ted, B.S.

Maher, Julie, D.V.M.

Otubu, Oti (Nigeria), B.S.

Pratt, William, B.S., M.S., D.V.M.

Rivas, Ariel (Uruguay), D.V.M., M.S.

Thompson, Gertrude (Mozambique), D.V.M., M.S.

Tokman, Michael, B.S., M.S.

Vella, Anthony, B.A., M.S.

Weichert, Wendy, B.S.

Zhang, Chonghui (P.R. China), B.S., M.S.

### Field of Microbiology

Field representative: Professor William C. Ghiorse
415 Stocking Hall
607 255-2418

Campbell, Barbara, B.S.

Kim, Carol, B.S.

### Field of Toxicology

Field representative: Professor Ruth Schwartz
256 Martha Van Rensselaer Hall
607 255-2054

Conboy, James, B.S., M.S.

Fisher, Jeffrey, B.S.

Gibbons, Jackie, B.S., M.S.

McLaughlin, Lee, A.B.

Vancutsem, Paul (Belgium), D.V.M.

### Field of Animal Science

Field representative: Professor Richard L. Quaas
114 Morrison Hall
607 255-3252

Petersson, Katherine, B.S., M.S.

### Field of Biochemistry

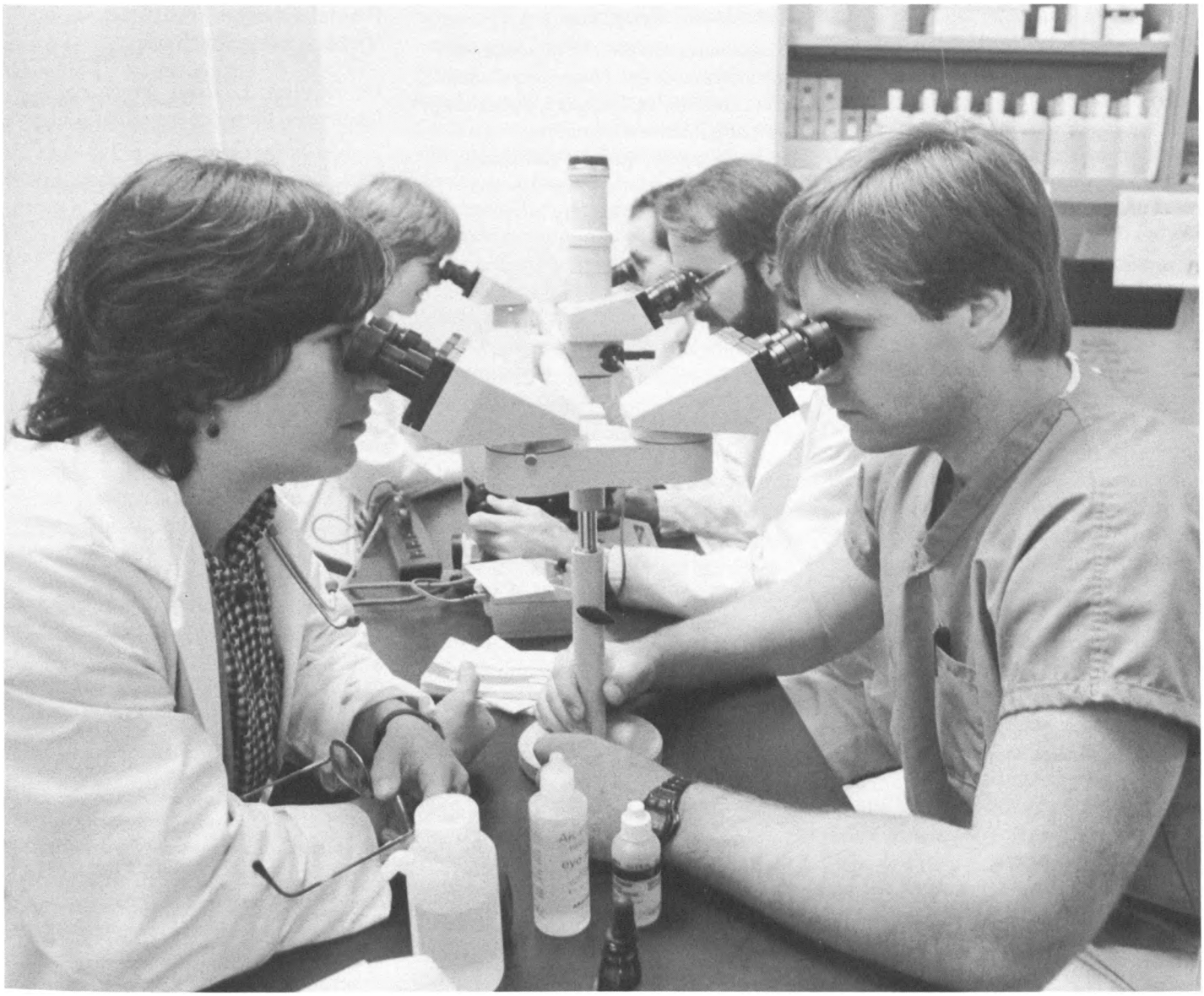
Field representative: Professor Volker M. Vogt
358 Biotechnology Building
607 255-2443

Carraway, Kermit, B.S.

Guy, Pamela, B.S.

Hart, Matthew, B.S.

**During hospital rounds, students use the five-headed microscope in the Critical Care Laboratory to determine which samples should be submitted for cultures or cytopathologic consultation.**



# Internships and Residencies

## Veterinary Medical Teaching Hospital

Dr. Francis A. Kallfelz, acting director
Veterinary Medical Teaching Hospital
607 253-3030

### Intern Program

Intern programs of the Veterinary Medical Teaching Hospital are available in the Ambulatory Clinic, the Large Animal Clinic (surgery) and the Small Animal Clinic (medicine and surgery).

#### Objectives

The intern program is a non–degree program that provides training for practice, clinical teaching, and specialty board eligibility. A one-year intern program with rotation in medicine and surgery is a prerequisite for most residency programs and for board certification. The intern program provides postgraduate education toward a high level of academic and clinical proficiency.

### Program

The intern in the Small Animal Clinic is assigned on a rotating basis to the various medical and surgical services and the anesthesiology service. Each service consists of one faculty member, a resident, and an intern. Fourth-year students are assigned to these services during the academic program. Interns in the Ambulatory Clinic are assigned to one of four services, each of which is the responsibility of one faculty member. Schedules are arranged so that the intern has the opportunity to work with most of the faculty in the area of the program selected. Interns in the Large Animal Clinic are assigned to the surgical service and are responsible to the faculty in the Section of Large Animal Surgery.

Interns share weekend duty and the responsibility for emergency service on a rotating basis with faculty available for consultation. The resident assigned to the service is responsible for the direct supervision of the intern and, along with the faculty member, evaluates the performance of the intern at the end of the rotation.

Interns are expected to attend and participate in hospital rounds and seminars. With permission of the director of interns, an intern may attend a limited number of elective courses. The intern is required to prepare a clinical paper suitable for publication under the supervision of a faculty member of the intern's choice.

The intern program extends from approximately June 15 of the year of acceptance to June 30 of the next year.

## Residency Program

Residencies are offered in anesthesiology, dermatology, large animal medicine, large animal surgery, ophthalmology, small animal medicine, small animal surgery, and the ambulatory clinic. The training programs are directed toward specialty board certification.

### Objectives

- To educate the resident to a high level of academic and clinical proficiency in a specific clinical discipline
- To fulfill the postgraduate education requirements of the various specialty boards
- To provide the resident experience in the methodology of professional veterinary medical education and experience in clinical teaching
- To assist in providing a high level of specialized veterinary service to the public and the profession

### Program

Each resident is supervised by the section chief of the specialty and designated faculty in the section.

The residency program consists of advanced training in a specific clinical discipline. Progression through the program leads to increased responsibility. Descriptions of each of the specific residency programs are available from the director of the Teaching Hospital.

Each clinical service consists of one faculty member, and a resident and/or an intern. Fourth-year students are assigned to the service during the academic program. The resident is responsible for the direct supervision of the intern on the service and participates in the clinical teaching of the fourth-year students. Residents have the opportunity to work with all the faculty in the discipline of the residency.

A minimum of two calendar years is required for successful completion of the program (three years in small animal surgery, large animal surgery, and ophthalmology).

# Postdoctoral Training in Veterinary Pathology

Dr. Bendicht U. Pauli, director
Chairman, Department of Pathology

## General Training Objectives

The major objectives of the postdoctoral training programs in the Department of Pathology are to provide contemporary graduate research training in cellular and molecular experimental pathology and residency training that meets the requirements for specialty board certification by the ACVP in anatomic and clinical pathology.

## Programs

### Graduate Research Training

The graduate program in experimental pathology extends over a three- or four-year period and leads to the Ph.D. degree. During the first year emphasis is on theoretical and practical courses in cellular and molecular biology, biochemistry, genetics, immunology, and biometrics. After successfully completing these courses, students begin research training by working in the laboratory of a faculty member. Current areas of research in the department include cancer-cell biology, connective-tissue disorders, neuromuscular diseases, immunopathology, reproductive diseases, and diseases of bone. Laboratory work is supplemented by informal discussions, lectures, seminars, and journal clubs. Variable exposure to diagnostic anatomic and clinical pathology is available to meet individual needs.

### Residency Training

A well-balanced residency training in anatomic and clinical pathology seeks to prepare students for careers in diagnostic veterinary pathology and involves rotating exposure to the extensive case material available through the necropsy, surgical pathology, clinical pathology, and NYS diagnostic laboratories. The time spent

in the program is determined by the entry-level skills of the applicant, and disciplinary competence is the primary training goal (one to three years). Learning via responsibility for diagnostic casework is supplemented by slide seminars, lectures, and rotation through specialty laboratories devoted to histochemistry and electron microscopy.

## Qualifications

The graduate research training program is designed to appeal to candidates who seek a career in biomedical research. The D.V.M. degree is desirable, but other graduate students will also be considered. A strong academic background is essential for admission to the Ph.D. program. The Graduate School of Cornell University and the graduate Field of Veterinary Medicine use the guidelines of a combined 1200 GRE score, a 3.0 grade point average (in a system based on 4.0), and high class rank as selection criteria. Foreign graduates must provide evidence of scholastic excellence and competence in English (a minimum TOEFL score of 550). Candidates may compete for various sources of financial support.

Applicants for residency training must hold the D.V.M. degree, have a solid academic record, and exhibit evidence of motivation and enthusiasm for advanced diagnostic training.

## Programmatic Strengths

The strengths of the training programs at Cornell University lie in an internationally acclaimed faculty dedicated to academic excellence and in a strong historical base in quality education in comparative pathology. The flexibility of the bidirectional training available in the Department of Pathology is structured to offer students the freedom to pursue individual interests and professional goals in either biomedical research or diagnostic pathology. The unique combination of departmental, college, and campuswide resources allows ready access to specialty research laboratories as well as a variety of conferences, lectures, seminars, and formal courses. Research programs are supported by a number of funding agencies and are carried out in modern and well-equipped laboratories featuring state-of-the-art instrumentation and research approaches. Departmental research facilities dedicated to tissue culture, electron microscopy, flow cytometry, cell biology, biochemical investigation, and recombinant DNA research are supplemented by extensive campuswide facilities and resources in the Division of Biological Sciences and the Cornell Biotechnology program that focus on biological and biomedical research in a variety of programs. Specialized campus facilities include FACS laboratoric protein and nucleic acid, hybridoma laboratories for monoclonal antibody production, and electron microscopy laboratories. Modern, sophisticated animal facilities in the College of Veterinary Medicine include areas committed to work with infectious and carcinogenic agents.

The diagnostic facilities of the college and the adjacent New York State Diagnostic Laboratory provide a wealth of material and form the foundation for residency training in pathology. Supporting services in diagnostic virology, bacteriology, serology, parasitology, and toxicology allow unsurpassed excellence in diagnostic pursuits.

## Special Programs

### Off-Campus Training in the Biomedical Community

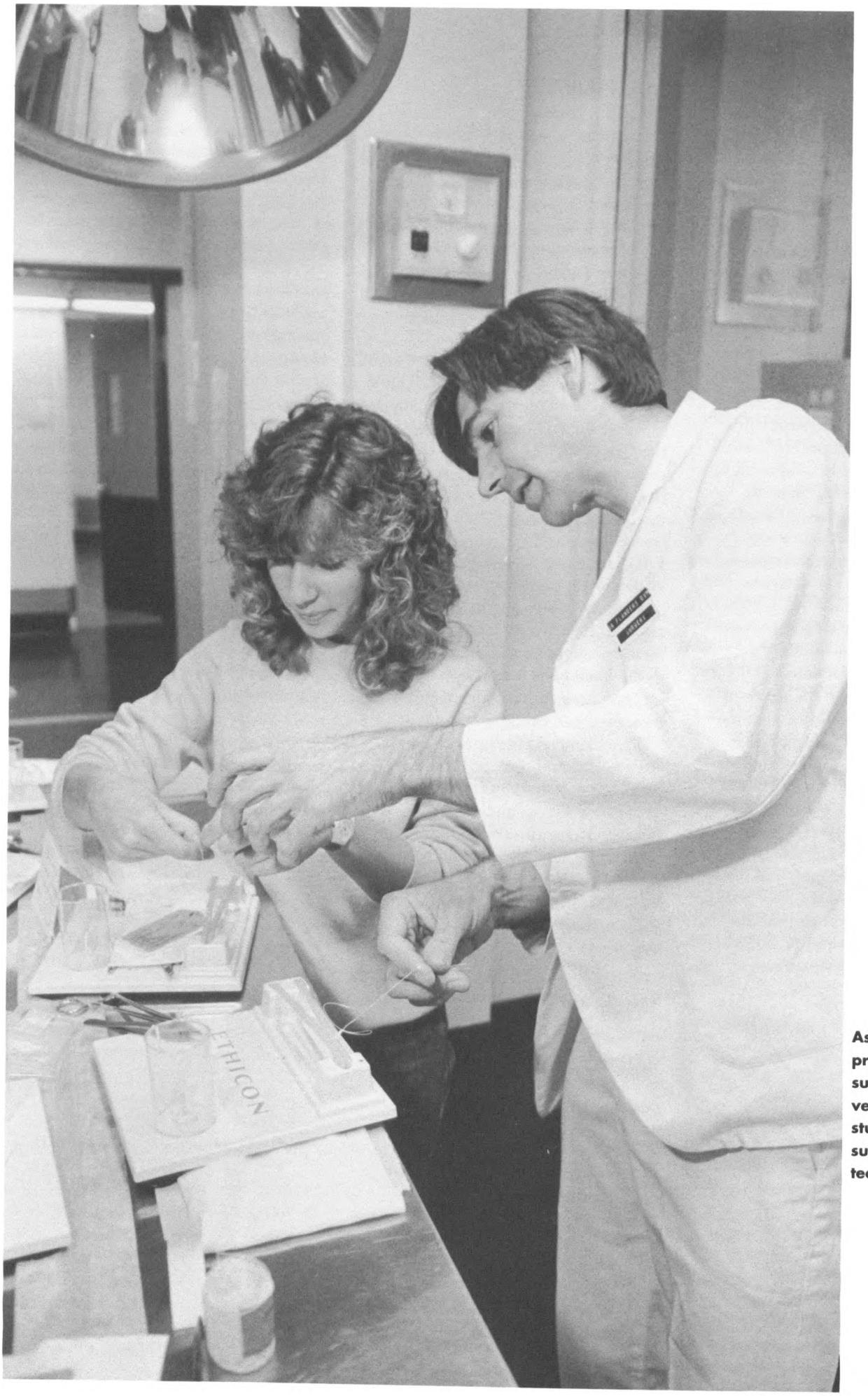
Effort is made to tailor the period of research training to the interests and career goals of the applicant, with ample opportunity provided for off-campus training in the biomedical community. Individuals interested in developing a career in comparative pathology may receive training in the pathology departments of the State University of New York medical schools and in the Cornell Medical Center, New York City.

### Instructorships, Necropsy Pathology, and Surgical Pathology Services

Two instructor positions are available each year with six months' responsibility in each of the two services noted above. Instructors work closely with pathologists, supervise senior veterinary students and first- and second-year residents, maintain contact with clinical staff and faculty, aid in the daily administration of both services, and exploit the publication potential of the diagnostic material. Ample time is available for final preparation for board certification by the American College of Veterinary Pathologists. Eligibility is determined by completion of at least two years of supervised residency training in veterinary pathology. Stipends depend on background and experience and the current college salary schedule.

### San Diego Zoo Residency Program

Veterinarians who have completed a minimum of one year of pathology residency at Cornell University are eligible for a special one-year period of residency training in the pathology of exotic animal species. Trainees may return to complete their training at Cornell University following the zoo pathology residency.




**As part of their preparation for surgical exercises, veterinary students practice suturing techniques.**

# Resources and Facilities

## Service Programs

### Veterinary Medical Teaching Hospital

Each year more than fifteen thousand cases are treated at the Veterinary Medical Teaching Hospital in its Large and Small Animal Clinics. An outreach of the hospital, the Ambulatory Clinic has ten field units (consisting of a specially equipped vehicle, a clinician, and three or four students) that travel throughout the area, serving over four hundred farms and forty thousand animals. The teaching hospital's highly trained specialists, sophisticated equipment, and capable support staff provide an invaluable resource for the state when health problems occur in the agricultural or equine industries, in the wildlife population, or among companion animals.

In addition to training for third- and fourth-year students, the teaching mission of the hospital encompasses the postgraduate education of interns and residents.

The teaching hospital is the proving ground for ideas and technologies developed in basic research. The clinical faculty provide the essential blend of medical, surgical, and investigative skills necessary to bring technology's promise to fruition. The rewards of clinical veterinary research extend far beyond animal health. Pacemakers, prosthetic hips, artificial heart valves, and new surgical procedures that now benefit man were all developed first in animals.

### The Diagnostic Laboratory

The Diagnostic Laboratory, located on the campus of the College of Veterinary Medicine, provides laboratory analyses and consultation on diagnostic and field problems and assists practicing veterinarians and the animal industry they serve. The laboratory consists of the Divisions of Bacteriology, Brucellosis, Virology, Toxicology, Automated Serology, Endocrinology, Parasitology, and Field Services/Extension for testing, consultation, and field outbreak investigations as well as preventive and disease surveillance programs. Pathology and clinical pathology services are offered through the Diagnostic Laboratory but provided by the Departments of Pathology and Clinical Sciences in the veterinary college. The laboratory conducts approximately seven hundred thousand tests a year. Research is conducted on new test development, pathogenesis, epidemiology, and preventive health programs.

The laboratory also provides testing for disease surveillance and control programs for such diseases as bovine brucellosis and equine infectious anemia for the New York State Department of Agriculture and Markets. The laboratory has cooperated with the state animal industry and the New York State Department of Agriculture and Markets to provide a disease-eradication and certified-free herd program for the bovine, sheep, and goat industries; for paratuberculosis (Johne's disease), for bluetongue disease and bovine leukosis disease; for the New York State Thoroughbred Breeding Industries' control program for equine viral arteritis; for the New York State horse industry surveillance program for Potomac horse fever; and for the poultry industry (egg-layers), a surveillance program for Salmonella enteriditis.

### Clinical Pathology

The Clinical Pathology Laboratory is a unit of the New York State Diagnostic Laboratory and performs diagnostic tests in hematology, clinical chemistry, immunology, and cytology. The Clinical Pathology Laboratory serves patients of the Veterinary Medical Teaching Hospital as well as patients of veterinary practitioners in New York State and throughout the country. Its services are also used by researchers at Cornell and in industry.

### Quality Milk Promotion Services

The New York State Quality Milk Promotion Services and Mastitis Control Program is a special program developed in 1946 to control mastitis outbreaks by culturing milk for bacterial causes, recommending specific treatments, providing milk equipment inspections, and examining milking procedures and hygiene. Over the years it has provided education and service to the dairy industry to reduce the losses due to mastitis. It is estimated that this service saves the New York dairy industry $48,000,000 annually in the control of just one infectious agent—*Streptococcus agalactiae*.

The program has recently been placed under the Diagnostic Laboratory, combining its personnel and, with the aid of other agriculture specialists in the College of Agriculture and Life Sciences at Cornell, supplying a range of support services to the dairy industry. The Quality Milk Promotion Services also provides a preventive mastitis herd program striving for higher production and increased income for the dairyman. Approximately five thousand visits to farms are made each year, and the milk samples of approximately 250,000 to 300,000 cows are examined by bacteriological culture. Five New York regional

laboratories, in Canton, Earlville, Geneseo, Kingston, and Ithaca provide the field and laboratory services for this program and also conduct applied and basic research in bovine mastitis. The regional laboratories are also being equipped to become diagnostic satellite laboratories for the central laboratory at Cornell. The first to be opened for general bacteriology service of all species is in Geneseo.

### Equine Drug Testing and Research Program

Horse racing is the largest spectator sport, and the industry is one of the major sources of tax revenue for state and local governments. The Equine Drug Testing and Research Program was formed in 1971, at the request of the racing industry, to prevent drug abuse in horses. Laboratories for testing are now located at all New York State pari-mutuel tracks. The central laboratory is located in Ithaca, New York, and is nationally and internationally recognized as a reference and research center. Over six hundred thousand samples are tested each year. The proven resources and capabilities of this very sophisticated program guarantee the integrity of racing statewide.

### New York State CEM Quarantine Facility

The Diagnostic Laboratory, with the College of Veterinary Medicine, operates a contagious equine metritis (CEM) quarantine station for the state and federal government. This is the only New York State quarantine facility for CEM. All culturing for CEM is performed at the Diagnostic Laboratory, where research has also concentrated on the development of a practical and reliable culture test.

## Species-oriented Programs

### The James A. Baker Institute for Animal Health

Established in 1950 as the Veterinary Virus Research Institute, the institute changed its name in 1975 to honor the founding director's contributions to veterinary medicine and to reflect the broad scope of the institute's activities.

The institute comprises the Cornell Research Laboratory for Diseases of Dogs and the Cornell Equine Genetics Center. The institute's primary mission is to prevent loss from infectious diseases in animals. To this end, basic research is conducted on disease-causing organisms to increase knowledge of their nature, means of spread, and methods of controlling their spread. The institute also provides advanced training in immunology, infectious diseases, and arthritis. A limited number of graduate students, postdoctoral fellows, and visiting investigators are accepted.

Within the last few years, facilities have been renovated and expanded to accommodate the programs. Among the added facilities are buildings for the breeding and rearing of specific-pathogen-free dogs and laboratory rodents and two new service laboratories. One of these units is dedicated to the production of monoclonal antibodies using cell hybridization techniques. In the other laboratory, researchers analyze particles and cells by flow cytometry. Projects conducted here also involve recombinant DNA techniques, cell hybridization, and embryo manipulation.

### Avian and Aquatic Animal Medicine

A vigorous multidisciplinary research program is carried out that encourages collaboration among faculty, staff, and graduate students. Major emphasis has traditionally been in the fields of virology and immunology, but bacterial and parasitic diseases are also investigated. Laboratory space is located at the P. Philip Levine Laboratory on Snyder Hill, about three miles from the campus, and in Schurman Hall on the campus proper. A forty-one-unit isolation building for studies on infectious diseases is located on the campus, and flocks of several genetically defined specific-pathogen-free chickens are maintained in highly secure buildings near the Levine Laboratory. These flocks provide chicks and embryos free of all diseases and antibodies for use in experimental studies.

Poultry diagnostic laboratories serving the chicken, duck, and turkey producers of the state are located in Ithaca and Eastport, Long Island. Research on economically important diseases of chickens, turkeys, and ducks and various aquatic animal species is conducted at the Ithaca and Eastport laboratories. Vaccines for chicken and duck industries are produced at Eastport.

A diagnostic and investigative program has been established at the Marine Biological Laboratory, Woods Hole, Massachusetts, to study the health of marine animals. Supported by the National Institutes of Health, its goals are to investigate disease outbreaks and develop diagnostic methods for recognizing infectious, parasitic, and toxicologic diseases. Colonies of aquatic animals, especially invertebrates, are being developed as defined laboratory animals for research.

At the college the Department of Avian and Aquatic Animal Medicine operates the Fish Diagnostic Laboratory, a facility designed to provide assistance to aquaculturists and others experiencing problems with fish health.

### Bovine Research Center

The Bovine Research Center at Cornell fosters research to improve the productivity, health, and well-being of cattle. It serves scientists at Cornell University with expertise and interest in a broad spectrum of scientific disciplines related to the dairy and beef cattle industries. It encourages cooperative research programs in health, metabolism, reproduction, breeding, and management for improved production in dairy and beef cattle. The center

also disseminates current information to the cattle industry, identifies areas for additional study, and seeks funding to support its research programs.

### Equine Research Park

The Equine Research Park, situated on 165 acres of land about one mile from the college, includes stall facilities for ninety horses and ponies and shed facilities for sixty horses. The park also has a half-mile track, a farrier shop, a stallion barn, and a separate brood mare barn, where box stalls are provided for foaling mares. In the brood mare barn there is a laboratory for reproductive studies and a center-court breeding arena with a dummy mount. Research at the park centers on reproduction, nutrition, behavior, bone and joint disease, pharmacology, infectious disease, and the special problems of the equine athlete.

### Equine Annex and Laboratory for Equine Embryo Biology

The Equine Annex, which includes the Contagious Equine Metritis Quarantine Facility, is a separate complex of buildings on Snyder Hill, barely a mile south of the college. Adjacent to the annex is the Laboratory for Equine Embryo Biology. Here, special facilities contain a laboratory, examination and palpation areas, and a transfer arena in support of an embryo transfer service available to horse owners and breeders.

### Equine Performance Testing Clinic

The Equine Performance Testing Clinic is the foundation of the college's developing program in Equine Sports Medicine. This facility, complete with a high-speed treadmill, laboratory space, and examination areas, will markedly improve the ability of college veterinarians to examine and treat patients with respiratory problems, lameness, or substandard performance. Additionally, the clinic will allow sophisticated research into important diseases affecting the performance of the equine athlete.

The centerpiece of the clinic is a Swedish SATO high-speed treadmill capable of going up to thirty-five miles per hour and tilting to a 10-percent slope. The treadmill allows veterinarians to assess many conditions in the horse's upper and lower airways and also allows daily workouts of horses regardless of season or weather. The treadmill will be an integral part of the work conducted in the clinic's three units: the Respiratory Function Testing Unit and the Lameness and Gait Analysis Unit, which are now in use; and the Fitness and Performance Testing Unit, scheduled to open in the near future.

### Cornell Feline Health Center

In 1974 the Board of Trustees of Cornell University approved the formation of the Cornell Feline Research Laboratory, changing the name in 1980 to the Cornell Feline Health Center. This formalized a program, started in 1964 by Dr. James H. Gillespie, to study feline infectious diseases. The center currently receives worldwide recognition for its work on feline infectious peritonitis, feline lentiviruses (feline immunodeficiency virus), feline leukemia, and respiratory diseases and for the development of the ELISA test for detection of coronaviral antibodies in feline serum.

Educational outreach is accomplished primarily through publications. Two newsletters, *Feline Health Topics* (for practitioners) and *Perspectives on Cats* (for cat owners and breeders), are published quarterly and distributed to over thirty thousand people. In addition, an animal information bulletin provides scientific data on a major feline health concern. Client information brochures are available on a cost basis to practitioners for distribution to their clients.

The Feline Health Center is funded primarily through contributions from cat fanciers, bequests, the memorial program, memberships, and grants from government, industries, and foundations. Some of the noteworthy funds that have been established are the Camuti Fund in support of the feline diagnostic and consultation service and the Buzz-Fuzz Harder Fund for cardiomyopathy studies.

## Academic Support Services

### Roswell P. Flower Veterinary Library

The library, endowed by a gift from Roswell P. Flower, governor of New York when the college was founded, is named the Flower Veterinary Library in his honor. It is maintained partly by endowment funds and partly by appropriations from the state. The library is on the second floor of Schurman Hall. The large reading room, which seats seventy, has display shelves for current journals, and areas of indexes, abstracts, and other reference books. The three levels of adjoining stacks include journals and monographs and are open for use. Individual study carrels are also available.

The library contains over seventy-five thousand volumes and regularly receives about thirteen hundred periodicals and series titles. This represents a worldwide selection of veterinary titles plus publications in the biomedical sciences, designed to support undergraduate, graduate, and research programs. Through the various libraries on the campus, nearly five million volumes and more than fifty thousand journals and serials are available to students. These collections, interlibrary loans, and photoduplicated materials supplement the research potential of the veterinary library, which is rich in historical and basic research resources as well as recent monographs and selected government publications. A bimonthly newsletter is issued listing recent acquisitions.

Information on policies and suggestions for the use of the library are provided to new students and faculty. A printed guide is also available. Additional instruction in bibliographic research is available for advanced problems.

A wide range of information services, including reference assistance, online

literature searching, interlibrary loan, photoduplication, and current awareness, are offered. In particular, the computer-assisted literature search service, called COMPASS at Cornell, provides rapid access to numerous bibliographic databases, including MEDLINE, CAB ABSTRACTS, and BIOSIS. Bibliographies can also be generated automatically each month through those online systems.

The college's Autotutorial Center contains a collection of over seven hundred titles in slide, audiotape, and videotape format. These media resources enhance academic programs as well as provide opportunities for self study. A collection of audiovisual materials is also available for loan to practicing veterinarians for continuing education purposes.

A microcomputer facility was established in the library in early 1985 and expanded significantly in 1988 to enhance the college's educational programs. The microcomputers are available for use primarily by students and feature a variety of software, including word processing, an electronic spreadsheet, and database management as well as computer-based tutorials. The classroom area, which features twenty microcomputers, supports course-related and other group instruction uses.

## Center for Research Animal Resources

In October 1980 Cornell University established the Center for Research Animal Resources (CRAR) under the jurisdiction of the vice president for research. Currently the center falls under the jurisdiction of the associate vice president for research, to whom Dr. Fred W. Quimby, the director, reports. This center is charged with the responsibility of implementing animal care programs throughout the university to assure compliance with all state and federal laws regarding the use of animals for teaching, research, and testing. It is also responsible for providing the associate vice president for research and advanced studies, the University Animal Welfare Committee (UAWC), and the Institutional Animal Care and Use Committee (IACUC) with information on developments in the field of animal welfare legislation and methods of compliance with new regulations.

Because sound animal care and use practices arise from proper awareness and education, CRAR offers instructional sessions to faculty, students, research technicians, and animal care technicians. These sessions introduce the participants to the ethics of using animals for research, the occupational health program for animal handlers, relevant federal and state regulations, and proper handling and restraint of common laboratory animals, as well as approved methods of euthanasia, available veterinary services, and the proper channels for reporting discrepancies in animal care.

The CRAR staff is also available to counsel and advise investigators, technicians, and others on procedures for proper housing, maintenance, care, and sanitation and disease control of animals and animal facilities. The center maintains information on the suitability of various animal models for research purposes and available alternatives to the use of living animals and regularly updates a listing of sources of disease-free animals.

The center also assembles data required by state and federal legislation relative to animal care and use within the university as well as maintains files and records all animal protocols for active research, teaching, and extension projects at Cornell.

## Biomedical Communications

Biomedical Communications offers in-house services in photography, video production, and both photomacrography and photomicrography. Film processing, printing, copy photography for teaching slides, slide duplication, and clinical, surgical, and gross-specimen photography are some of the services provided. Biomedical Communications is also equipped with a Zeiss microscope and macrophotography unit to photograph small biological specimens and microscope slides. Studio facilities are available for product photography and portraits. Video cameras, the services of an experienced videographer, and both 1/2" VHS and 3/4" video editing systems make possible the production of educational videotapes. In addition, Biomedical Communications schedules, supplies, and maintains the audiovisual equipment needed in classrooms and for lectures or special events.

## Biomedical Electronics Service

The Biomedical Electronics Service provides on-site, economical repair and maintenance of college equipment as well as design and construction of specialized equipment. The service performs scheduled preventive maintenance checks on a variety of centrifuges, microscopes, and other equipment and offers consultation services on new equipment acquisition and use, as well as training in instrumentation concepts and techniques.

## Computer Facility

The College of Veterinary Medicine at Cornell has developed an integrated hospital computer system designed to meet the operational, administrative, and research needs of a veterinary teaching hospital. The interactive online system was developed using the MUMPS language and currently supports over one hundred user terminals throughout the college. Functional areas within the hospital that have been computerized include medical records, admissions desks, clinical laboratory, pharmacy, radiology, ambulatory clinic, and pathology. In addition, the State Diagnostic Laboratory has been automated and a number of administrative functions such as college personnel records, student admissions and records, college and departmental accounting, student job placement, word processing, and electronic mail have been implemented on the computer.

**In a mock practice situation complete with "client" and "patient," second-year students apply textbook knowledge to real life. They will take a patient history, perform an examination, order diagnostic tests if appropriate, then offer a diagnosis and treatment.**

# Faculty and Administration

## University Administration

Frank H. T. Rhodes, *president*

Robert Barker, *senior provost and chief operating officer*

Malden C. Nesheim, *provost*

G. Tom Shires, *provost for medical affairs*

James E. Morley, Jr., *senior vice president*

Norman R. Scott, *vice president for research and advanced studies*

John F. Burness, *vice president for university relations*

William D. Gurowitz, *vice president for campus affairs*

M. Stuart Lynn, *vice president for information technologies*

Larry I. Palmer, *vice president for academic programs*

Richard M. Ramin, *vice president for public affairs*

Frederick A. Rogers, *vice president for finance and treasurer*

John R. Wiesenfeld, *vice president for planning*

Walter J. Relihan, Jr., *university counsel and secretary of the corporation*

James A. Sanderson, *chief investment officer*

Joycelyn R. Hart, *associate vice president for human relations*

Walter Lynn, *dean of the University Faculty*

## College Administration

Robert D. Phemister, *dean of the college*

S. Gordon Campbell, *associate dean*

Douglas D. McGregor, *associate dean for research*

Donald F. Smith, *associate dean for veterinary education*

John A. Lambert, *assistant dean for administration*

John C. Semmler, *assistant dean for public affairs*

Neil L. Norcross, *secretary*

Marcia J. Sawyer, *director of student affairs and admissions*

Gloria R. Crissey, *director of financial aid, registrar*

Elizabeth A. Fontana, *director of development*

Rita W. Harris, *director of personnel*

Susanne K. Whitaker, *librarian, Flower Veterinary Library*

John Lewkowicz, *director, computing facility*

Donald Hinman, *director, biomedical electronics*

Sandra Berry, *director, biomedical communications*

Charles S. Pearson, *director of financial services*

Fred Quimby, *director of the Center for Research Animal Resources*

Karen E. Redmond, *director of public information*

John E. Saidla, *director of continuing education*

Robert Webster, *director of facilities administration*

## College of Veterinary Medicine at Cornell Advisory Council 1990–91

Richard C. Grambow, D.V.M.
chairman
3705 W. Genesee Street
Syracuse, New York 13219

Donald P. Berens (Trusee Emeritus)
(Owner, D. P. Berens, Inc., retail consultant)
22 Countryside Road
Fairport, New York 14450

Donald R. Davidsen, D.V.M.
The State Assembly
325 Legislative Office Building
Albany, New York 12248

Stephen J. Ettinger, D.V.M.
California Animal Hospital, Inc.
1736 South Sepulveda Boulevard
Los Angeles, California 90025

Ralph W. F. Hardy
President
Boyce Thompson Institute
for Plant Research
Cornell University
Ithaca, New York 14853

Patricia T. Herr, D.V.M.
2363 Henbird Lane
Lancaster, Pennsylvania 17601

John Patrick Jordan
Administrator
Cooperative State Research Service
U.S. Department of Agriculture
Washington, D.C. 20251

Joseph P. King (emeritus)
53 Country Club Drive
Rochester, New York 14618

Stephen J. Kleinschuster
Director, New Jersey Agricultural
Experiment Station
Rutgers University
New Brunswick, New Jersey 08901

Robert E. Malouf
Director
New York Sea Grant Institute
Dutchess Hall
SUNY at Stony Brook
Stony Brook, New York 11794-5001

John L. Mara, D.V.M.
Director of Professional Affairs
Hill's Pet Products
P.O. Box 148
Topeka, Kansas 66601

John W. McCann, D.V.M.
The State Assembly
919 Legislative Office Building
Albany, New York 12248

Bernard W. Potter (Trustee)
B. W. Potter Holstein Dairy Farm
3455 Route 13
Truxton, New York 13158

Kenneth J. Rotondo, D.V.M.
(private practitioner)
2721 Balltown Road
Schenectady, New York 12309

James L. Seward
The Senate
State of New York
805 Legislative Office Building
Albany, New York 12247

Richard J. Sheehan, D.V.M.
(private practitioner)
600 South Main Street
Mansfield, Massachusetts 02048

Kent R. Van Kampen
Chief Executive Officer
Virogenetics Corporation
120 De Freest Drive
Troy, New York 12180

Stephen H. Weiss (emeritus)
Managing Partner
Weiss, Peck & Greer
One New York Plaza
New York, New York 10004

Bruce Widger, D.V.M. (Trustee Emeritus)
11 Flower Lane
Marcellus, New York 13108

Harold M. Zweighaft, D.V.M.
(private practitioner)
8 W. 86th Street
New York, New York 10024

David Shepherd (observer)
Room 806
Hotel Jamestown Building
Jamestown, New York 14701

## Faculty Committees and Advisers

### July 1, 1990–June 30, 1991

### General Committee

*(Elected by faculty)*

H. N. Erb (1988–91), chairperson

J. F. Cummings (1990–93)

J. F. Randolph (1989–92)

D. H. Schlafer (1988–91)

M. E. White (1989–92)

### Graduate Field of Veterinary Medicine Executive Committee

*(Elected by graduate faculty)*

J. F. Timoney (1992),
field representative

E. J. Dubovi (1992)

C. Guard (1992)

D. M. Noden (1990)

G.W.G. Sharp (1992)

## University Appeals Panel

*(Elected by faculty)*

J. T. Blue (1989–94)
L. E. Carmichael (1988–93)
A. Dobson (1987–92)
H. J. Harvey (1990–95)
W. O. Sack (1986–91)

## Faculty Council of Representatives

*(Elected by faculty)*

B. A. Ball (1989–92)
E. J. Dubovi (1990–93)
C. E. Farnum (1990–93)
R. F. Gilmour (1989–92)
J. W. Hermanson (1989–92)
T. R. Houpt (1988–91)
G. A. Weiland (1990–93)

## Committee on Curriculum

*(Elected by faculty)*

J. G. Babish (1/90–12/91)
S. A. Center (1/90–12/91)
R. P. Hackett (1/90–12/91)
F. W. Scott (1/90–12/91)
M. M. Suter (1/90–12/91)
J. F. Wootton (1/90–12/91)
C. E. Farnum (1/90–12/92)
J. A. Flanders (1/90–12/92)
K. A. Schat (1/90–12/92)
D. F. Smith, ex officio

## SUNY Senate

*(Elected by faculty)*

H. F. Schryver, senator
G. Lust, alternate

## Class Advisory Committees

**Class of 1991**

J. A. Appleton
D. D. Bowman
H. N. Erb
H. J. Harvey
D. F. Holmes
K. A. Houpt
R. H. Jacobson
D. H. Lein

**Class of 1992**

P. R. Bowser
R. A. Cerione
R. B. Hillman
W. E. Hornbuckle
F. A. Kallfelz
R. M. Lewis
N. S. Moise
C. E. Short

**Class of 1993**

K. A. Beck
J. T. Blue
J. A. Flanders
T. W. French
T. J. Kern
W. S. Schwark
E. J. Trotter
E. M. Wertz

**Class of 1994**

J. F. Cummings
A. de Lahunta
J. W. Hermanson
T. R. Houpt
D. M. Noden
D. Robertshaw
W. O. Sack
J. F. Wootton

## Faculty Advisers to Student Organizations

**SCAVMA - Student Chapter of the American Veterinary Medical Assoc.**
Faculty Adviser: W. E. Hornbuckle

**AAEP - American Association of Equine Practitioners**
Faculty Adviser: S. L. Fubini

**AAZV - American Association of Zoo Veterinarians**
Faculty Adviser: W. J. Gould

**AABP - American Association of Bovine Practitioners**
Faculty Adviser: F. H. Fox

**AAHA - American Animal Hospital Association**
Faculty Advisers: J. F. Randolph and S. A. Center

**AAFP - American Association of Feline Practitioners**
Faculty Adviser: J. E. Saidla

**Avian Clinic**
Faculty Advisers: W. J. Gould and L. G. Carbone

**VIDA - Veterinarians Interested in Developing Areas**
Faculty Adviser: K. A. Schat

**Veterinary Intercultural Association**
Administrative Adviser: S. J. Selden

**Open House**
Faculty Adviser: R. O. Gilbert
Administrative Adviser: M. J. Sawyer

**Phi Zeta**
President: T. J. Kern
Secretary/Treasurer: J. F. Randolph

**Omega Tau Sigma**
Faculty Adviser: W. C. Rebhun

**Alpha Psi**
Faculty Adviser: T. J. Kern

## Admissions Committee

G. Lust (1989–91), chairperson
M. J. Appel (1990–92)
J. F. Cummings (1989–91)
A. de Lahunta (1989–91)
R. D. Gleed (1990–92)
T. J. Kern (1990–92)
D. F. Holmes (1989–91)
M. J. Sawyer, ex officio

## Committee on Scholarships

H. J. Harvey (1991), chairperson
S. A. Center (1991)
R. E. Kaderly (1992)
R. M. Lewis (1991)
E. Loew (1992)
D. N. Tapper (1993)
G. R. Crissey, ex officio
J. C. Semmler, ex officio

### Committee on Deficient Students
R. C. Riis, chairperson
A. Dobson
C. M. Fewtrell
M. M. Suter (alternate)

### Committee on Student Conduct
F. H. Fox, chairperson
D. F. Holmes
K. A. Houpt
J. F. Randolph
M. C. Smith

### Committee on International Programs
D. Robertshaw (1991), chairperson
L. E. Carmichael (1991)
R. N. Gonzalez (1992)
R. H. Jacobson (1991), secretary
F. A. Kallfelz (1992)
S. J. Shin (1993)
S. G. Campbell, ex officio

### Committee on Research Animal Use and Care
P. R. Bowser
R. P. Hackett
V. N. Meyers-Wallen
F. W. Quimby
E. J. Trotter
D. Robertshaw
D. D. McGregor, ex officio

### Committee on the Use of Live Animals in Teaching
W. O. Sack
L. A. Dillingham
J. E. Fortune
S. L. Fubini
L. M. Nowak
B. A. Summers

### Committee on the College Library
W. O. Sack, chairperson
A. Dobson
H. F. Schryver
J. M. Spitsbergen
G. A. Weiland
S. K. Whitaker, ex officio
D. D. McGregor, ex officio
D. F. Smith, ex officio

### Pharmacy and Therapeutics Committee
N. G. Ducharme
S. L. Fubini
W. H. Miller
W. S. Schwark
E. M. Wertz
G. A. Decker, ex officio
F. A. Kallfelz, ex officio

## Special Committees 1990–91

### Annual Conference for Veterinarians
**83rd, January 8–10, 1991**
F. H. Fox, chairperson
T. J. Divers
W. J. Gould
W. E. Hornbuckle
W. H. Miller
A. J. Nixon
J. E. Saidla, ex officio

**84th, January 7–9, 1992**
F. H. Fox, chairperson
T. J. Divers
W. J. Gould
W. S. Schwark
W. H. Miller
W. C. Rebhun
J. E. Saidla, ex officio

### Senior Seminar Committee
F. H. Fox, chairperson
A. de Lahunta
A. E. Yeager
T. R. Houpt
J. M. King
M. C. Smith

### Expanded Senior Seminar Committee
M. A. Brunner
R. O. Gilbert
R. E. Habel
R. B. Hillman
D. F. Holmes
H. E. Hornbuckle
K. A. Houpt
J. L. Hyde
G. D. Mechor
R. R. Minor
W. S. Schwark
J. F. Wootton

### Biohazard Safety Committee
E. J. Dubovi, chairperson
J. G. Babish
L. E. Carmichael
T. J. Reimers
F. W. Quimby, ex officio
L. J. Thompson, ex officio

### Computer Advisory Committee
E. Loew, chairperson
B. J. Cooper
R. E. Oswald
R. H. Jacobson
N. S. Moise
H. O. Mohammed
J. A. Lambert, ex officio
J. M. Lewkowicz, ex officio

### Committee on the Use of Computers in Education

R. E. Oswald, chairperson
G. A. Weiland
R. R. Minor
T. W. French
H. O. Mohammed
D. M. Noden

### College Research Council

A. J. Winter (1990-91), chairperson
E. J. Dubovi (1989-92)
R. E. Oswald (1990-93)
A. Quaroni (1988-91)
J. M. Scarlett (1990-93)
K. A. Schat (1989-92)
B. C. Tennant (1990-93)
A. van Tienhoven (1988-91)
D. D. McGregor, ex officio

### James Law Lecturer Series Committee

R. G. Bell
B. J. Cooper
P. W. Nathanielsz
B. U. Pauli
J. F. Timoney
M. E. White

### Affirmative Action Committee

S. A. Naqi, chairperson
R. G. Bell
C. M. Fewtrell
J. M. Scarlett
M. C. Smith
A. Yen
R. W. Harris, ex officio
S. J. Selden, ex officio

### Central Planning Committee (CPC) for the Facilities Master Plan

B. W. Calnek, chairperson
R. J. Avery
F. A. Kallfelz
D. H. Lein
D. D. McGregor
D. F. Smith
W. S. Schwark
J. A. Lambert
J. C. Semmler
R. J. Webster, Jr.

### Student/Faculty Liaison Committee

Student representatives and faculty members are elected by the student body in the fall. One student serves as chairperson.

### Honor Code Committee

Student and faculty representatives are elected by the student body.

### Graduate/Faculty Liaison Committee

Graduate students select the committee.

### Environmental Health Committee (Faculty-Staff)

Rita Harris, chairwoman

### Academic Planning Committee (A.P.C.)

C. E. Farnum, chairperson
D. F. Antczak
R. J. Avery
F. A. Kallfelz
D. M. Noden
R. V. Pollock
D. Robertshaw
K. A. Schat
D. H. Schlafer
W. S. Schwark
D. F. Smith
D. N. Tapper

## Faculty

### Emeritus Professors

Bentinck-Smith, John, A.B., D.V.M.; clinical pathology

Boyer, Clyde I., Jr., V.M.D., M.S.; laboratory animal medicine

Bruner, Dorsey W., B.S., Ph.D., D.V.M.; veterinary microbiology

Evans, Howard E., Ph.D.; veterinary and comparative anatomy

Fabricant, Julius, V.M.D., M.S., Ph.D.; avian medicine

Gasteiger, E. L., Jr., M.S., Ph.D.; physical biology

Geary, Jack C., D.V.M.; radiology

Georgi, Jay R., D.V.M., Ph.D.; parasitology

Gillespie, James H., V.M.D.; veterinary microbiology

Habel, Robert E., D.V.M., M.Sc., M.V.D.; veterinary anatomy

Hitchner, Stephen B., B.S., V.M.D.; avian medicine

Kirk, Robert W., D.V.M.; medicine

Leibovitz, Louis, V.M.D.; avian and aquatic animal medicine

Lengemann, Fred W., M.N.S., Ph.D.; radiation biology

Leonard, Ellis P., B.S., D.V.M.; small animal surgery

McEntee, Kenneth, D.V.M., Ph.D.(honorary); veterinary pathology

Melby, Edward C., Jr., D.V.M.; medicine

Poppensiek, George C., V.M.D., M.S.; James Law Professor of Comparative Medicine

Postle, Donald S., D.V.M., M.S.; veterinary science

Rickard, Charles G., D.V.M., M.S., Ph.D.; veterinary pathology

Roberts, Stephen J., D.V.M., M.S.; veterinary medicine, obstetrics

Sellers, Alvin F., V.M.D., M.Sc., Ph.D.; veterinary physiology

Sheffy, Ben E., M.S., Ph.D.; nutrition

Whitlock, John H., D.V.M., M.S.; parasitology

## Professors

Appel, Max J., D.V.M., Ph.D.; veterinary virology

Avery, Roger J., Ph.D.; virology, chairman of the Department of Microbiology, Immunology, and Parasitology

Black, Jonathan, Ph.D.; adjunct, pathology

Burny, Arsene, Ph.D.; adjunct, microbiology

Calnek, Bruce W., D.V.M., M.S.; avian and aquatic animal medicine; chairman of the Department of Avian and Aquatic Animal Medicine

Campbell, S. Gordon, M.V.Sc., Ph.D.; immunology, associate dean for academic affairs

Carmichael, Leland E., D.V.M., Ph.D.; John M. Olin Professor of Virology

Cummings, John F., D.V.M., M.S., Ph.D.; veterinary anatomy

deLahunta, Alexander, D.V.M., Ph.D.; veterinary anatomy, chairman of the Department of Anatomy

Dobson, Alan, Ph.D., M.A., Sc.D.; veterinary physiology

Dodds, W. Jean, D.V.M.; adjunct, pathology

Farrow, Brian R. H., B.V.Sc., M.R.C.V.S., Ph.D.; internal medicine, neurology, chairman of the Department of Clinical Sciences

Fox, Francis H., D.V.M.; veterinary medicine and obstetrics

Gallo, Robert C., M.D., D.Sc.; adjunct, veterinary microbiology

Hansel, William, M.S., Ph.D.; veterinary physiology, Liberty Hyde Bailey Professor of Animal Physiology

Hintz, Harold F., Ph.D.; animal nutrition

Houpt, Katherine A., V.M.D., Ph.D.; veterinary physiology

Houpt, T. Richard, V.M.D., M.S., Ph.D.; veterinary physiology

Kallfelz, Francis A., D.V.M., Ph.D.; veterinary medicine, acting director of the Veterinary Medicine Teaching Hospital

King, John M., D.V.M., Ph.D.; veterinary pathology

Krook, Lennart P., D.V.M., Ph.D.; veterinary pathology

Lewis, Robert M., D.V.M.; veterinary pathology

Lust, George, Ph.D.; physiological chemistry

McGregor, Douglas D., M.D., D.Phil.; veterinary immunology, director of the James A. Baker Institute for Animal Health, associate dean for research

Mebus, Charles A., D.V.M., M.S., Ph.D.; adjunct, pathology

Minor, Ronald R., V.M.D., Ph.D.; veterinary pathology

Naqi, Syed A., Ph.D.; avian and aquatic animal medicine

Nathanielsz, Peter W., M.B., Ph.D., M.D.; reproductive biology

Noden, Drew M., M.S., Ph.D.; anatomy

Norcross, Neil L., M.S., Ph.D.; immunochemistry, secretary of the college

Noronha, Fernando M., D.V.M.; veterinary virology

Nosanchuk, Jerome S., M.D.; adjunct, clinical pathology

Pauli, Bendicht U., D.V.M., Ph.D.; veterinary pathology, chairman of the Department of Pathology

Phemister, Robert D., D.V.M., Ph.D., veterinary pathology, dean of the college

Posso, Manuel, M.D.; adjunct, comparative pathology

Rebhun, William C., D.V.M.; medicine

Robertshaw, David, B.V.Sc., Ph.D.; physiology; chairman of the Department of Physiology/Section of Physiology

Sack, Wolfgang O., D.V.M., Ph.D., Dr.Med.Vet.; veterinary anatomy

Schat, Karel A., D.V.M., Ph.D.; avian and aquatic animal medicine

Schwark, Wayne S., D.V.M., M.Sc., Ph.D.; veterinary pharmacology

Scott, Danny W., D.V.M.; medicine

Scott, Fredric W., D.V.M., Ph.D.; veterinary virology, director of the Cornell Feline Health Center

Sharp Geoffrey W. G., B. Pharm., Ph.D., D.Sc.; pharmacology, chairman of the Department of Pharmacology

Short, Charles E., D.V.M., M.S.; anesthesiology

Smith, Donald F., D.V.M.; surgery, associate dean for veterinary education

Tapper, Daniel N., V.M.D., Ph.D.; physical biology

Tennant, Bud C., D.V.M.; comparative gastroenterology, James Law Professor of Comparative Medicine

Timoney, John F., M.V.M., M.S., Ph.D., D.Sc.; veterinary bacteriology

VanPoznak, Alan, M.D.; adjunct, anesthesiology

Wasserman, Robert H., M.S., Ph.D.; James Law Professor of Physiology

Winter, Alexander J., D.V.M., M.S., Ph.D.; veterinary microbiology

Wootton, John F., M.S., Ph.D.; biochemistry

## Associate Professors

Antczak, Douglas F., V.M.D., Ph.D.; immunology

Babish, John G., M.S., Ph.D.; toxicology and epidemiology

Bell, Robin G., Ph.D.; immunology

Blue, Julia T., D.V.M., Ph.D.; clinical pathology

Bowser, Paul R., M.S. Ph.D.; avian and aquatic animal medicine

Casey, James W., Ph.D.; virology

Center, Sharon A., D.V.M.; medicine

Cerione, Richard A., Ph.D.; pharmacology

Cooper, Barry J., Ph.D.; veterinary pathology

Corradino, Robert A., M.S., Ph.D.; physiology

Divers, Thomas J., D.V.M.; medicine

Dubovi, Edward J., M.A., Ph.D., virology

Ducharme, Normand G., D.V.M., M.Sc.; surgery

Edwards, N. Joel, D.V.M.; adjunct, medicine

Erb, Hollis N., D.V.M., M.S., Ph.D.; epidemiology

Farnum, Cornelia, D.V.M., Ph.D.; anatomy

Fewtrell, Clare, M.S., D.Phil.; pharmacology

Fortune, Joanne E., M.S., Ph.D.; physiology

Fredrickson, Bruce E., M.D.; adjunct, comparative orthopedics

French, Tracy W., D.V.M.; clinical pathology

Gilmour, Robert F., Jr., Ph.D.; physiology

Gleed, Robin D., B.V.Sc., D.V.A. anesthesiology

Guard, Charles L., Ph.D., D.V.M.; medicine

Hackett, Richard P., D.V.M., M.S.; surgery

Harvey, H. Jay, D.V.M.; surgery

Henion, John D., M.S., Ph.D.; toxicology

Hornbuckle, William E., D.V.M.; small animal medicine

Jacobson, Richard H., M.S., Ph.D.; immunoparasitology

Kaderly, Robert E., D.V.M., M.Sc., Ph.D.; surgery

Kern, Thomas J., D.V.M.; ophthalmology

Kessler, Matt J., D.V.M.; adjunct, medicine

Lein, Donald H., D.V.M., Ph.D.; theriogenology, director of the Diagnostic Laboratory

Lowe, John E., D.V.M., M.S.; veterinary surgery

Lucio, Benjamin, Ph.D.; avian and aquatic animal medicine

Ludders, John W., D.V.M.; anesthesiology

Maylin, George A., D.V.M., Ph.D.; toxicology and environmental health, director of the Equine Drug Testing Program

Morris, Mark L., D.V.M., M.S., Ph.D.; adjunct, medicine

Myers, David D., D.V.M., M.S., Ph.D.; courtesy, pathology

Nixon, Alan J., B.V.Sc., M.S.; surgery

Oswald, Robert E., Ph.D.; pharmacology

Poston, Hugh A., M.S., Ph.D.; courtesy, avian and aquatic animal medicine

Quimby, Fred W., V.M.D., Ph.D.; pathology, director of the Center for Research Animal Resources

Randolph, John F., D.V.M.; medicine

Reimers, Thomas, M.S., Ph.D.; endocrinology

Rendano, Victor, V.M.D., M.S.; radiology

Riis, Ronald C., M.T., D.V.M., M.S.; clinical ophthalmology

Scarlett, Janet M., D.V.M., M.P.H., Ph.D.; epidemiology

Schlafer, Donald H., D.V.M., M.S., Ph.D.; pathology

Schryver, Herbert F., D.V.M., Ph.D.; pathology

Sears, Philip M., D.V.M., Ph.D.; Diagnostic Laboratory, director of the New York State Mastitis Control Program and Quality Milk Promotion Services

Shin, Sang J., D.V.M.; microbiology, Diagnostic Laboratory

Smith, Mary C., D.V.M.; medicine

Straw, Barbara E., D.V.M., Ph.D.; Diagnostic Laboratory

Summers, Brian A., M.Sc., Ph.D.; pathology

Torres, Alfonso, Ph.D.; adjunct, Diagnostic Laboratory

Trotter, Eric J., D.V.M., M.S.; surgery

Weiland, Gregory A., Ph.D.; pharmacology

White, Maurice E., D.V.M.; medicine

Wood, Philip A., D.V.M., Ph.D.; adjunct, pathology

Yen, Andrew, Ph.D.; clinical pathology

### Assistant Professors

Appleton, Judith A., Ph.D.; immunology

Ball, Barry A., D.V.M., Ph.D.; theriogenology

Barr, Stephen C., M.V.S., Ph.D.; medicine

Beck, Kathy A., D.V.M.; radiology

Bowman, Dwight D., Ph.D.; parasitology

Daels, Peter F., D.V.M.; theriogenology

Ding, Xiu-Ying, M.D.; visiting, reproductive studies

Donnelly, Thomas, B.V.Sc.; adjunct, laboratory animal medicine

Flanders, James A., D.V.M.; surgery

Fubini, Susan L., D.V.M.; surgery

Gilbert, Robert O., M.Med.Vet.; theriogenology

Gould, Willard J., III, D.V.M.; medicine

Grohn, Yrjo T., D.V.M., M.S., Ph.D.; epidemiology

Hermanson, John W., Ph.D.; anatomy

Horne, William A., D.V.M., Ph.D.; pharmacology

Kawula, Thomas H., M.S., Ph.D.; bacteriology

Lopez, Jorge W., Ph.D.; virology

Mechor, Gerald D., D.V.M., M.V.Sc.; medicine

Meyers-Wallen, Vicki N., V.M.D., Ph.D.; theriogenology

Miller, William H., Jr., V.M.D.; dermatology

Mohammed, Hussni O., M.V.Sc., M.P.V.M., Ph.D.; epidemiology

Moise, N. Sydney, D.V.M., M.S.; medicine

Nguyen, Hai T., V.M.D., M.D.; adjunct, pathology

Nowak, Linda M., Ph.D.; pharmacology

Parrish, Colin R., Ph.D.; virology

Pollock, Roy V., D.V.M., Ph.D.; medical informatics, director of the Center for Medical Informatics

Spitsbergen, Jan M., D.V.M., Ph.D.; aquatic animal medicine

Suter, Maja M., Ph.D.; pathology

Tolosa de Talamoni, Nori G., Ph.D.; visiting, physiology

Wertz, Etta M., D.V.M., M.S.; anesthesiology

Yeager, Amy E., D.V.M.; radiology

## Senior Research Associates

Cheng, Chao-Fu, M.S., Ph.D.; pathology

Concannon, Patrick W., Ph.D., M.S.; physiology

Eckerlin, Richard H., D.V.M.; Diagnostic Laboratory

Figueroa, Jorge P., M.D., Ph.D., physiology

Fullmer, Curtis S., M.S., Ph.D.; physiology

Gonzalez, Ruben N., Ph.D., Diagnostic Laboratory

Wentworth, Richard A., M.S., Ph.D.; physiology

Woolcock, Peter R., Ph.D., avian and aquatic animal medicine

Wurster, Nancy I., Ph.D.; microbiology, immunology, and parasitology

### Senior Extension Associates

Bennett, Gary J., D.V.M., Diagnostic Laboratory

Brunner, Michael A., D.V.M., Ph.D.; Diagnostic Laboratory

Hayes, Gerald L., D.V.M., Diagnostic Laboratory

Mutalib, Ahmed A. H., D.V.M.; avian and aquatic animal medicine

Saidla, John E., D.V.M.; Diagnostic Laboratory

Schulte, Hal F., III, D.V.M.; Diagnostic Laboratory

Thompson, Larry J., D.V.M., Ph.D.; Diagnostic Laboratory

Wilson, David J., D.V.M., M.S.; Diagnostic Laboratory

### Senior Clinician

Hillman, Robert B., D.V.M., M.S.; clinical sciences

### Senior Lecturers

Holmes, Dorothy E., D.V.M., Ph.D.; microbiology, immunology, and parasitology

McFadden, C. H., Ph.D.; physiology

Winter, Lola E., microbiology, immunology, and parasitology

### Lecturers

Dennett, Debra L., D.V.M.; anatomy

Gallagher, David P., clinical sciences

Paul, Eileen C. A., Ph.D.; physiology

Ryan, Gerald D., clinical sciences

### Instructors

Butt, Mark T., D.V.M.; pathology

Card, Claire E., D.V.M., Ph.D.; clinical sciences

Dougherty, S., D.V.M.; clinical sciences

Parchman, Mark B., D.V.M.; clinical sciences

Rakestraw, P., V.M.D.; clinical sciences

Rawson, Richard E., D.V.M., Ph.D.; physiology

Rowland, Peter, D.V.M.; pathology

Trepanier, Lauren A., D.V.M.; clinical sciences

## Directors, Laboratory Operations

Baldwin, Betty H., M.S.; clinical sciences

Carbone, Lawrence G., D.V.M.; Center for Research Animal Resources

Dean, William F., M.S., Ph.D.; avian and aquatic animal medicine (Eastport)

Dillingham, Lloyd A., D.V.M.; Center for Research Animal Resources

Ebel, Joseph G., Jr.; toxicology

Fronckowiak, Andrew F., M.S.; equine drug testing (Buffalo/Batavia)

Hopkins, Stephen E., M.A.; equine drug testing

Howard, Daniel A.; equine drug testing (Finger Lakes)

Myers, John A.; equine drug testing (Vernon Downs)

Schlau, Richard A.; equine drug testing (Monticello)

Sondak, David G., A.A.S.; equine drug testing (Yonkers/Roosevelt)

Wilson, Frederick, M.S.; equine drug testing (Saratoga)

## Field Veterinarians

Julius, Frederic S., D.V.M.; mastitis control (Kingston)

Sandhu, Tirath S., M.S., Ph.D.; avian and aquatic animal medicine (Eastport)

## Veterinary Medical Teaching Hospital

Acting director: F. A. Kallfelz

Chief of medicine: M. E. White

Chief of surgery: R. P. Hackett

### Large Animal Clinic

Head: N. G. Ducharme

*Faculty:* T. J. Divers (medicine), N. G. Ducharme (surgery), S. L. Fubini (surgery), R. P. Hackett (surgery), A. J. Nixon (surgery), P. C. Rakestraw (surgery), W. C. Rebhun (medicine), B. C. Tennant (medicine)

*Residents:* D. A. Hendrickson (surgery), D. G. Kenney (medicine), A. E. Sams (surgery), J. L. Ward (surgery), A. D. Weldon (medicine)

*Interns:* R. B. Edwards III (surgery), L. A. McDuffee (surgery)

### Small Animal Clinic

Head: H. J. Harvey

*Faculty:* S. C. Barr (medicine), S. A. Center (medicine), S. A. Dougherty (medicine), J. A. Flanders (soft-tissue surgery), W. J. Gould (medicine/avian and exotics), H. J. Harvey (soft-tissue surgery), W. E. Hornbuckle (medicine), R. E. Kaderly (orthopedic surgery), T. J. Kern (ophthalmology), W. H. Miller (dermatology), N. S. Moise (cardiology), M. B. Parchman (surgery), J. F. Randolph (medicine), R. C. Riis (ophthalmology), D. W. Scott (dermatology), L. A. Trepanier (medicine), E. J. Trotter (orthopedic surgery)

*Residents:* H. J. Lawrence (surgery), E. N. Peterson (medicine), P. H. Scherlie (ophthalmology), D. J. Severson (surgery), R. P. Suess, Jr. (surgery), B. A. Walker (medicine), J. R. Wellington (dermatology), W. Yaphe (medicine)

*Interns:* S. S. Baumann (medicine/surgery), L. Bravo (medicine/surgery), T. A. Hexter (medicine/surgery), L. D. Libby (medicine/surgery), A. B. Marlar (medicine/surgery), W. P. Stubbs (medicine/surgery)

### Ambulatory

Head: M. C. Smith

*Faculty:* F. H. Fox (internal medicine/obstetrics), C. L. Guard (internal medicine), G. D. Mechor (medicine), M. C. Smith (internal medicine/clinical toxicology), M. E. White (internal medicine)

*Residents:* J. J. Dascanio, Jr., L. D. Warnick

*Interns:* S. L. Ditson, C. C. Hazelwood, P. N. Thompson

### Anesthesiology

Chief: C. E. Short

*Faculty:* R. D. Gleed, J. W. Ludders, C. E. Short, E. M. Wertz

### Theriogenology

Chief: R. B. Hillman

*Faculty:* B. A. Ball, C. E. Card, P. F. Daels, R. O. Gilbert, R. B. Hillman, V. N. Meyers-Wallen

### Radiological and Physical Diagnostics

Chief: F. A. Kallfelz

*Faculty:* K. A. Beck, F. A. Kallfelz, V. T. Rendano, G. D. Ryan, A. E. Yeager

## Diagnostic Laboratory

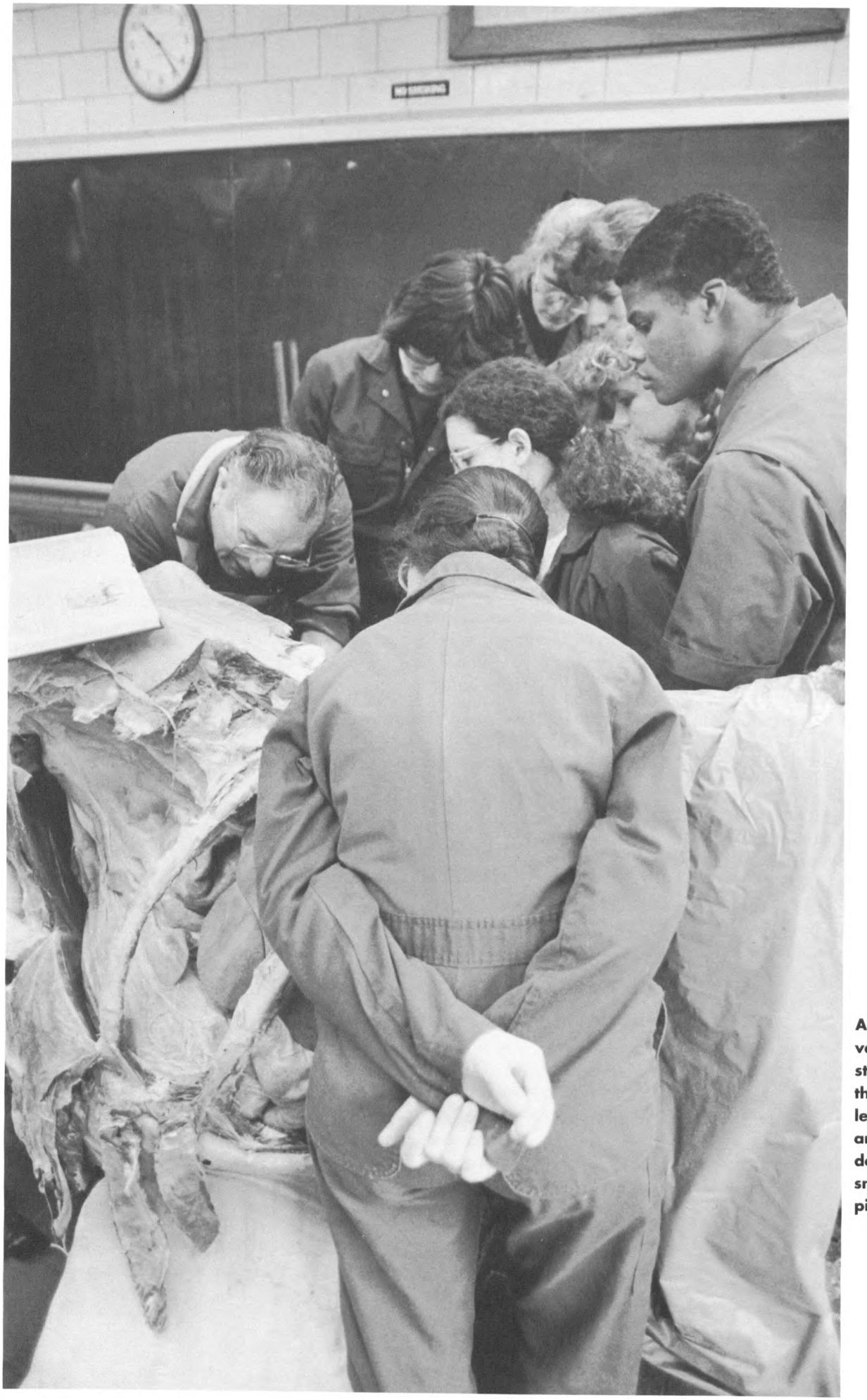
Director: associate professor
D. H. Lein
206 Diagnostic Laboratory
607 253-3900

*Associate professors:* E. J. Dubovi, J. D. Henion, R. H. Jacobson, J. E. Lowe, G. A. Maylin, T. J. Reimers, P. M. Sears, S. J. Shin

*Assistant professor:* Y. F. Chang

*Directors of Laboratory Operations:* Y. F. Chang (assistant director, bacteriology), E. J. Dubovi (virology), R. H. Eckerlin (diagnostic toxicology), J. D. Henion (human drug testing), R. H. Jacobson (automated serology), D. H. Lein (extension and field services: New York State CEM Quarantine Facility), J. W. Lopez (assistant director, virology), G. A. Maylin (equine drug testing), P. L. McDonough (assistant director, bacteriology), T. J. Reimers (endocrinology), S. J. Shin (bacteriology), S. E. Wade (parasitology)

*Extension field services:* J. T. Blue (director, clinical pathology), M. A. Brunner (bovine extension specialist), T. W. French (assistant director, clinical pathology), J. E. Lowe (equine extension specialist), C. A. Rossiter (Johne's Program), J. E. Saidla (feline extension specialist), B. E. Straw (swine extension specialist)



**All Cornell veterinary students begin their education by learning the anatomy of the dog, horse, cow, small ruminants, pig, bird, and fish.**

# Description of Courses

Under each department heading there are brief descriptions of the courses offered. Most of these courses are a part of the veterinary core curriculum; some are elective to veterinary students or are given primarily for graduate students or students of other colleges of the university. Courses in other colleges available to all Cornell students are listed in *Courses of Study*.

**Course Numbering System**

500 series: D.V.M. core curriculum courses

600 series: elective courses for D.V.M. and other students

700–800 series: graduate-level courses

## Anatomy

Professor A. deLahunta, chairman
D-204 Schurman Hall
607 253-3547

Professors: J. F. Cummings, D. N. Noden, W. O. Sack; professors emeriti: H. E. Evans, R. E. Habel; associate professor: C. E. Farnum; assistant professor: J. Hermanson; teaching assistants: S. Hackett, G. Burns; medical illustrator: M. Simmons

The major objectives of the Department of Anatomy are the education of the veterinary students and the performance of investigations that contribute new information to the scientific literature. Graduate education is a component of this research activity. Textbook preparation is a major activity that supports the teaching program and contributes to the professional literature.

The educational program in the anatomical sciences provides a solid foundation for other basic sciences and for the courses in the clinical sciences. Significant efforts are made to integrate the anatomical teaching with those courses and to relate the anatomical studies to clinical, medical, and surgical situations. First-year students are introduced to the professional vocabulary in the anatomical sciences that will serve them throughout their professional career.

Research activities span a large range of basic and applied subjects in the fields of gross anatomy, developmental biology, cytology, neuromuscular mechanisms, neuroanatomy, neuropathology, and clinical neurology. Faculty are frequently consulted in their various areas of expertise.

**500 Gross Anatomy: Small Animal**
Fall. 4 credits. Limited to first-year veterinary students. Letter grades only. A. deLahunta; C. E. Farnum, course coordinator; and assistants.

The structure of the typical mammal is studied by detailed systematic and regional dissection of the dog. The lectures, which are supplemented by demonstrations and films, consider the comparative and regional gross aspects of vertebrate organ systems, anatomical terminology, anatomic literature and techniques, and radiographic anatomy.

**501 Gross Anatomy: Large Animal**
Spring. 5 credits. Limited to first-year veterinary students. Letter grades only. Prerequisite: VETA 500. J. W. Hermanson; W. O. Sack, course coordinator; and assistants.

Regional anatomy of the horse, cow, goat, and pig is studied by dissection. Special attention is given to the anatomic basis for physiological processes and clinical procedures and to the veterinary public-health inspection of food animals.

**502 Microscopic Anatomy**
Fall and spring. 3 1/2 credits. Primarily for first-year veterinary students; others by permission of the instructor. Prerequisites: completion of, or concurrent registration in, VETA 500 or 700. Letter grades only. J. F. Cummings and assistants.

The microscopic structure of the cell, tissue, and organs of domestic animals is studied. Illustrated lectures are presented to relate structure to function, correlate microscopic and gross anatomy, and establish a foundation for subsequent studies in physiology and pathology. Routine histologic slides, electron photomicrographs, and immunocytochemical and histochemical preparations are used in laboratory study.

**504 Neuroanatomy and Clinical Neurology**
Fall and spring. 2 1/2 credits. Limited to first-year veterinary students. Letter grades only. A. deLahunta.

The nervous system of domestic animals is studied by functional systems. This is a vertically integrated course that includes dissection of the central nervous system of the dog, the anatomical basis for the diagnosis of diseases of the nervous system, and the differential diagnosis of those diseases. Clinical cases with pertinent lesions are demonstrated with each system.

**505–506 Applied Anatomy**
505, fall; 506, spring. 1 credit each term. Limited to third-year veterinary students. Letter grades only. A. deLahunta.

This course provides an opportunity for practice in the recognition of the anatomical features that are essential to diagnostic, surgical, obstetrical, and postmortem procedures. The approach is topographical, comparative, and clinical. The emphasis is on the study of living animals, supplemented by dissections, models, and radiographs.

**507 Animal Development**
Fall. 3 credits. Primarily for first-year veterinary students; a limited number of others by permission of the instructor. Prerequisites: Biological Sciences

274 or equivalent and permission of the instructor. Letter grades only. D. M. Noden.

This course focuses on the preimplantation, embryonic, and fetal stages of development in amniotic vertebrates, particularly domesticated species. While primary emphasis is on the morphological development of the young embryo, of fetal organ systems, and of the placentas in these species, considerable attention is given to understanding the mechanisms controlling developmental processes and the genetic or environmental factors responsible for many congenital birth defects.

**508 Anatomy of the Fish and Bird**
Spring. 1/2 credit. Limited to first-year veterinary students. Letter grades only. H. Evans, course coordinator; and J. W. Hermanson.
An introduction to the anatomy of fishes and birds.

**600 Special Projects in Anatomy**
Fall and spring. By permission of the instructor. (1 credit per 2 1/2-hour period.)

**601 Research Opportunities in Veterinary Medicine**
May be taken during the school term, during January, or in the summer. 1–4 credits. By permission of the instructor. S-U grades only.

An independent study course. Students work closely with individual faculty members in their research laboratories.

**602 Advanced Clinical Neurology**
Fall. 1 credit. Prerequisite: first two semesters of veterinary curriculum. S-U grades only. A. deLahunta.

Correlation of anatomy, physiology, and pathology in the diagnosis and treatment of diseases of the nervous system and an understanding of their pathogenesis. Case demonstrations will be emphasized.

## Avian and Aquatic Animal Medicine

Professor B. W. Calnek, chairman
E-113 Schurman Hall
607 253-3365

Professors: S. A. Naqi, K. A. Schat; professors emeriti: J. Fabricant, S. B. Hitchner, L. Leibovitz; associate professors: P. R. Bowser, B. Lucio; courtesy associate professor: H. A. Poston; assistant professor: J. M. Spitsbergen; senior extension associate: A. Mutalib; senior research associate: P. R. Woolcock; director of laboratory: W. F. Dean; field veterinarian: T. S. Sandhu

The department is strongly research oriented, following the general approach of disease control through preventive medicine. Diagnostic laboratories for domestic poultry and both freshwater and marine aquatic animals are located at the college and at one regional laboratory in New York State. These laboratories provide fresh material for teaching and research purposes. Research facilities are found at several of these locations but are mostly located at the P. Philip Levine Laboratory near the campus. Departmental laboratories are well equipped for studies in the disciplines of pathology, microbiology, immunology, and molecular biology. Special emphasis has been placed on studies of infectious diseases. Well-defined genetic strains of specific-pathogen-free chickens are maintained as a source of experimental animals. Isolation units are available for studies of infectious diseases of domestic poultry, pet and wild birds, and aquatic animals.

**255 Poultry Hygiene and Disease (Also Animal Sciences 332)**
Spring, odd-numbered years. 2 credits. Minimum enrollment, 5 students; maximum enrollment, 15 students. Prerequisites: Micro 290 and permission of the instructor. Letter grades only. Lecture and laboratory, W 2:05–4:25. B. Lucio-Martinez.

Selected diseases of poultry are used as models to discuss control through eradication, or immunization. Includes laboratory sessions on anatomy of the chicken, bleeding, euthanasia, and necropsy techniques. Common serological techniques will be demonstrated.

**555 Avian Diseases**
Fall. 2 credits. Limited to veterinary students. Required of third-year veterinary students. Letter grades only. S. A. Naqi and W. J. Gould, course coordinators.

*Avicultural Medicine Section (1 credit. W. J. Gould).* A clinically oriented course that starts with restraint and dietary requirements of pet birds but focuses primarily on presentation, diagnosis, and treatment of common avian diseases. A laboratory session uses budgerigars to illustrate the fundamentals of restraint and physical examination of pet birds.

*Poultry Disease Section (1 credit. S. A. Naqi).* Presentations focus on the etiology, pathogenesis, diagnosis, and control of some of the common diseases of domestic and commercial poultry. Consequences of stress and immunologic impairment for the disease process are discussed. Basic concepts of epidemiology and preventive medicine in relation to the current disease control practices in the poultry industry are emphasized. Laboratory sessions address handling and restraint of birds, bleeding techniques, euthanasia, and necropsy procedures.

**614 Research Opportunities in Veterinary Medicine**
May be taken during the school term, during January, or in the summer. 1–4 credits. Primarily for veterinary students; others by permission of the instructor. S-U grades only. K. A. Schat.

An independent study course. Students work closely with individual faculty members in their research laboratories.

**[630 Diseases of Aquarium Fishes**
Spring, even-numbered years. 2 credits. Minimum enrollment, 8 students; maximum enrollment, 16 students. Elective primarily for veterinary students; others by permission of the instructor. S-U grades only. 1 lecture-

laboratory per week, weeks 2 through 14. P. R. Bowser. Not offered 1990–91.

A discussion of health management of aquarium fishes including aquarium system design; water quality; and pathogenesis, diagnosis, and management of commonly encountered diseases of aquarium fishes.]

**631 Fish Health Management**
Spring, odd-numbered years. 2 credits. Minimum enrollment, 8 students; maximum enrollment, 16 students. Elective course primarily for veterinary students; others by permission of the instructor. S-U grades only. 1 lecture-laboratory per week, weeks 2 through 14. P. R. Bowser.

A discussion of principles and practices designed to minimize diseases in fishes maintained in aquaria, aquaculture facilities, and research laboratories. The course will emphasize the interactions between the fish, the environment, and pathogenic organisms that are found in the fish culture environment.

**[663 Veterinary Medicine in Developing Nations**
Spring, even-numbered years. 2 credits. Limited to 20 students, with preference given to veterinary students; others by permission of the instructor. S-U grades only. Lecture discussion, F 2–4. K. A. Schat. Not offered 1990–91.

The aim of this course is to give students a broader insight into the many problems important for lesser-developed nations. Special emphasis is placed on nonveterinary aspects related to the development of those countries, such as sociological and economic interactions, the transfer of technology, and the role of women. Final selection of the topics depends on the availability and expertise of participating faculty. Active participation of the students during the lecture and discussion periods is encouraged and essential for the success of the course.]

**672 Aquavet I: Introduction to Aquatic Veterinary Medicine**
Four weeks of full-time instruction at Woods Hole, Massachusetts, immediately after the spring term. 4 credits. Limited to 24 students from Cornell, the University of Pennsylvania, and other colleges of veterinary medicine; by permission of the instructor. S-U grades only. P. R. Bowser.

The course is sponsored by this college, the School of Veterinary Medicine at the University of Pennsylvania, and three marine science facilities at Woods Hole—the Marine Biological Laboratory, the Woods Hole Oceanographic Institution, and the Northeast Center of the National Marine Fisheries Service. It is designed to introduce veterinary medical students to medicine as it applies to aquatic animals. The marine environment is described and visited on field trips in the Woods Hole area. Certain aspects of the comparative anatomy, physiology, nutrition, microbiology, pathology, and medicine of a variety of marine and freshwater species are discussed. Some emphasis is placed on systems of aquaculture. The specific diseases of a few selected species are presented as examples, including the diseases of a crustacean, a shellfish, a finfish, and marine mammals. Students present seminars on appropriate topics.

**673 Aquavet II: Health Management in Confined Populations of Invertebrates and Fish**
Summer. 4 credits. Limited to 14 veterinary students. Prerequisites: formal course work in diseases of aquatic animals or appropriate aquatic animal experience, and permission of the instructor. S-U grades only. P. R. Bowser.

An advanced course in diseases of aquatic animals. Four weeks of full-time instruction at Woods Hole, Massachusetts, immediately after the spring term. The course is sponsored by the College of Veterinary Medicine at Cornell, the School of Veterinary Medicine at the University of Pennsylvania, and three marine science facilities at Woods Hole—the Marine Biological Laboratory, the Woods Hole Oceanographic Institution, and the Northeast Center of the National Marine Fisheries Service. It is oriented toward the health maintenance of marine invertebrates commonly used as laboratory animals and of finfish encountered in display aquaria and aquaculture facilities. The material presented will consist of an in-depth discussion of aquatic systems design, water quality management, culture methods, nutrition, immunology, physiology, infectious diseases, noninfectious diseases, and regulatory concerns. This gives the student an extensive hands-on learning experience under the guidance of invited faculty members considered to be among the leaders in their respective fields of aquatic animal medicine.

**770 Advanced Work in Avian Diseases**
Fall and spring. Credit to be arranged. By special arrangement with the instructor. Letter grades only. S. A. Naqi.

**772 Advanced Work in Aquatic Animal Diseases**
Fall and spring. By special arrangement with the instructor. P. R. Bowser.

**773 Advanced Work in Avian Immunology**
Fall and spring. Credit to be arranged. By permission of the instructor. K. A. Schat.

## Clinical Sciences

Professor B. R. H. Farrow, chairman
427 Veterinary Research Tower
607 253-3570

**Section of Medicine.** Professors: A. deLahunta, B. R. H. Farrow, F. H. Fox, D. W. Scott, B. C. Tennant; professors emeriti: R. W. Kirk, E. C. Melby, Jr., S. J. Roberts; associate professors: S. A. Center, T. J. Divers, C. L. Guard, W. E. Hornbuckle, T. J. Kern, J. F. Randolph, W. C. Rebhun, R. C. Riis, M. C. Smith, M. E. White (chief); assistant professors: S. C. Barr, W. J. Gould, G. D. Mechor, W. H. Miller, N. S. Moise; instructors: S. Dougherty, L. A. Trepanier

**Section of Surgery.** Professor: D. F. Smith; professor emeritus: E. P. Leonard; associate professors: N. G. Ducharme, R. E. Kaderly (chief), R. P.

Hackett, H. J. Harvey, E. J. Trotter; assistant professors: J. A. Flanders, S. L. Fubini, A. J. Nixon; lecturer: M. B. Parchman

**Section of Theriogenology.** Assistant professors: B. A. Ball, P. F. Daels, R. O. Gilbert, V. N. Meyers-Wallen; senior clinician: R. B. Hillman (acting chief); instructor: C. E. Card

**Section of Anesthesiology.** Professor: C. E. Short (chief); associate professors: R. D. Gleed, J. W. Ludders; assistant professor: E. M. Wertz

**Section of Epidemiology.** Associate professors: H. N. Erb, J. M. Scarlett (chief); assistant professors: Y. T. Grohn, H. O. Mohammed, R. V. Pollock

**Radiological and Physical Diagnostics.** Professor: F. A. Kallfelz (chief); professor emeritus: J. C. Geary; associate professor: V. T. Rendano, Jr.; assistant professors: K. A. Beck, A. E. Yeager; senior lecturer: G. D. Ryan

**Equine Research.** Professor: H. F. Hintz; associate professor: H. F. Schryver (director); J. E. Lowe

**Mastitis Research.** Professor: N. L. Norcross (director); professor emeritus: D. S. Postle

**Other faculty.** Lecturer: D. P. Gallagher

The majority of the lectures and laboratory courses provided by the Department of Clinical Sciences are taught during the third year of the veterinary curriculum. The practical application of the students' basic knowledge in veterinary medicine to clinical diagnosis and therapy of diseases is emphasized at this time.

The fourth year is devoted to intensive training in clinical medicine, surgery, and the specialty disciplines. Students are assigned responsibility for patient care under close faculty supervision. The curriculum consists mostly of an assignment to clinical services throughout the teaching hospital and ambulatory clinic.

During that thirty-six-week period the students participate for twenty-eight weeks on assigned clinical services, and for any eight-week period they may elect the clinical service of their choice. The teaching hospital is equipped with modern surgical and diagnostic services, including sophisticated radiologic facilities and diagnostic capabilities involving ultrasound and nuclear medicine. The clinical pathology laboratory is equipped with an automated analyzer for blood and other body fluids.

The teaching hospital consists of three clinics. The Small and Large Animal Clinics are both hospitals with complete facilities for intensive patient care. These clinics receive both outpatients and patients that are hospitalized. Patients come directly from local clientele or are referred to the teaching hospital from veterinary practitioners in New York State and the surrounding states of New England, New Jersey, and Pennsylvania. Students are assigned to the patients in the hospital, where their activities are closely supervised by the faculty. Students participate in the selection and evaluation of diagnostic and therapeutic procedures and assist in surgery. Although the final decision on all diagnostic and therapeutic procedures is made by the faculty assigned to each service, active student participation is encouraged and is essential for optimum patient care and student education.

Proximity to an urban community and an agricultural college and well-stocked farming community offer the necessary variety of patients for study.

The Ambulatory Clinic provides veterinary service on the premises of the patient under conditions similar to those encountered in private large animal practice. Students perform physical examinations and give treatment under the supervision of a faculty member. The farming community adjacent to the veterinary college is largely devoted to dairy farming, providing ample material related to obstetrics and diseases of dairy cows. In addition, the New York State Mastitis Control Program maintains a central field laboratory at the college. Fourth-year students accompany and assist veterinarians on field trips that deal with all phases of bovine mastitis and related dairy management procedures.

**520 Preventive Medicine in Animal Health Management**
Spring. 1 credit. Required of all third-year veterinary students. Graduate and animal science students by permission of the instructor. Letter grades only. H. N. Erb, course coordinator; Y. T. Grohn; and guest lecturers.

Topics include introductory lectures on cost-benefit analysis, ventilation and other aspects of "safe" animal housing, and genetics. A few lectures deal with species-specific herd health programs (e.g., setting up a dairy herd health program, working with dog or cat breeders or humane shelters). The emphasis in these lectures is on methods and problems in setting up programs, record keeping, decisions on what to include, and the difference between preventive programs and sporadic diagnostic and therapeutic practice.

**545 Clinical Epidemiology**
Fall. 2 credits. Required of all second-year veterinary students. Others by permission of the instructor. Letter grades only. H. N. Erb; H. O. Mohammed; J. M. Scarlett, course coordinator.

This course reviews the basic concepts of infectious and chronic disease epidemiology. Descriptive, analytic, and experimental study designs are covered, as well as evaluation of diagnostic and screening tests, data quality, and ethical considerations in biomedical research. In addition, the application of epidemiologic methods to the investigation of disease outbreaks is discussed.

**547 Practice Management**
Fall and spring. 2 credits. Intended for fourth-year veterinary students. Open to spouses of currently matriculated veterinary students, graduates of the college, and students of other schools of veterinary medicine by permission of the instructor. S-U grades only. D. P. Gallagher.

An elective rotation designed for the individual who anticipates a career in private practice, this course bridges the gap between the traditional scientific

and clinical training that a student receives and the nonclinical aspects of the setting in which he or she will ultimately work. The subject matter focuses on the tasks and techniques of fiscal, administrative, and marketing management, with emphasis on the issues and problems typically encountered in a veterinary practice. Employing a combination of lecture, discussion, case studies, and readings, the topics covered include bookkeeping, accounting, financial and economic analysis, basic principles of pricing and fee determination, credit and collection techniques, inventory maintenance and control, site feasibility, marketing and public relations, personnel management, and the use of computers. Also included are a review of issues related to opportunities for practice ownership (acquisitions) and an introduction to basic concepts of personal financial planning.

**548 Anesthesiology**
Fall. 1 credit. Required of all third-year veterinary students. Not open to students of other colleges. Letter grades only. R. D. Gleed; J. W. Ludders; C. E. Short, course coordinator; E. M. Wertz

The basic principles of anesthesiology are presented, including the responses to injectable and inhalant anesthetics, premedications, and medications to control pain. The clinical use of anesthetics and the responses during administration of those agents in both large and small animals is included. There is an emphasis on the cardiopulmonary responses of the animal during anesthesia, including the methods and medications to improve function. The discussions include the use of equipment for administration of anesthetics, patient monitoring, and mechanical ventilation. Related study includes lectures on shock and fluid administration, postoperative care, and cardiopulmonary resuscitation.

**561 Theriogenology I**
Spring. 3 credits. Required of all second-year veterinary students. Not open to others. Letter grades only. Fee, $15. B. A. Ball; P. F. Daels; R. O. Gilbert, course coordinator; R. B. Hillman; V. N. Meyers-Wallen.

A presentation of applied physiology and endocrinology of the male and female reproductive tract using the bovine model. Management practices to ensure maximum reproductive efficiency are discussed. Diagnosis, treatment, and prevention of congenital, infectious, and endocrine diseases affecting the genital organs are covered. The technique, advantages, and risks involved in artificial insemination are detailed. Hands-on laboratory experience is provided for learning rectal examination of the genital organs in cattle and horses. Reproductive tracts recovered from the slaughterhouse are used to illustrate and correlate the stage of the estrus cycle with ovarian and uterine changes as well as provide demonstrations of many of the pathologic conditions of the genital organs. Laboratory sessions also provide experience in breeding soundness evaluation in bulls and stallions.

**562 Theriogenology II**
Fall. 3 credits. Required of all third-year veterinary students. Not open to others. Letter grades only. Fee, $15. B. A. Ball, course coordinator; P. F. Daels; R. O. Gilbert; R. B. Hillman; V. N. Meyers-Wallen.

Applied physiology and endocrinology in the canine, feline, equine, and porcine species are covered. Management practices to ensure maximum reproductive efficiency are discussed for each species. Laboratory exercises include continuation of training in rectal examinations as well as hands-on experience in obstetrical manipulation and fetotomy techniques, practice in determination of the stage of the estrus cycle in bitches by vaginal cytology, and breeding soundness evaluation of mares.

**563 Large Animal Medicine and Surgery**
Fall. 5 credits. Limited to third-year veterinary students. Letter grades only. T. J. Divers; N. G. Ducharme; F. H. Fox; R. P. Hackett; S. L. Fubini; C. L. Guard; R. B. Hillman; W. C. Rebhun, course coordinator; D. F. Smith; M. C. Smith; B. C. Tennant; M. E. White; and others.

This is a team-taught lecture course that is designed to impart a general knowledge of the principles of diagnosis and treatment of medical and surgical diseases of large domestic animals. Major emphasis is on cattle and horses, but some lectures are devoted to swine and small ruminants. Important medical and surgical diseases of all major body systems are discussed as well as metabolic disorders and those associated with various toxicities and poisonous plants. Several lectures address the diagnosis and treatment of various lamenesses in large animals.

**564 Large Animal Medicine and Surgery**
Spring. 6 credits. Limited to third-year veterinary students. Letter grades only. T. J. Divers; N. G. Ducharme; F. H. Fox; R. P. Hackett; S. L. Fubini; C. L. Guard; R. B. Hillman; W. C. Rebhun, course coordinator; D. F. Smith; M. C. Smith; B. C. Tennant; M. E. White; and others.

A continuation of lectures designed to impart a general knowledge of the principles of diagnosis and treatment of medical and surgical diseases of large domestic animals.

**566 Radiographic Techniques**
Fall, first five weeks. 1 credit. Required of all third-year veterinary students. Others with appropriate background by permission of the instructor. K. A. Beck; F. A. Kallfelz; V. T. Rendano; G. D. Ryan, course coordinator; A. E. Yeager.

Fundamentals of radiographic imaging and diagnosis, radiation safety, radiation therapy, ultrasound, and nuclear medicine.

**567 Clinical Nutrition**
Fall. 2 credits. Required of all third-year veterinary students. Others by permission of the instructor. Letter grades only. F. A. Kallfelz.

The first third of this course is devoted to a review of basic principles of nutrition and specific nutritional requirements of both companion and farm animals. Students are given an

introduction to ration evaluation and formulation of rations for normal animals. Computerized approaches to ration evaluation and formulation are demonstrated. In addition, the special nutritional needs of newborn and growing animals; special nutrient requirements for work, production, and reproduction; and nutritional considerations for older animals are considered. The second two-thirds of this course covers clinical nutrition. Nutritionally induced diseases due to nutrient deficiencies and excesses as well as metabolic diseases are considered. Dietary management of nutritionally induced, degenerative, and other diseases is stressed. Case material from the Teaching Hospital is used as appropriate to demonstrate these principles.

**568 Foundations of Clinical Science I**
Fall. 2 credits. Limited to first-year veterinary students. C. L. Guard; W. E. Hornbuckle, course coordinator; W. C. Rebhun; other faculty.

The purpose of this course is to begin to build the fundamental clinical skills of physical examination and diagnostic reasoning and to relate them to concurrent studies in anatomy and physiology. Practical laboratories give students the opportunity to practice these skills, and the participation of both clinical and basic science faculty members emphasizes the interdependence of the basic and clinical sciences.

**569 Foundations of Clinical Science II**
Spring. 2 credits. Limited to first-year veterinary students. Prerequisite: VETCS 568. C. L. Guard; W. E. Hornbuckle, course coordinator; W. C. Rebhun; other faculty.

A continuation of Vet Med 568.

**570 Theriogenology Service**
Spring. 4 credits. Limited to fourth-year veterinary students. Letter grades only. B. A. Ball; R. O. Gilbert; R. B. Hillman, course coordinator; V. N. Meyers-Wallen.

An elective clinical service rotation, this course is offered to provide additional hands-on experience in all phases of theriogenology. Equine reproductive experience is gained in teasing, rectal palpations, ultrasound scanning, semen collection and evaluation, natural breeding, and artificial insemination. Additional techniques emphasized include taking and evaluation of endometrial biopsies, endometrial culturing, and collection and evaluation of endometrial cytology smears. Bovine experience includes weekly trips to the slaughterhouse, where rectal palpation findings can be compared to actual structures present in recovered tracts. Additional experience in rectal palpation is gained by following cyclic changes in assigned cows in the veterinary college dairy herd as well as by participating in herd–health palpations. Hands-on experience is provided in superovulation and embryo recovery techniques, as well as in surgical deviation of the penis to provide teaser bulls. Trips to the Department of Animal Science sheep and swine barns allow observation of breeding programs and provide experience in castration, docking, clipping milk teeth, notching ears, etc. Weekly seminars are presented on current topics in theriogenology.

**572 Senior Seminar**
Fall and spring. 1 credit. Required of all fourth-year veterinary students. First-, second-, and third-year students and all staff members are also invited and encouraged to attend. S-U grades only. F. H. Fox, chairman.

The aim of this course is to give the student the responsibility and opportunity of selecting and studying a disease entity on the basis of a case or series of cases or to give the student the responsibility and opportunity of conducting a short-term, clinically oriented research project under the direction of a faculty member. In either case, an oral report will be presented at a weekly seminar. A written report will also be submitted at the time of the seminar. All participants are encouraged to foster an atmosphere in which discussion, exchange of ideas, and the airing of controversial opinions might flourish.

**574 Large Animal Surgery Service**
Fall and spring. 4 credits. Limited to fourth-year veterinary students. Letter grades only. R. P. Hackett.

The rotation through Large Animal Surgery Service is structured to provide supervised clinical experience in the practice of large animal surgery. Under the direction of faculty and house staff, students participate in the diagnosis, surgical treatment, and care of patients presented to the Large Animal Clinic. Training through patient care is supplemented by formal rounds and by didactic instruction.

**575 Ambulatory Service**
Fall and spring. 4 credits. Required of all fourth-year veterinary students. Not open to students from other colleges. Letter grades only. F. H. Fox; C. L. Guard; G. D. Mechor; M. C. Smith, course coordinator; M. E. White.

A clinical service rotation. Students accompany ambulatory clinicians on farm calls. Routine herd health visits are conducted for cattle, horses, sheep, goats, and swine. Reproductive evaluations (including pregnancy and fertility examinations), nutritional evaluation, and disease prevention are stressed. Herd health programs also include vaccinations, parasite control, mastitis prevention, and routine procedures such as castration and dehorning. With appropriate herds, analysis of computerized performance data is conducted and discussed with the owner. In addition to assisting with routine scheduled work, students participate in diagnosis and medical or surgical treatment of ill or injured animals. That includes rotating assignments for night and weekend emergency duty. In summary, while assigned to the ambulatory clinic, fourth-year students learn the skills and procedures necessary for operation of a modern veterinary practice offering primary care to private large animal clients.

**578 Clinical Anesthesia**
Fall and spring. 2 credits. Limited to fourth-year veterinary students. Letter grades only. R. D. Gleed; J. W. Ludders; C. E. Short, course coordinator; E. M. Wertz.

This course is designed to provide clinical experience in the use of anesthetics in both large and small animals. Experience includes both elective and high-risk procedures. Extensive monitoring of the patient, including ECGs, blood pressure, end tidal $CO_2$, and blood gases are included in the program. In addition to the technical experience of anesthetic administration, case discussions, literature reviews, and anesthetic fundamentals are provided by the residents and faculty.

**579 General Medicine and Surgery**
Spring. 4 credits. Required of all second-year veterinary students. Prerequisite: VETPA 536. Letter grades only. C. L. Guard; H. J. Harvey; W. E. Hornbuckle, course coordinator; and other faculty.

An introduction to veterinary internal medicine and surgery. Emphasis is placed on the comparative and pathophysiologic aspects of disease, the clinical manifestations of organ system dysfunction, the principles of aseptic surgical technique, the healing of incised and traumatic wounds, and the prevention and treatment of surgical complications.

**580 Radiology Service**
Fall and spring. 2 credits. Required of all fourth-year veterinary students. Not open to others. Letter grades only. K. A. Beck; F. A. Kallfelz, course coordinator; V. T. Rendano; G. D. Ryan; A. E. Yeager.

A clinical rotation, this is a two-week course in diagnostic veterinary radiology that provides the student with technical and interpretive aspects of radiology in clinical, laboratory, and autotutorial settings. Radiographic examples of common large and small animal disease conditions are available for study in an autotutorial teaching film file. Under the guidance of the radiology staff the student participates in radiographing and interpreting radiographs of patients in the Veterinary Medical Teaching Hospital. Eight three-hour laboratory sessions are given in which the student gains hands-on experience in diagnostic ultrasound, nuclear medicine, patient positioning for radiography, formulation of a radiographic technique chart, performance of a nonselective angiogram, and performance of an intravenous urogram-cystogram. The laboratories familiarize the student with darkroom techniques and radiographic film artifacts. Aspects of radiation safety are discussed.

**581 Animal Nutrition**
Fall. 2 credits. Limited to first-year veterinary students. Letter grades only. H. F. Hintz.

Functions of nutrients, signs of deficiencies and excesses of nutrients, sources of nutrients, and situations that are likely to cause deficiencies or excesses are discussed during the first part of the course. The identification and evaluation of feedstuffs and supplements are stressed. During the last part of the course, feeding programs for beef cattle, dairy cattle, horses, swine, cats, and dogs will be discussed. Practice in ration formulation will be provided.

**582 Large Animal Surgical Exercises**
Spring. 2 credits. Required of all third-year veterinary students. Not open to others. S-U grades only. S. L. Fubini and faculty of surgery and anesthesiology sections.

This course is designed to impart fundamental skills in preoperative and postoperative care, anesthesia, aseptic techniques, instrument and tissue handling, and surgical techniques by closely supervised operations on the large domestic animals.

**583 Small Animal Medicine and Surgery**
Fall. 5 credits. Required of all third-year veterinary students. Not open to others. Prerequisites: VETPA 536, VETPA 571, and VETPR 528. Letter grades only. Faculty of medicine and surgery sections. J. A. Flanders and N. S. Moise, course coordinators.

The major medical and surgical diseases of dogs and cats are presented on an organ system basis. Emphasis is on diagnosis (clinical signs, laboratory aids) and therapy. This course is continuous with VETCS 584 in the spring.

**584 Small Animal Medicine and Surgery**
Spring. 7 credits. Limited to third-year veterinary students. Letter grades only. Faculty of the Department of Clinical Sciences. J. A. Flanders and N. S. Moise, course coordinators.

A continuation of VETCS 583.

**586 Small Animal Surgical Exercises**
Spring. 2 credits. Limited to third-year veterinary students. S-U grades only. H. J. Harvey and faculty of the surgery and anesthesiology sections.

This course provides the opportunity for the student to practice basic surgical skills. Three procedures (laparotomy, thoracotomy, orthopedic approach) were chosen as the core exercises of the course. These procedures encompass maneuvers with widespread application to many types of surgery. The schedule is constructed so that each student will be the primary surgeon for each core exercise.

**589 Small Animal Medicine Service**
Fall and spring. 4 credits. Required of all fourth-year veterinary students. Not open to others. Letter grades only. S. C. Barr; S. A. Center; W. J. Gould; W. E. Hornbuckle; N. S. Moise; J. A. Randolph, course coordinator.

Two medical services. The Small Animal Medicine Service is structured to provide supervised clinical experience in the practice of companion animal medicine. The course is conducted in the Small Animal Clinic of the Veterinary Medical Teaching Hospital. Students interact directly with clients presenting their pets for primary or referral medical care. Under the supervision of the clinical faculty and staff, the students are expected to formulate and carry out plans for the diagnostic evaluation and medical management of these patients. After review by the faculty and staff, the students then explain their plans to the clients and provide follow-up care and management of these patients. The net effect of this course is that the students gain experience under close supervision and the pets presented receive appropriate care.

**591 Small Animal Surgery Service**
Fall and spring. 4 credits. Required of all fourth-year veterinary students. Not open to others. Letter grades only. R. E. Kaderly.

A clinical service rotation, this course exposes the student to the practice of surgery under actual hospital conditions. Students participate in the diagnostic techniques, the planning of therapy, and the daily care of dogs, cats, and exotic species under the direction of a faculty veterinarian. Students assist experienced surgeons in the operating room and, with house-officer supervision, are responsible for patients undergoing elective ovariohysterectomy or castration. Client communications and the basics of efficient practice are also emphasized.

**593 Ophthalmology Service**
Fall and spring. Two-week (2 credits) minimum requirement for fourth-year veterinary students. Limited to veterinary students. Letter grades only. T. J. Kern; R. C. Riis, course coordinator.

This course combines clinical experience with beginning skills in diagnostic ophthalmology. Students learn how to apply the diagnostic tests. The feeling of performing a good ocular examination is the goal of this rotation. Confidence in using direct and indirect ophthalmoscopes, slit lamps, tonometers, goniolenses, conjunctival cytology, and surgery comes with practice introduced in this rotation. The first week requires an introductory orientation tape in the Autotutorial Center. Every morning this rotation includes a surgical procedure, and every afternoon is scheduled with consultations. A high percentage of the consultations are referral cases that usually challenge the service, although adequate routine case material is presented to prepare most senior students for practice.

**594 Large Animal Medicine Service**
Fall and spring. 2 credits. Required of all fourth-year veterinary students. Not open to students of other colleges. Letter grades only. W. C. Rebhun.

**596 Opportunities in Veterinary Medicine**
Fall and spring. 2–4 credits. S-U grades only. Curriculum Committee.

This course provides opportunities for students after the end of the third year to explore professional areas not available through the core-selective curriculum. Blocks of two to four weeks are usually spent at other teaching hospitals, research laboratories, or zoological facilities. Proposals are formulated by the student and submitted to the college registrar. The coordinator of opportunities blocks reviews and approves the proposals. On-site supervisors of the block act as ex officio faculty members and are expected to formally evaluate each student.

**598 Dermatology Service**
Fall and spring. 2 credits. Required of all fourth-year veterinary students. Not open to others. Letter grades only. W. H. Miller, Jr. and D. W. Scott, course coordinators.

A clinical rotation. Students participate in the diagnosis and management of skin disorders in small and large animals. Patients are examined by appointment and through consultation with other hospital services.

**600 Journal Reading I**
Fall and spring. 1 credit. Limited to veterinary students. S-U grades only. F 8. D. F. Smith.

Course is designed to familiarize veterinary students with the broad range of veterinary, medical, and general scientific literature in a way that promotes the development of permanent reading habits, critical reading skills, and methods for retrieval of professional and scientific information. This is a small-group didactic course that will emphasize both group learning and individual study skills.

**601 Dentistry**
Fall and spring. 1 credit. Open to all veterinary students. S-U grades only. J. Saidla.

The main objective of this course is to present an introduction to the basics of small animal dentistry. Practical aspects will be emphasized. Laboratory sessions will follow the specific topic lecture and will be a hands-on experience. Students will work in groups of two so that everyone can gain the same technical aspects of instrumentation and develop some of the manipulative skills necessary to perform basic dental procedures. Live animals will be used only in the first laboratory session; canine and feline heads will be used in the other sessions.

**616 Research Opportunities in Veterinary Medicine**
May be taken during the school term, during January, or in the summer. 1–4 credits. By permission of the instructor. S-U grades only. Clinical Sciences faculty.

An independent study course. Students work closely with individual faculty members in their research laboratories.

**664 Introduction to Epidemiology**
Fall. 3 credits. A graduate course. Prerequisites: Statistics and Biometry 601 (College of Agriculture and Life Sciences). Prequisites may be taken concurrently. Lecture, hours to be arranged. S-U grades optional. H. N. Erb, course coordinator; Y. T. Grohn; H. O. Mohammed; J. M. Scarlett.

Lectures and discussion will deal with the fundamentals of epidemiology. Current topics in epidemiology from the fields of nutrition, infectious and chronic diseases, occupational medicine, and veterinary medicine will be reviewed to illustrate the principles and practice of epidemiology.

**665 Study Designs**
Spring. 2 credits. A graduate course. Prerequisites: VETCS 664 and Statistics and Biometry 601 (College of Agriculture and Life Sciences). Lecture, hours to be arranged. S-U grades optional. H. N. Erb; Y. T. Grohn; H. O. Mohammed, course coordinator; J. M. Scarlett.

Design and interpretation of cross-sectional, case control, and cohort studies (including controlled clinical trial) will be covered. Design issues will include sample size, bias, and relative advantages and disadvantages.

**666 Advanced Methods in Epidemiology**
Fall. 3 credits. A graduate course. Prerequisites: VETCS 665 and Statistics and Biometry 602 (College of Agriculture and Life Sciences). Lecture, hours to be arranged. S-U grades optional. H. N. Erb; Y. T. Grohn, course coordinator; H. O. Mohammed; J. M. Scarlett.

Concepts introduced in VETCS 664 and VETCS 665 are further developed, with emphasis on statistical methods. Topics include interaction, effect modification, stratified analysis, matching and multivariate (logistic regression) methods, survival analysis, and strategies for the analysis of epidemiologic data.

**675 Special Problems in Large Animal Medicine**
Fall or spring. Limited to veterinary students. By permission of the instructor.

**676 Special Problems in Large Animal Surgery**
Fall and spring. By permission of the instructor.

**677 Special Problems in Large Animal Obstetrics**
Fall and spring. Limited to veterinary students. By permission of the instructor. B. A. Ball; R. O. Gilbert; R. B. Hillman, course coordinator; V. N. Meyers-Wallen.

**678 Fundamental Techniques in Bovine Embryo Transfer**
Spring. 1 credit. Limited to third- and fourth-year veterinary students. S-U grades only. R. B. Hillman.

The major emphasis of this course is on bovine embryo transfer, but information is provided on equine, ovine, and caprine embryo transfer as well. Freezing and micromanipulation are also considered. Some of the class work is in the laboratory.

**[679 Dairy Herd Management and Health**
Fall. 2 credits. Intended for third- and fourth-year veterinary students. Enrollment limited to 20 students. S-U grades only. Lectures, T R 7:30–9 p.m.; some Saturday p.m. labs. C. Guard. Not offered 1990–91.

This course will cover areas of dairy herd management in the context of production efficiency and the role of the veterinarian as management consultant. Major subject areas will include nutrition, mastitis, reproduction, and herd replacement raising. Means of evaluating performance in those key areas will be stressed. Other related topics include relevant data acquisition and analysis, a survey of housing and feeding facilities, and milking equipment designs and troubleshooting.]

**680 Poisonous Plants**
Fall. 1 credit. Students from other colleges by permission of the instructor. S-U grades only W 8. R. B. Hillman; M. C. Smith, course coordinator.

Field trips demonstrate toxic plants growing in natural or cultivated settings. Lectures address economically important poisonous plants native to the United States. Information presented includes plant identification, natural habitat, toxic principles, clinical signs of toxicity, and treatment and prevention of poisoning in animals. Some of the major toxic principles found in plants and considered in detail in the course are nitrates, cyanide, oxalates, photodynamic agents, alkaloids, and mycotoxins.

**681 Horse Health Management**
Spring, odd-numbered years. 1 credit. Intended for third- and fourth-year veterinary students. S-U grades only. W 8. T. L. Brant, C. A. Collyer, R. B. Hillman.

Prevention of equine diseases from foaling through adulthood by management practices, nutrition, and vaccination procedures is emphasized. The reproductive aspects of a breeding farm are detailed, starting with the need for complete health records and including the normal reproductive cycle, detection of estrus, breeding techniques, use of lighting programs and hormones, stallion fertility, and artificial insemination. Diagnosis, treatment, and management of problem mares are included. Pregnancy determination and care of the pregnant mare are covered, as are natural and induced parturitions. Care of the newborn foal and diagnosis, treatment, and prevention of foal diseases are also included.

**683 Elementary Biostatistics**
Spring. 1 credit. Intended for veterinary students; others with permission of the instructor. Minimum enrollment of 10 students is required. H. N. Erb.

The course takes a practical approach to elementary statistics for people who will read statistics and maybe do some statistics on their own. Topics include descriptive statistics and some of the simpler, two-variable tests of association.

**684 Horse Lameness**
Spring. 1 credit. Limited to third-year veterinary students. S-U grades only. N. G. Ducharme, course coordinator; and A. L. Nixon.

This course is designed to acquaint third-year students with the advanced equine lameness problem. The course consists of lectures and laboratories stressing lameness as it can be evaluated in private practice.

**685 Introduction to Practice Management**
January 1991. 2 credits. Minimum enrollment, 5 students. S-U grades only. M–F, 9–5. D. P. Gallagher. This minisemester selective course is intended to introduce students to veterinary practice management through lectures and discussions.

**686 Goats: Management and Diseases**
Spring. 1 credit. Intended for second-, third-, and fourth-year veterinary students. S-U grades only. F 8. M. C. Smith.

Infectious, parasitic, nutritional, and toxic diseases of goats are considered. Appropriate herd health programs to prevent or control these conditions are outlined. Medical and surgical procedures demonstrated or discussed include anesthesia, dehorning, castration, tattooing, foot care, and various obstetrical manipulations. Physiology, nutrition, and management are considered as they pertain to maintaining health and productivity of the goats.

**688 Special Problems in Small Animal Medicine**
Fall and spring. Limited to veterinary students. By permission of the instructor.

**689 Special Problems in Small Animal Surgery**
Fall or spring. Limited to fourth-year veterinary students. By permission of the instructor.

**690 Veterinary Dermatology**
Spring. 1 credit. Limited to veterinary students. S-U grades only. W 8. W. H. Miller, Jr. and D. W. Scott, course coordinators.

This course emphasizes dermatologic conditions of small and large animals not covered in the core curriculum. Course grade is based on a final examination.

**692 Computers in Veterinary Medicine**
Spring. 2 credits. Veterinary students only. S-U grades only. Minimum enrollment 10. Course coordinator: C. Rumsey.

The course is a practical hands-on laboratory course. Sessions typically begin with an overview and demonstration, followed by in-class exercises. Topics covered include: microcomputer basics; using MS-DOS; word processing; spreadsheets (including the use of herd-health and ration-balancing templates); practice management; computer-assisted diagnosis; and choosing a microcomputer. Some sessions are taught by expert guest instructors. The precise balance depends on the expertise of the students in the course (to be surveyed before the first class meeting). If students are already computer literate, less time is spent on basics and more on specific medical applications.

**[694 Diseases of Exotic Pets**
Spring. 1 credit. Intended for second-, third-, and fourth-year veterinary students; others by permission of the instructor. W. J. Gould. Not offered 1990–91.

A potpourri of topics relating to exotic animal pets and sick or injured wildlife is covered. Speakers from the college and surrounding area touch on many subjects of practical clinical interest.]

**695 Advanced Equine Surgical Techniques**
Spring. 1 credit. Limited to third-year veterinary students. Letter grades only. S. L. Fubini.

This course consists of four laboratories performing advanced surgical procedures on ponies. Procedures in this laboratory are performed primarily at referral surgical centers, and it is the intent of this course not to make the students proficient in these techniques, but to make them more enlightened referring practitioners. The course therefore is intended for those students anticipating equine practice after graduation. This course is offered the last four weeks of spring semester, following the core course Large Animal Surgical Exercises.

**697 Advanced Techniques in Food Animal Surgery**
Spring. 1 credit. S. L. Fubini.

This course consists of four laboratories performing advanced surgical procedures on small ruminants, cadaver specimens, and adult cattle. Procedures in this laboratory are performed primarily at referral surgical centers, and it is the intent of this course not to make the students proficient in these techniques, but to make them more enlightened referring practitioners. The course therefore is intended for those students anticipating food animal practice after graduation. This course is offered the last four weeks of spring semester, following the core course Large Animal Surgical Exercises.

**698 Senior Seminar Selective**
Fall and spring. 1 credit. Limited to first-, second-, and third-year veterinary students. S-U grades only.

Attendance of a total of 14 of the senior seminar sessions presented during the academic year is required for completion of this course. It is the responsibility of each student to sign the attendance record at the start of the session. Signups after the fact are not allowed. No credit is given for attendance not documented by signature on the attendance sheet.

**[700 Pathophysiology of Gastrointestinal Surgery**
Fall, every third year. 1 1/2 credits. S-U grades only. Limited to veterinary interns and residents. Not offered 1990–91.

Normal anatomy and physiology of the gastrointestinal system in carnivores, herbivores, and ruminants will be presented initially. This will be followed by in-depth discussion of the pathophysiological mechanisms and sequelae of gastrointestinal obstructions including reperfusion injury, peritonitis, adhesions, and short bowel syndrome.]

**[701 Pathophysiology in Orthopedic Surgery**
Winter, every third year. 1 1/2 credits. S-U grades only. Limited to veterinary interns and residents. Not offered 1990–91.

Presentation of recent research and literature pertaining to the structure, function, and dysfunctional basis of cartilage and bone diseases in man and animals. The pathophysiology of metabolic bone diseases, aberrations in fracture healing, osteomyelitis and infectious arthritis, degenerative joint disease, and derangements in normal endochondral ossification including various manifestations of osteochondrosis will be presented and related to surgical treatments where appropriate.]

**766 Graduate Research**
Fall, spring, and summer. Credit and hours to be arranged. By permission of the graduate faculty member concerned. S-U grades only. Graduate faculty of the Section of Epidemiology.

**768 Master's-Level Thesis Research**
Fall or spring. 1–6 credits. Graduate faculty, Section of Epidemiology. This course enables graduate students in the Section of Epidemiology to receive graduate research credits for master's-level thesis research.

**769 Doctoral-Level Thesis Research**
Fall or spring. 1–6 credits. Graduate faculty, Section of Epidemiology. This course enables students in the Section of Epidemiology to receive graduate research credits for doctoral-level thesis research.

**782 Special Topics in Comparative Ophthalmology**
Fall, alternate years. 1 credit. Intended for veterinary students and graduates. Minimum enrollment, 10 students. S-U grades only. W 8. T. Kern; W. C. Rebhun; R. C. Riis, course coordinator.

This is a selective course for students and graduates who want more depth and core material. The topics are expanded considerably, ranging from presenting signs, diagnosis, and treatment to follow-up evaluations. All species are covered independently. The titles of the topics are general, but specific detail is given. These topics may range from keratopathies (in other words, dystrophies, degenerations, and inflammations), lid abnormalities with corrective surgical options, glaucoma options, and retinopathies through optic neuropathies. When appropriate, case material is brought to class for discussion of interesting ocular manifestations of systemic disease. Lectures on special diagnostics and their interpretations.

**799 Independent Studies in Epidemiology**
Fall and spring. 1 to 3 credits. H. N. Erb, Y. T. Grohn, H. O. Mohammed, J. M. Scarlett.

The purpose of this course is to investigate an epidemiologic topic with one of the instructors. It provides experience in problem definition, research design, and the analysis of epidemiologic data.

## Microbiology, Immunology, and Parasitology

Professor R. J. Avery, chairman
616A Veterinary Research Tower
607 253-3400

Professors: M. Appel, S. G. Campbell, L. E. Carmichael, G. Lust, D. D. McGregor, F. M. Noronha, F. W. Scott, J. F. Timoney, A. J. Winter; professors emeriti: D. W. Bruner, J. R. Georgi, J. H. Gillespie, G. C. Poppensiek, B. E. Sheffy, J. H. Whitlock; associate professors: D. F. Antczak, R. G. Bell, J. W. Casey; assistant professors: J. A. Appleton, D. D. Bowman, T. Kawula, C. R. Parrish; senior lecturers: D. F. Holmes, L. Winter; senior research associate: N. Burton-Wurster; research associates: W. Corapi, C. H. Wang, J. R. Williams; senior extension associate: J. E. Saidla; teaching support specialist: M. F. Frongillo; postdoctoral fellows: S. Jones, T-Y. Han; joint appointees: (professor) N. L. Norcross; (associate professors) W. Rebhun, V. Utermohlen; adjunct professors: (professors) D. Axelrod, A. Burny, R. Gallo

**315 Basic Immunology Lectures (also Biological Sciences 305)**
Fall. 3 credits. Strongly recommended: basic courses in microbiology, genetics, and biochemistry. Letter grades only. T R 8:30–9:55. A. J. Winter.

The course begins with a consideration of antigens and the molecular basis for antigenic specificity. A discussion follows of the molecular structure, biological functions, and genetic basis of diversity of antibodies, and in vitro interactions of antigens and antibodies. The student is then introduced to the lymphoid system and the cellular interactions responsible for production of antibodies and immune lymphocytes. This requires a substantial coverage of the genetic control mechanisms imposed by the major histocompatibility complex. The general question of regulation of the immune response, including the unresolved problem of unresponsiveness to one's own body antigens (self-tolerance) is taken up, followed by the final section concerning the manifestations of immunity. These include reactions that are harmful to the body (allergies) as well as beneficial reactions that defend the body against harmful microorganisms and cancers.

**316 Basic Immunology Laboratory (also Biological Sciences 307)**
Fall. 2 credits. Prerequisite: a course in basic microbiology or permission of the instructor. Recommended: concurrent enrollment in VETMI 315. Letter grades only. Laboratories, T R 10:10–12:15. N. L. Norcross. A series of laboratory exercises illustrate the immunological concepts presented in VETMI 315.

Exercises are designed to give students experience with the stimulation and measurement of an immune response in the rabbit. Techniques to familiarize students with both humoral and cellular immune phenomena are included with the goal of offering tangible, hands-on experience in immunology. Among the methods and techniques offered are agglutination and precipitation methods, virus neutralization and phagocytosis, measurement of the biological activity of complement components, antibody-dependent cell-mediated cytotoxicity, T and B cell identification, monoclonal antibodies and the ELISA, antibody production by single cells, lymphocyte blastogenesis, and delayed hypersensitivity.

**317 Pathogenic Virology**
Spring. 4 credits. Intended primarily for graduate and undergraduate microbiology majors. Limited to 40 students. Prerequisites: Microbiology 290 and 291 (College of Agriculture and Life Sciences). Strongly recommended: VETMI 315 (Basic Immunology Lectures) and VETMI 316 (Basic Immunology Laboratory). Lectures T R. J. Casey, L. Winter, D. Holmes.

The Pathogenic Virology course will cover properties of the virion, viral-host interactions, strategies for gene regulation, and mechanism of pathogenicity. Selected viral infections that result in immune disfunction and neoplasia will be highlighted in the context of current approaches to prevent or reduce the severity of disease. Laboratories will emphasize the isolation and culture of viral pathogens as well as in vitro systems for studying the pathogensis of, and the immune response to, infectious agents. Discussions will be included in the laboratory and guest speakers will present current approaches to identifying and characterizing viral agents. Additionally, each student enrolled in the laboratory will present a descriptive summary on a viral system and discuss a research approach to solve a particular problem. This course listing has been modified so that Pathogenic Virology will be offered separately

from Pathogenic Bacteriology. Each course will be given on alternate years.

**318 Pathogenic Bacteriology and Mycology (also Biological Sciences 308)**
Spring. Lecture only, 2 credits; lecture and laboratory, 4 credits. Intended primarily for graduate and undergraduate microbiology majors. Limited to 20 students. Prerequisites: Micro 290 and 291 (College of Agriculture and Life Sciences). Strongly recommended: VETMI 315 and 316. Letter grades only. Lectures, T R 1:25–2:15. Laboratory 2:25–5.

This is a course in medical microbiology, covering pathogenic bacteriology and mycology. Lectures in bacteriology and mycology cover the major groups of bacterial pathogens and some of the important virulence mechanisms and highlight certain aspects of the normal flora, antibiotic therapy, and drug resistance that are relevant to the pathogenesis of bacterial disease. Laboratories emphasize techniques for isolation and culture of bacterial and fungal pathogens as well as demonstrate tissue culture and animal models for studying the pathogenesis of, and the immune response to, infectious agents. One important principle emphasized in both portions of the course is that disease is the product of the interaction of the host, pathogen, and environment.

**[331 Medical Parasitology**
Fall, alternate years. 2 credits. Prerequisite: zoology or biology. Letter grades only. Lectures, M F. D. D. Bowman. Not offered 1990–91

A systematic study of arthropod protozoan and helminth parasites of public health importance, with emphasis on epidemiological, clinical, and zoonotic aspects of these parasitisms.]

**510 Veterinary Parasitology**
Fall. 4 credits. Limited to second-year veterinary students. Prerequisites: zoology and biology. Letter grades only. D. D. Bowman.

A systematic study of arthropod, protozoan, and helminth parasites of vertebrate animals, with particular emphasis on the bionomics, epidemiology, and control of parasitisms of veterinary and public health importance. Laboratories consist of practical exercises in the antemortem and postmortem diagnosis of arthropod, protozoan, and helminth parasitisms of domestic animals and the interpretation of their pathogenetic significance.

**515 Veterinary Immunology**
Spring. 2 credits. Limited to first-year veterinary students. Letter grades only. J. A. Appleton; D. Holmes.

The objective of the lectures is to give the veterinary student a general outline of the mammalian and avian immune response. Emphasis will be on basic principles, using examples from domestic animals, thereby stressing the applications of immunology to veterinary medicine. The laboratories illustrate and enlarge upon the concepts presented in the lectures and give the student firsthand experience of the simple immunological tests commonly used in veterinary practice. The more-complex tests are presented as demonstrations.

**516 Infectious Diseases I: Bacteriology and Mycology**
Fall. 4 credits. Limited to second-year veterinary students. Letter grades only. J. F. Timoney, course coordinator; L. E. Winter.

The lectures in veterinary bacteriology are intended to give the veterinary student an understanding of the circumstances and processes by which pathogenic bacteria and fungi enter and cause disease in the different organ systems of animals. Thus the student is given the basis for an intelligent approach to the symptomatology, diagnosis, control, treatment, and prevention of the more important bacterial and fungal diseases in domestic animals. Laboratory exercises are concerned with the isolation, culture, and identification of the major groups of veterinary bacterial and fungal pathogens as they occur in clinical material. Students have the opportunity to collect and culture specimens and make presumptive bacteriologic or fungal diagnoses based on their own investigations in the laboratory and the case histories involved. The laboratory exercises are also supplemented with small group discussion-demonstration sessions on interesting cases and diagnostic material.

**517 Infectious Diseases II: Virology and Viral Diseases**
Fall. 2 credits. Required of all second-year veterinary students. Letter grades only. F. W. Scott.

This course covers viruses that produce important diseases in animals. The first third of the term covers general virology, and the second two-thirds covers viral diseases, including the basic properties of the virus, how the virus produces disease, and how the host responds to the virus infection. Virological and serological procedures important for the diagnosis of various virus diseases are discussed.

**518 Infectious Diseases III: Infectious and Zoonotic Diseases**
Spring. 2 credits. Required of all second-year veterinary students. Others by permission of the instructor. Letter grades only. Lecture-demonstration-discussion. D. F. Holmes (zoonotic diseases), course coordinator; M. J. Appel (foreign-animal diseases).

Clinical signs, etiology, methods of differential diagnosis, pathogenesis, methods of spread, reservoir hosts, methods of prevention and control of diseases transmissible to man, and foreign-animal diseases that resemble indigenous infectious diseases or present serious economic or public health threats to the United States. Sections on food- and water-borne and occupational diseases are included.

**605 Special Projects in Microbiology**
Fall and spring. Credit to be arranged. By permission of the instructor. Prerequisite: a good background in microbiology or immunology. S-U grades only. Microbiology staff.

The course is designed for undergraduates and as a veterinary elective. Preferably, students should have some background in pathogenic microbiology and immunology. It normally provides an opportunity for the student to work in a research laboratory or carry out a special project under supervision.

**606 Small Animal Infectious Diseases**
Spring. 2 credits. Prerequisite: three semesters of the veterinary-college curriculum or permission of the instructor. S-U grades only. T R 8. F. W. Scott and guest lecturers.

An elective course designed to give the future small animal practitioner a greater understanding of the infectious diseases of the dog and cat. Emphasis is on etiology, pathogenesis, diagnosis, treatment, and prevention. The diseases covered include the diseases of dogs and cats that are caused by viruses, bacteria, fungi, and protozoa.

**607 Virus Diseases of Cattle**
Fall, even-numbered years. 1 credit. Limited to junior and senior veterinary students. Open to graduate students in the veterinary college by permission of the instructor. S-U grades only. W 8. F. Fox, J. Gillespie, J. King, and guest lecturers.

Designed to give the future bovine practitioner an understanding of the viral diseases of cattle raised in the United States. Emphasis is placed on clinical signs and diagnosis, etiology, pathogenesis, pathology, control and prevention (including maternal immunity), vaccination, and other therapy. A clinician, a pathologist, and a microbiologist are in attendance at every lecture to cover each aspect of the disease as it relates to their disciplines. This assures complete coverage of each topic through appropriate interaction and integration of the subject matter.

**609 A Health Program for Sheep**
Spring, every second year. Lecture, 1 credit; laboratory, 1 credit; field project, 1 credit (total possible 3 credits can be taken independently). A veterinary selective course, open to other students by permission of the instructor. 1 lecture and 1 laboratory each week. Semester-long field project. S. G. Campbell. Offered 1991.

The objectives of the course are to provide the student with sufficient information to set up a health program for sheep in the northeastern United States and to ensure that the participants can prepare one for themselves or their clients. The lectures will contain sufficient information about the nutrition, husbandry, and common ailments of sheep (parasitism, foot problems, pneumonia, etc.) to ensure that a control program can be formulated. During the laboratories, appropriate demonstrations are provided and the students themselves carry out certain practical exercises with sheep (handling, necropsy, pregnancy diagnosis, etc.). In the field project, small groups of students formulate a health-maintenance program for an actual flock of sheep in Tompkins County.

**615 Research Opportunities in Veterinary Medicine**
May be taken during the school term, during January, or in the summer. 1–4 credits. By permission of the instructor. Microbiology faculty. An independent-study course. Students work closely with individual faculty members in their research laboratories.

**651 Clinical Parasitology of Avian Species**
Spring. 1 credit. Open to third- and fourth-year veterinary students only. Enrollment limited to 8. S-U grades only. 1 lecture and 1 laboratory, F 1–5. D. D. Bowman.

This course presents advanced veterinary students with the methods used in detecting, diagnosing, and treating parasitic infections of birds. Nondomestic species will be emphasized, but poultry specimens serve as examples due to availability and current knowledge. Arthropod, protozoan, and helminth parasites are considered.

**700 The Biology of Animal Viruses and Viral Pathogenesis**
Fall. 3 credits. Hours to be arranged. Letter grades only. L. E. Carmichael; C. R. Parrish, course coordinator.

Open to advanced undergraduates who are properly prepared and veterinary students by permission of the instructor. Lectures focus on the biology of animal viruses and the mechanisms of disease. Current literature and articles are used to systematically explore fundamental principles and recent findings in animal-virus research and the mechanisms by which they cause disease.

**[705 Advanced Immunology Lectures**
Spring, even-numbered years. 3 credits. Prerequisite: introductory immunology. Letter grades only. Lectures M W F 9. Staff; A. J. Winter, course coordinator. Not offered 1990–91.

Coverage, at an advanced level, of molecular and cellular immunology, immunoregulation, and the immunology of infectious diseases and tumors.]

**706 Immunology Seminar Series**
Fall and spring. No credit. Required of all graduate students in the Field of Immunology. S-U grades only. 12:15, first and third Friday of each month. R. Dietert.

Presentations of research investigations by Cornell faculty members, postdoctoral fellows, and graduate students in the Field of Immunology and by invited speakers from other institutions.

**707 Advanced Work in Bacteriology, Virology, and Immunology**
Fall and spring. Credit to be arranged. By permission of the instructor. Hours to be arranged. Microbiology staff.

This course is designed primarily for graduate students with a good background in pathogenic microbiology and immunology. It may be elected by veterinary students who are properly prepared.

**[708 Selected Topics in Animal Virology**
Spring. 2 credits. Hours to be arranged. Not offered 1990–91.

Lectures will focus on the molecular biology of a few selected animal viruses. Important publications will provide the basis for a discussion of current models for virus replication and for host-viral interactions.]

**709 Laboratory Methods of Diagnosis**
Fall and spring. 1–3 credits by arrangement. By permission of instructor. Microbiology staff.

Instructions and practice in the application of microbiological and serological methods for the diagnosis of disease.

**710 Microbiology Seminar**
Fall and spring. 1 credit. Required of all graduate students in the Department of Microbiology, Immunology, and Parasitology. S-U grades only. M 12:15. R. Avery.

**713 Special Topics in Immunology: Topic to be determined**
Spring. 1 credit. Prerequisite: introductory immunology. Lectures, M W F 9. Involves intensive student participation; enrollment is limited. This course will not be offered on a regular basis. Course coordinator: A. Winter.

**737 Advanced Work in Animal Parasitology**
Fall and spring. 1–3 credits by arrangement. For advanced undergraduate and graduate students. Letter grades only. D. D. Bowman and other faculty. This course is intended for graduate students minoring in parasitology and for highly motivated veterinary students with interests in parasitologic research.

**[767 Immunoparasitology**
Spring. 2 credits. Not offered 1990–91.

This course studies the immune response to representative helminth and protozoan parasites of vertebrate hosts. Emphasis is placed on the physiological and immunological relationships that play a role in regulation of parasitic infections. In vitro correlates of immunity to parasites, immunodiagnosis, and parasite-induced immunopotentiation and suppression are discussed.]

**783 Seminars in Parasitology**
Fall and spring. 1 credit. Open to veterinary students, graduate students minoring in the field of parasitology, and others by permission of the instructor. S-U grades only. D. D. Bowman. Date and hours to be arranged.

A seminar series designed to acquaint students with current research in the field of parasitology. The range of topics is determined, in part, by the interests of those participating and may include such topics as the ecology of parasitism, parasite systematics, immunoparasitology, and parasitic diseases of plants and animals, including man.

## New York State Veterinary Diagnostic Laboratory

Director: associate professor D. H. Lein
206 Diagnostic Laboratory
607 253-3900

Associate professors: E. J. Dubovi, J. D. Henion, R. H. Jacobson, J. E. Lowe, G. A. Maylin, T. J. Reimers, P. M. Sears, S. J. Shin; assistant professor: Y. F. Chang; directors of laboratory operations: Y. F. Chang (assistant director, bacteriology), E. J. Dubovi (virology), R. H. Eckerlin (diagnostic toxicology), J. D. Henion (human drug testing), R. H. Jacobson (automated serology), D. H. Lein (extension and field services: New York State CEM Quarantine Facility), J. W. Lopez (assistant director, virology), G. A. Maylin (equine drug testing), P. L. McDonough (assistant director, bacteriology), T. J. Reimers (endocrinology), J. E. Saidla (assistant director, Feline Health Center), P. M. Sears (mastitis), S. J. Shin (bacteriology), S. E. Wade (parasitology); extension field services: M. A. Brunner (bovine extension specialist), J. E. Lowe (equine extension specialist), C. A. Rossiter (Johne's Program), J. E. Saidla (feline extension specialist), B. E. Straw (swine extension specialist), J. T. Blue (director, clinical pathology), T. W. French (assistant director, clinical pathology)

**531 Regulatory Medicine**
Spring, first seven weeks. No credit. Required of all third-year veterinary students. S-U grades only. Lectures, M 8. F. J. Drazek.

A review of animal and poultry diseases that are reportable to the New York State Department of Agriculture and Markets in preparation for taking the USDA accreditation examination.

**611 Mastitis**
January 1991, 6–8 hours per day for three weeks. 3 credits. Limited to second-, third-, and fourth-year veterinary students. Not open to others. Letter grades only. P. M. Sears and staff.

An elective course for veterinary students. Covers the causes, diagnosis, treatment, and prevention of bovine mastitis. The role of management practices is stressed. The course includes lectures, readings, discussions, laboratory exercises, and farm visits as part of the New York State Quality Milk Services Program–Mastitis Control Program.

**700 Special Projects in Diagnostic Endocrinology**
Fall and spring. 1–3 credits. By permission of the instructor. Letter grades only. T. J. Reimers.

An independent-study course. Students have an opportunity to research a particular topic in diagnostic/clinical endocrinology of animals.

**701 Special Projects in Infectious Diseases**
Fall and spring. 1–3 credits. By permission of the instructor. S-U grades only. Diagnostic Laboratory faculty.

This course provides laboratory experience with attention to specific aspects of infectious disease problems.

**702 Special Topics in Infectious Diseases**
Fall and spring. 1–3 credits. By permission of the instructor. S-U grades only. Diagnostic Laboratory faculty.

The objective of this course is to offer a broad exposure to various aspects of infectious diseases.

**703 Doctoral-Level Thesis Research**
Fall and spring. 6–9 credits. S-U grades only. By permission of the instructor. Diagnostic Laboratory faculty.

Research leading to a doctoral degree.

**704 Master's-Level Thesis Research**
Fall and spring. 1–3 credits. S-U grades only. By permission of the instructor. Diagnostic Laboratory faculty.

Research leading to a master's degree.

## Pathology

Professor B. U. Pauli, chairman
216 Veterinary Research Tower
607 253-3300

Professors: J. King, L. Krook, R. Lewis, R. Minor, R. Phemister; professors emeriti: J. Bentinck-Smith, C. I. Boyer, Jr., K. McEntee, C. G. Rickard; adjunct professors: J. Black, W. J. Dodds, C. A. Mebus, J. Nosanchuk, M. Posso; associate professors: J. T. Blue, B. Cooper, T. French, D. H. Lein, D. D. Myers, F. Quimby, D. H. Schlafer, B. A. Summers, A. Yen; adjunct associate professor: P. Wood; assistant professor: M. Suter; adjunct assistant professors: T. Donnelly, H. T. Nguyen

### 535 Veterinary Pathology I

Fall. 4 credits. Required of all second-year veterinary students. Others by permission of the instructor. Prerequisites: VETA 502 and 503 or equivalent histology courses. Letter grades only. T R 9–12:20. B. J. Cooper.

A study of disease processes beginning at the cellular level and progressing to selected body systems. Cellular pathology, injury and death at the cellular and tissue level, derangements in body fluids and blood flow, inflammation and repair, the nature and causes of tissue injury, abnormalities of cell growth, neoplasia, and the relationship of genetics to disease are discussed as general processes at a mechanistic level. Those basic pathogenic processes are subsequently applied to the diseases occurring in complex organ systems such as the skin and endocrine and reproductive systems. This serves as a bridge between Veterinary Pathology I and Veterinary Pathology II.

### 536 Veterinary Pathology II

Spring. 4 1/2 credits. Required of all second-year veterinary students. Not open to others. Prerequisite: VETPA 535. Letter grades only. T R 10–12:20, W 10. D. H. Schlafer.

A systematic study of the diseases in each major organ system with emphasis on differential diagnostic features and the correlation of disturbed function with morphologic change.

### 539 Introduction to Laboratory Animal Medicine

Spring. 1 credit. Required of all third-year veterinary students. Others by permission of the instructor. Prerequisites: Pathology 535 and 536. Letter grades only. F. W. Quimby.

An introduction to the biology and diseases of common laboratory animal species, including mice, rats, hamsters, guinea pigs, rabbits, and nonhuman primates. Exotic species, including amphibia and reptiles, are also discussed. The etiology and pathogenesis of the most prevalent diseases are emphasized. Practical means of diagnosis and treatment are discussed. The course also provides an overview of the many aspects of laboratory animal medicine as practiced in academe, industry, and research.

### 540 Pathology Service

Fall and spring. 2 credits. Required of all fourth-year veterinary students. Not open to others. Letter grades only. J. M. King.

This course involves the hands-on diagnostic necropsies of most mammalian species that come to the necropsy room in the pathology department and the hands-on necropsies of feathered species in the avian and aquatic animal medicine department. The sessions are two weeks long for each group of three to five senior veterinary students. They meet at 9:00 a.m. each day for an hour's review of the students' written reports of necropsies done the day before, followed by a 2 1/2-hour microscopic review of hematology and cytology slides, performance of urinalysis techniques, and discussions of case studies. Beginning about 1:30 p.m. each day, the necropsy requests are reviewed and necropsies performed under the guidance of pathology interns, residents, or faculty members until all are complete. One student per day attends and performs avian necropsies in the laboratory. The mammalian necropsy service is a twenty-four-hour service, seven days a week, but prudence is used for late-night and weekend duty.

### 549 Laboratory Animal Medicine Rotation

Fall or spring. 2 credits. Limited to fourth-year veterinary students. Letter grades only. F. W. Quimby.

The practice of laboratory-animal medicine requires a combination of preventive programs, clinical skills, knowledge of various species' biologies, familiarity with research methodology, and acquaintance with state and federal regulations. This course is offered as a two-week introduction to that specialty. Students accompany laboratory-animal veterinarians on clinical rounds of Cornell's research-animal housing and participate in laboratory diagnostic work. Review sessions are conducted on the biology, medicine, and husbandry of rodents, rabbits, and primates and on current legislation regulating the care and use of research animals. The course also includes a field trip to the research-animal facilities of Rockefeller University, the Cornell University Medical College, and the Laboratory of Experimental Medicine and Surgery in Primates.

### 571 Clinical Pathology

Spring. 3 credits. Required of all second-year veterinary students. Others by permission of the instructor. Prerequisites or corequisites: VETPA 535 and VETPA 536. Letter grades only. In any week there will be either three lectures or two lectures and one laboratory. J. Blue.

The course teaches the methods and interpretation of laboratory tests in the areas of hematology, clinical chemistry, urinalysis, and diagnostic cytology.

### 636 Wildlife Pathology

Fall. 2 credits. Intended for first-, second-, and third-year veterinary students. Open to others. J. M. King.

A presentation of the nature and causes of diseases of wild rabbits, opossums, squirrels, deer, certain waterfowl, and some other species. Emphasis on epizootiology, etiology, pathogenesis, diagnostic lesions, and effects on populations. Laboratory experience in specimen collection and necropsy techniques. Guest lectures on ecology and population dynamics by

members of the Department of Natural Resources.

**637 Postmortem Pathology**
Fall and spring. 1 credit. Intended for first-, second-, or third-year veterinary students. J. M. King.

A presentation of gross and microscopic lesions of diagnostic significance, employing color projection slides as illustrations. Emphasis on pathological and differential diagnosis of a wide spectrum of viral, metabolic, bacterial, parasitic, and other diseases.

**638 The Bottom Line**
Fall and spring. 1 credit. Limited to veterinary students. S-U grades only. Discussion, W 12:20–1. R. M. Lewis.

This course is organized in a modified Clinico-Pathologic Conference format. Selected case material derived from the Teaching Hospital patient population is discussed, emphasizing and illustrating the salient clinical, antemortem, and postmortem features of twenty-eight disease entities each semester. Interactive discussion between participating faculty and students follows each case presentation.

**639 Special Topics in Laboratory Animal Medicine and Science (formerly Autotutorial Course)**
Fall and spring. 1–3 credits. F. Quimby.

This course is offered to individuals interested in pursuing various aspects of laboratory animal medicine and science in depth. A variety of resources are available to assist students in their research on a particular topic: the library of the Division of Laboratory Animal Medicine, including the autotutorial library; the university libraries; and special information collected from other institutions. Grades are determined on the basis of a paper, an oral presentation, or the creation of an audiovisual teaching aid, any of which may be selected by the student.

**640 Principles of Toxicological Pathology**
Fall, alternate years. 3 credits. Intended for veterinary and graduate students. J. M. King. The primary objective of this elective graduate-level course is to make the student aware of the problems and their solutions encountered in pathology as it applies to the field of toxicology, with special emphasis on industrial toxicology and governmental regulations.

**641 Clinical Immunology**
Spring. 1 credit. Limited to veterinary students. Others by permission of the instructor. Lecture, W 8. R. M. Lewis.

This course emphasizes the clinical aspects of fifteen specific diseases that are mediated by immunologic processes. Case material from the teaching hospital is used to illustrate the presenting clinical signs, laboratory diagnostic methods, clinical course, therapeutic approaches, and eventual outcome of each disease under discussion. Student participation in the informal case discussions is encouraged as a means of introducing students to the practice of veterinary medicine through case discussion and analysis. Training is also provided in the use of the college's computerized biomedical information system and the hospital records system to develop a critical case analysis, which serves as the basis for grading.

**[642 Public Policy and Laboratory Animal Science**
Spring, even-numbered years. 2 credits. Intended for fourth-year veterinary students, residents, and veterinarians enrolled in the Graduate School who have a serious interest in pursuing a career in laboratory animal medicine. Prerequisite: VETPA 539 or equivalent. One evening each week for two hours. F. Quimby and others. Not offered 1990–91.

The course is conducted as a series of small-group discussions with individual participation and weekly readings required. It focuses on public policy in laboratory animal science and includes the following discussion topics: public perceptions of animal use in teaching, research, and testing; federal and state laws governing animal use; the recognition and alleviation of pain and distress during animal experimentation; euthanasia; biological hazards in animal research; alternatives and adjuncts to animals in research; and factors that complicate animal research.]

**643 The Use of Animal Models to Explore Physiologic and Pathologic Mechanisms in Animals and Man**
Fall, odd-numbered years. 2 credits. Intended for fourth-year veterinary students, residents, and veterinarians enrolled in the Graduate School who have a serious interest in pursuing a career in laboratory-animal medicine. Prerequisite: VETPA 539 or equivalent. One evening each week for two hours. F. Quimby and others.

The course is conducted as a series of small-group discussions with individual participation and weekly readings required. It focuses on the use of animal models for exploring physiologic and pathogenetic mechanisms in animals and man. This segment includes the following discussion topics: the value of basic research, the benefits of animal research to human and animal health, the requisite features of an appropriate animal model, the origin of inbred and congenic strains, transgenic animals, and a survey of animal models. Animal models used in investigations of body systems (pulmonary, CNS, hematologic) are the focus during even-numbered years, while models of disease processes (oncology, virology, autoimmunity), as well as aging and transplantation, are the focus in odd-numbered years.

**[701–712 Pathobiology of Disease**
1 credit per section. Prerequisite: VETPA 535 or permission of instructor. Letter grades only. Lectures, M 11, W 10:30. Drs. Pauli and Yen. Not offered 1990–91.

This course is designed to provide students with an understanding of the cellular and molecular events of specific disease processes. Intensive student participation and preparation are involved.]

**[701 Pathobiology of Disease: Cell Growth, Differentiation, and Neoplastic Transformation**
Spring, odd-numbered years. Not offered 1990–91.]

**[702 Pathobiology of Disease: Tumor Cell Biology**
Spring, odd-numbered years. Not offered 1990–91.]

**[703 Pathobiology of Disease: Extracellular Matrix**
Spring, odd-numbered years. Not offered 1990–91.]

**[704 Pathobiology of Disease: Advanced Immunopathology**
Fall, odd-numbered years. M. Suter. Not offered 1990–91.]

**[705 Pathobiology of Disease: Toxicologic Pathology**
Fall, odd-numbered years. Not offered 1990–91.]

**[706 Pathobiology of Disease: Advanced Reproductive Pathology**
Fall, odd-numbered years. D. Schlafer. Not offered 1990–91.]

**[707 Pathobiology of Disease: The Inflammatory Process**
Spring, even-numbered years. D. Slauson. Not offered 1990–91.]

**[708 Pathobiology of Disease: Inherited Neuromuscular Diseases**
Spring, even-numbered years. B. Cooper. Not offered 1990–91.]

**[709 Pathobiology of Disease: Advanced Clinical Pathology**
Fall, even-numbered years. J. Blue, T. French. Not offered 1990–91.]

**[710 Pathobiology of Disease: Advanced Neuropathology**
Fall, even-numbered years. Dr. Summers. Not offered 1990–91.]

**[711 Pathobiology of Disease: Metabolic Bone Disorders**
Fall, even-numbered years. Not offered 1990–91.]

**[712 Pathobiology of Disease: Laboratory Animal Pathology**
Fall, even-numbered years. Not offered 1990–91.]

**736 Pathology of Nutritional Diseases**
Spring. 3 credits. For graduate students in pathology or nutrition and an elective course for veterinary students at the sophomore level or above. Prerequisite: VETPA 535. Letter grades only. L. P. Krook.

**788 Seminar in Surgical Pathology**
Fall and spring. 1 credit. Intended for instructors and graduate students; third- and fourth-year veterinary students may attend. Letter grades only. Lecture-seminar, T 8. Pathology staff.

The major objective of this course is to introduce the students to the gross and microscopic features of surgical pathology. Selected material from the Surgical Pathology Service is prepared in advance for independent review by the students. The material is presented in a slide-seminar format by the students under the review of the faculty. Emphasis is placed on pathogenesis, etiology, and pathologic descriptions of the lesions. In addition, appropriate guest lecturers cover specific areas of interest and special topics not encountered in the departmental service programs. B. A. Summers.

**789 Seminar in Necropsy Pathology**
Fall and spring. 1 credit. Intended for third- and fourth-year veterinary students, graduate students, interns, and residents. Letter grades only. R 8.

The major objective of this course is to introduce the student to the gross and microscopic features of necropsy pathology. Selected material from the Necropsy Service is prepared in advance for independent review by the students. This material is presented in a slide-seminar format by the students under the review of the faculty. Emphasis is placed on pathogenesis, etiology, and pathologic description of the lesions. In addition, appropriate guest lecturers cover specific areas of interest and special topics not encountered in the departmental service programs.

**793 Lectures in General Pathology**
Fall. 2 credits. Limited to graduate students by permission of the instructor. Letter grades only. Lecture, T R 9–10. B. J. Cooper.

This course consists of only the lecture portion of Pathology 535 without the laboratory. It is designed to accommodate certain graduate students who desire exposure to general pathology but lack histology experience. The subject matter covered is described under 535.

**794 Lectures in Special Pathology**

Spring. 3 credits. Limited to graduate students by permission of the instructor. Letter grades only. Lecture, T W R 10–11. D. H. Schlafer.

This course covers only the lecture portion of Pathology 536, consisting of a systematic study of the diseases in each major organ system with emphasis on differential diagnostic features and the correlation of disturbed function with morphologic change.

**796 Medical Primatology**
Fall, even-numbered years. Two evening hours each week. 1–2 credits. Offered to veterinary students, interns, residents, and graduate students by permission of instructor. F. Quimby.

A survey of major diseases, medical care, and management techniques for all life stages of primates. Topics to be discussed include physical examination, restraint anesthesia, housing, and management of various nonhuman primate species; bacterial, viral, and parasitic diseases; noninfectious diseases; infant and nursery care reproduction and behavioral considerations; and therapeutics.

## Pharmacology

Professor G. W. G. Sharp, chairman
D-124 Pierre A. Fish Laboratory
607 253-3650

Professor: W. S. Schwark; associate professors: J. G. Babish, R. A. Cerione, C. M. S. Fewtrell, R. E. Oswald, G. A. Weiland; assistant professors: W. A. Horne, L. M. Nowak

Specific information about faculty, staff, and courses may be obtained by contacting the department.

**528 Pharmacology I**
Fall. 4 credits. Prerequisites: VETA 500, 501, 502, 503, and 504; VETPH 525, 526, and 527; VETPA 535; or permission of the instructors. Letter grades only. R. E. Oswald and other

faculty.

Topics covered include physiological disposition of drugs and poisons, drug-receptor interactions, cell and organ pharmacology, and actions of drugs affecting the nervous system. Several clinical topics are covered in the laboratory session.

**529 Pharmacology II**
Spring. 2 credits. Prerequisite: VETPR 528 or permission of the instructors. Letter grades only. W. S. Schwark and other faculty.

Topics covered include chemotherapy and the action of drugs affecting the heart, gastrointestinal tract, skin, and the respiratory, endocrine, and urinary systems.

**610 Introduction to Chemical and Environmental Toxicology (also Toxicology 610 and Food Science 610)**
Fall. 3 credits. M W F 11:15. J. Babish.

This course is designed to introduce graduate and upperclass undergraduate students to the principles of toxicology. Specifically the course covers the concepts underlying the absorption, distribution, and excretion of toxicants; biological systems as targets of toxic agents; commonly encountered toxic agents; and the ecological distribution of toxic materials.

**620 Advanced Clinical Pharmacology (Selective)**
Spring. 1 credit. Limited to third- and fourth-year veterinary students. Others by permission of the instructor. S-U grades only. W. S. Schwark.

An extension of the core veterinary pharmacology courses, VETPR 528 and 529. Emphasis will be on selected topics in veterinary therapeutics with reference to clinical case material.

**621 Toxicology (also Toxicology 621)**
Spring. 1 credit. Nonveterinary students by permission of the instructor. S-U grades only. T 8. W. S. Schwark.

Specific information about this course can be obtained from the department. Basic and clinical aspects of the more common poisonings that affect domestic animals are considered. Emphasis will be given to heavy-metal poisoning; chelation phenomena; selected organic poisonings, including pesticides, herbicides, and rodenticides; and forensic considerations.

**622 Special Projects in Pharmacology**
Fall, spring, and summer. 1–3 credits. By permission of the instructor. Pharmacology faculty.

**629 Research Opportunities in Veterinary Medicine**
May be taken during the school term, during January, or in the summer. 1–4 credits. By permission of the instructor. S-U grades only. Pharmacology faculty.

An independent-study course. Students work closely with individual faculty members in their research laboratories.

**[700 Calcium and Other Second Messengers in Cell Activation**
Fall, alternate years. 2 credits. By permission of the instructor. Lecture-discussion, 2 hours each week. Letter grades only. C. M. S. Fewtrell. Not offered 1990–91.

Calcium as second messenger; regulation of intracellular calcium and techniques for studying calcium movements and distribution in cells. Phosphatidylinositol turnover; activation of protein kinase C by diacylglycerol and the release of calcium from intracellular stores by inositol trisphosphate. Adenylate cyclase, guanine nucleotide regulatory proteins, and cyclic nucleotides as transducers and second messengers. The role of ion channels in cell activation. Each topic will be introduced with a lecture that will be followed by discussion of recent papers from the literature.]

**[701 Receptors and Ion Channels**
Spring. 2 credits. By permission of the instructor. Lecture and discussion. R. E. Oswald, course coordinator; G. A. Weiland. Not offered 1990–91.

Biochemical and electrophysiological mechanisms of ligand- and voltage-modulated ion channels and the role of those channels in physiological function; disease states and drug actions on the level of the membrane, cell, and organ. This is to familiarize students with concepts, methods, and recent progress in understanding the mechanisms of neurotransmitter-drug receptors.]

**[703 Receptor Binding: Theory and Techniques (also Biological Sciences 790–02)**
Spring, even-numbered years. 2 credits. By permission of the instructors. Lecture, T 7–8:50 p.m. R. E. Oswald, course coordinator; G. A. Weiland. Not offered 1990–91.

The course covers both the practical and theoretical tools needed to set up and use a radioligand binding assay to measure and characterize physiologically and pharmacologically relevant neurotransmitter hormone drug receptors. The emphasis of the course is on the quantitative and physical chemical aspects of receptor binding. Topics discussed in the course are historical background of receptor theory; the basic methods of a radioligand binding assay, including various methods of separating and measuring bound and free ligand; methods of analyzing equilibrium binding, the thermodynamic basis of the binding; equilibrium binding for complex binding mechanisms, including allosteric mechanisms; coupling of binding to response; antagonism of response and inhibition of binding; the kinetics of simple and complex binding mechanisms; and common artifacts encountered in radioligand binding assays.]

**704 CNS Neuropharmacology: Mechanisms–Synaptic Transmission**
Spring. 3 credits. Limited to 20 third- and fourth-year undergraduate and graduate students.

This is a basic-level course in vertebrate central-nervous-system pharmacology, in which mechanisms of synaptic transmitter and drug action at the membrane and cellular level are emphasized. The relationship between particular neurotransmitters, neuroanatomical structures, normal function, and dysfunction is discussed.

**[705 Molecular Mechanisms of Receptor-G Protein Coupled Signaling**
Spring, even-numbered years. 2 credits. By arrangement. R. Cerione. Not offered 1990–91.

This course focuses on the mechanisms of action of GTP binding proteins. A number of receptor-coupled signaling systems are examined, including adenylate cyclase, vertebrate vision, phosphatidyl inositol lipid turnover, and receptor systems regulating various ion channels.]

**[711 The Role of Calcium in Stimulus-Secretion Coupling**
Fall, spring, and summer. 1-3 credits. By permission of the instructor. C. M. S. Fewtrell. Not offered 1990–91.]

**[712 The Receptor for Immunoglobulin E on Tumor Mast Cells**
Fall, spring, and summer. 1-3 credits. By permission of the instructor. C. M. S. Fewtrell. Not offered 1990–91.]

**713 Mechanisms of Growth-Factor Action**
Fall, spring, and summer. 1–3 credits. By permission of the instructor. R. A. Cerione.

**[714 Central Nervous System Neurotransmitters**
Fall, spring, and summer. 1–3 credits. By permission of the instructor. L. M. Nowak. Not offered 1990–91.]

**716 Neurobiology of Seizure Disorders**
Fall, spring, and summer. 1–3 credits. By permission of the instructor. W. S. Schwark.

**717 Single-Channel Recording**
Fall, spring, and summer. 1–3 credits. By permission of the instructor. R. E. Oswald.

**718 Structure-Function of the Nicotinic Acetylcholine Receptor**
Fall, spring, and summer. 1–3 credits. By permission of the instructor. R. E. Oswald.

**719 Computer Modeling of Drug-Receptor Interactions**
Fall, spring, and summer. 1–3 credits. By permission of the instructor. R. E. Oswald.

**720 Modulation of Nicotinic Acetylcholine Receptor Function by Substance P**
Fall, spring, and summer. 1–3 credits. By permission of the instructor. G. A. Weiland.

**721 Molecular Mechanisms of Pharmacological Blockade of Voltage-dependent Calcium Channels**
Fall, spring, and summer. 1–3 credits. By permission of the instructor. G. A. Weiland.

**[723 The Role of Calcium in the Control of Electrolyte Transport**
Fall and spring. 1–3 credits. By permission of the instructor. G. W. G. Sharp. Not offered 1990–91.]

**[724 The Control of Hormone Secretion**
Fall and spring. 1–3 credits. By permission of the instructor. G. W. G. Sharp. Not offered 1990–91.]

**Special Topics in Pharmacology**
Fall, spring, and summer. 1 credit each topic. By permission of the instructor. Pharmacology faculty. Reading and discussions.

**741 Neuromodulation**
G. A. Weiland.

**742 Receptor Mechanisms**
G. A. Weiland.

**743 Neuropeptides**
G. A. Weiland.

**744 Voltage-dependent Calcium Channels**
G. A. Weiland.

**745 Neuropharmacology**
G. A. Weiland.

**746 Electrophysiological Techniques**
R. E. Oswald.

**[747 Amino Acid Neurotransmitters**
L. M. Nowak. Not offered 1990–91.]

**[748 Stimulus-Secretion Coupling**
C. M. S. Fewtrell. Not offered 1990–91.]

**[749 Second Messengers in Cell Activation**
C. M. S. Fewtrell. Not offered 1990–91.]

**[750 Cell Calcium**
C. M. S. Fewtrell. Not offered 1990–91.]

**[751 Receptors in the Immune System**
C. M. S. Fewtrell. Not offered 1990–91.]

**[752 Mediators of Inflammation**
C. M. S. Fewtrell. Not offered 1990–91.]

**753 Clinical Pharmacology**
Fall. W. S. Schwark.

Discussion on current issues in applied therapeutics in veterinary medicine. Enrollment by permission of instructor.

**754 G Proteins in Signal Transduction**
R. A. Cerione.

**755 Calcium in the Control of Hormone Secretion**
Fall and spring. G. W. G. Sharp.

**756 Mechanisms of Calcium Handling**
Fall and spring. G. W. G. Sharp.

**757 Intestinal Electrolyte Transport**
Fall and spring. G. W. G. Sharp.

**759 Receptor Binding Techniques**
R. E. Oswald, course coordinator; G. A. Weiland.

**760 Advanced Topics in Pharmacology**
1–3 credits. Pharmacology faculty.

**770 Graduate Research in Pharmacology**
1–10 credits.

This course is offered by individual faculty members in the Department of Pharmacology for graduate students undertaking research toward M.S. or Ph.D. degrees.

## Physiology

Professor D. Robertshaw, chairman
725 Veterinary Research Tower
607 253-3854

Professors: K. W. Beyenbach, A. Dobson, K. A. Houpt, T. R. Houpt, F. A. Kallfelz, P. W. Nathanielsz, D. N. Tapper, R. H. Wasserman, J. F. Wootton; professors emeriti: E. L. Gasteiger, W. Hansel, F. W. Lengemann, A. F. Sellers; associate professors: R. A. Corradino, J. E. Fortune, R. Gilmour, E. R. Loew, A. Quaroni, R. B. Silver; senior lecturer: C. H. McFadden; lecturer: E. Paul; instructor: R. Rawson; senior research associates: P. W. Concannon, C. S. Fullmer, R. A. Wentworth; research associates: J. S. Chandler, T. J. McDonald, J. Owiny; postdoctoral associates: M. M. Hinshelwood, M. Jones, D. A. Myers, T. L. Pannabecker, A. K. Voss, D. J. Zimmer

Instruction in physiology in the veterinary curriculum is concentrated in the first year and includes two semesters devoted to systems and cellular physiology. Laboratories, demonstrations, case-based exercises done in small groups, and small-group discussions exemplifying physiological principles in various animal species are an integral part of these offerings. The courses are directed toward an understanding of the function, integration, and control, as well as the cellular and biochemical basis, of physiological processes. The laboratory, demonstrations, and case-based learning are considered a significant aspect of the educational process, providing the students with hands-on experience and enabling them to observe and work with concepts and mechanisms associated with important physiological events that are important for the clinical management of patients.

Faculty are also members of the Section of Physiology, Division of Biological Sciences. The section has teaching responsibilities in the undergraduate curriculum, offering basic courses in introductory biology, introductory animal physiology, cellular physiology, and mammalian physiology, in addition to upper-level specialized courses. Faculty are also members of the graduate Field of Physiology, the graduate Field of Veterinary Medicine, and other graduate fields.

The facilities of the department and section include laboratories and offices in the Veterinary Research Tower, D-wing of Schurman Hall, and the Stimson Hall Physiology Annex. Research projects range from those dealing with the physiology and metabolism of the whole animal to the investigation of the hormonal regulation of gene expression. The laboratories and animal quarters are well equipped. The following research areas are emphasized:
*(a)* reproductive physiology, *(b)* endocrinology, *(c)* cellular physiology, *(d)* neurophysiology, *(e)* gastrointestinal physiology, *(f)* metabolism, *(g)* behavioral physiology, *(h)* renal physiology, *(i)* vision, *(j)* cardiovascular physiology, and *(k)* temperature regulation.

**Bio S 214 Biological Basis of Sex Differences (also Women's Studies 214)**
Fall, alternate years. 3 credits. Prerequisite: one year of introductory biology. Lectures, T R 8:30–9:55. Occasional discussions to be arranged. J. E. Fortune.

The structural and functional differences between the sexes are examined. Emphasis is placed on mechanisms of mammalian reproduction; where possible, special attention is given to studies of humans. Current evidence of the effects of gender on nonreproductive aspects of life (behavior, mental and physical capabilities) is discussed. The course is intended to provide students with a basic knowledge of reproductive endocrinology and a basis for objective evaluation of sex differences in relation to contemporary life.

**Bio S 313 Histology: The Biology of the Tissues**
Fall. 4 credits. Prerequisite: one year of introductory biology; a background in vertebrate anatomy and organic chemistry or biochemistry strongly recommended. Lectures, T R 1:25–2:15. Laboratories, T R 2:30–5:00. R. B. Silver.

Provides the student with a basis for understanding the microscopic, fine structural, and functional organization of vertebrates, as well as the methods of analytic morphology at the cell and tissue levels. The dynamic interrelations of structure, composition, and function in cells and tissues are emphasized. (Course may include work with invertebrate or vertebrate animals.)

**Bio S 316 Cellular Physiology**
Spring. 4 credits. Limited to 100 students, with preference given to students concentrating in animal physiology and anatomy. Each lab limited to 24 students. Prerequisite: concurrent or previous enrollment in Biological Sciences 330 or 331. Lectures, M W F 9:05. Laboratories, M T W or R 1:25–5. A. Quaroni and staff.

Lectures introduce students to the most current information on the ways cells function and regulate themselves and neighboring cells and on what molecules are involved in those regulatory processes. Laboratories provide an introduction to cell and organ culture and to immunological techniques used to study cell structure and function in vivo and in vitro. Experiments performed in the laboratory are closely related to, and provide practical experience with, subjects covered in the lecture.

**346 Introductory Animal Physiology (also Biological Sciences 311)**
Fall. 3 credits. Prerequisites: one year of college biology, chemistry, and mathematics. Lectures, M W F 11:15. E. R. Loew.

A general course in animal physiology emphasizing principles of operation, regulation, and integration common to a broad range of living systems from the cellular to the organismal level. Structure-function relationships are stressed along with underlying physical-chemical mechanisms.

**348 Introductory Animal Physiology Laboratory (also Biological Sciences 319)**
Fall. 3 credits. Enrollment limited to 80 students. Designed for upper-level undergraduate and graduate students majoring in physiology and for others interested in biomedically related professions. Each laboratory section limited to 20 students. Prerequisite: concurrent or previous enrollment in Biological Sciences 311 or permission of instructor based on previous meritorious performance in another introductory animal physiology course. Laboratories, M T W or R 1:25–5 (mandatory discussion). R. A. Corradino, course coordinator; P. W. Concannon.

A series of student-conducted in vitro and in vivo experimental exercises designed to illustrate basic physiological processes in animals and to introduce students to animal physiology research techniques, instrumentation, experimental design, and interpretation of results. Protocols include anesthesia, dissection, vivisection, physiographic recording, and computer simulations. Experiments with living tissues and live animals will examine properties of blood, muscle, nerves, cardiovascular, respiratory, and gastrointestinal function and control; and endocrine regulation of mineral metabolism and reproductive tissue activity. Experimental resources include live animals of several vertebrate species, including frogs, birds, rats, and rabbits, which will be euthanized in conjunction with the laboratory exercises. Grading is based on required written reports of laboratory activities.

**Bio S 410 Seminar in Anatomy and Physiology**
Fall and spring. 1 credit. May be repeated for credit only once. Limited to upperclass students. S-U grades only. Seminar to be arranged. Organizational meeting first W of each semester at 7:30 p.m., 828 Vet Research Tower. Staff (coordinator: D. Robertshaw).

**Bio S 458 Mammalian Physiology**
Spring. 6 credits. Enrollment limited. Graduate student auditors allowed. Prerequisite: Biological Sciences 311 (VETPH 346) or equivalent with permission of instructor. Lectures, M W F 8. Laboratory, 4 additional hours to be arranged. K. W. Beyenbach and staff.

Selected topics in mammalian physiology are discussed in the lecture and concurrently studied in the laboratory. Topics are selected from the following: physiology of excitable and epithelial cell membranes, the autonomic nervous system, cardiovascular physiology, gastrointestinal physiology, renal physiology, energy metabolism, and acid-base balance. Live animals and isolated living tissues are studied in the laboratory portion of the course.

**Bio S 499 Undergraduate Research in Biology**
Fall and spring. Variable credit. Prerequisite: written permission from the staff member who will supervise the work and assign the grade. Any faculty member in the Division of Biological Sciences may act as a supervisor. Faculty supervisors outside the division are acceptable only if a faculty member of the division agrees to take full responsibility for the quality of the work. *This course is divided into multiple sections as printed in the* Course and Time Roster *and its supplement.* Students must register under supervisor's assigned section number or under section 1 if supervisor was not assigned a section number. Staff.

Practice in planning, conducting, and reporting independent laboratory and library research programs. Research credits may *not* be used in completion of the following concentration areas: animal physiology and anatomy; biochemistry; botany; cell biology; and ecology, systematics, and evolution. No more than 4 credits of research may be used in completion of the following concentration areas: genetics and development, neurobiology and behavior.

**526 and 527 Systems Physiology I and II**
Fall, 6 credits; spring, 5 credits. Required of all first-year students of veterinary medicine. Others with permission of the course coordinator. This is a two-semester animal physiology course which includes systemic and cellular aspects of the physiology of the common domestic species. Whole animal physiology is approached from the perspective of clinical veterinary medicine. All of the major systems are considered. Individual and cooperative learning in small groups is emphasized. Case-based exercises, along with lectures, laboratory exercises, computer simulations, and group discussions, are an integral part of the course.

**528 Veterinary Ethics**
Fall and spring. 1 credit. Limited to veterinary students. D. Robertshaw.

A lecture and discussion course dedicated to exploring some of the ethical issues that face the veterinarian in modern society as well as within the profession.

**612 Research Opportunities in Veterinary Medicine**
May be taken during the school term, during January, or in the summer. 1–4 credits. Limited to veterinary students. By permission of the instructor. Physiology faculty.

An independent-study course. Students work closely with individual faculty members in their research laboratories.

**Bio S 619 Lipids (also Nutritional Sciences 602)**
Fall. 2 credits. Lectures, T R 11:15. A. Bensadoun.

Advanced course on biochemical, metabolic, and nutritional aspects of lipids. Emphasis is placed on critical analysis of current topics in lipid methodology; lipid absorption; lipoprotein secretion, molecular structure, and catabolism; mechanism of hormonal regulation of lipolysis and fatty acid synthesis; and cholesterol metabolism and atherosclerosis.

**625 Problems in Dog and Cat Behavior**
Spring. 1 credit. S-U grades only. Students of other colleges by permission of the instructor. K. A. Houpt.

The goal of this course is to give veterinary students the ability to treat the behavior problems of cats and dogs. The most common problems are

aggression and destructiveness in dogs and aggression and house soiling in cats. Other, less frequently encountered problems are insufficient or excessive sexual or maternal behavior, wool chewing, and hypervocalization in cats, and hyperactivity, phobias, and barking in dogs. History-taking, counseling, and follow-up methods will be presented, and each student will have the opportunity to participate in three cases. Cases will be treated in the clinic, during house calls, and via telephone consultations. The behavioral and pharmacological techniques used to treat behavior problems will be presented and the success of each evaluated.

**626 Problems in Equine Behavior**
Spring. 1 credit. S-U grades only. Students of other colleges by permission of the instructor. K. A. Houpt.

The goal of this course is to give veterinary students the ability to treat behavior problems of horses. The most common behavior problems are aggression, self-mutilation, stable vices, and foal rejection. History-taking, counseling, diagnostic tests, follow-up, and the importance of cooperation with the referring veterinarian will be presented. Methods of preventing behavior problems, training techniques of value to the practitioner, and socialization of foals will be presented using videotapes and demonstrations. The behavioral and pharmacological techniques used to treat behavior problems will be presented and the success of each evaluated. The students will be encouraged to develop techniques of their own based on an understanding of normal equine behavior.

**627 Acid-Base Relations (also Biological Sciences 715)**
Fall, spring, and summer. 2 credits. Students of other colleges by permission of the instructor. Prerequisite: VETPH 526 or permission of the instructor. A. Dobson.

The course uses a self-instruction program to promote an understanding of the basis, interpretation, and technique of measuring acid-base status. The text used, *Acid Base Physiology*, by R. W. Winters, K. Engel, and R. B. Dell, starts with the elementary physical chemistry of acids, bases, and buffers and then discusses the bicarbonate buffer system and whole-blood buffers. The physiological controls for acid base of the respiratory and renal system are introduced, followed by a logical development of acid-base terminology. The latter part of the text systematically describes the physiopathology and etiology of the four primary acid-base disturbances. This book is particularly effective in consolidating the basic principle because it continues to reinforce the concepts it introduces throughout the remainder of the text. It requires about thirty hours of study.

**628 Graduate Research in Animal Physiology**
Fall and spring. Variable credit. Prerequisite: written permission of section chairperson and staff member who will supervise the work and assign the grade. S-U grades optional.

Similar to Biological Sciences 499 but intended for graduate students who are working with faculty members on an individual basis.

**Bio S 710–718 Special Topics in Physiology**
Fall or spring. 1 or 2 credits for each topic. May be repeated for credit. Enrollment in each topic may be limited. S-U grades optional, with permission of instructor.

Lectures, laboratories, discussions, and seminars on specialized topics.

***Fall 1990:*** **two topics are offered.**
**713 Cardiac Electrophysiology**
Fall, alternate years. 1 credit. S-U grades optional. R. Gilmour.

Survey of cardiac potentials, passive membrane properties, ion channels, and cardiac arrhythmias. Emphasis on non-linear dynamical aspects of cardiac electrophysiology and cardiac arrhythmias.

**717 Structure and Function of Joints with Emphasis on Arthritis**
Offered each fall. 1 credit. Undergraduate and graduate students. Lecture, 1 hour each week to be arranged. R 3:00, 828 Vet Research Tower. G. Lust.

***Spring 1991:*** **four topics are offered.**
**712 Homeostatic Regulation and Pathophysiology of Calcium**
Spring, alternate years. 2 credits. Lecture-seminar. R. Wasserman.

This lecture-seminar course will emphasize current views on the role of hormones, growth factors, and mitogenic factors in the control of the metabolism of calcium at the cellular and systemic level. Included will be a discussion of calcium transport mechanisms, the control of cellular calcium, and factors affecting bone formation, bone resorption, and bone remodelling. Disease states associated with the abnormal metabolism of calcium will also be discussed.

**714 Physiology of Pregnancy**
2 credits. Offered alternate years. P. W. Nathanielsz.

This is a seminar course covering aspects of maternal, placental, and fetal function. Emphasis is on fetal growth, respiration, neural and endocrine and cardiovascular function, myometrial activity, parturition and placental function.

**715 Acid-Base Relations**
Fall and spring. 2 credits. A. Dobson.

An independent study course.

**716 Regulation of Mitosis and the Cell Cycle**
Spring, alternate years. 1 credit. M 7:00 p.m., 828 Veterinary Research Tower. R. Silver.

This course will focus on regulatory mechanisms, Ca2+ regulation, metabolic pathways that exhibit cell-cycle-related periodicities, genetic biochemical and cell physiological studies of the cell cycle, and evidence for intracellular clocks and escapements.

**[718 Evolution of Color Vision**
1 credit. Seminar, 1 hour each week to be arranged. E. R. Loew. Not offered 1990–91.]

**720 Special Problems in Physiology**
Fall and spring. Registration by permission. Laboratory work, conferences, collateral readings, and reports. Adapted to the needs of students.

**726 Physiology I**
Fall. 3 credits. Limited to graduate students. Prerequisites: a course in cell physiology or biochemistry and a course in anatomy. By permission of the instructor. Letter grades only.

This course consists of the lectures only of VETPH 526. The subjects include the nervous system, muscle, blood, and cardiovascular, respiratory, and renal physiology.

**727 Physiology II**
Spring. 3 credits. By permission of the instructor. Prerequisite: VETPH 726. Letter grades only. T. R. Houpt and others.

A continuation of organ and systems physiology of domestic animals that includes acid-base relations and environmental physiology, simple-stomach and ruminant digestive systems, hepatic function, liver and metabolic physiology, endocrinology, and reproduction, with emphasis on medically relevant aspects. Lectures only.

**752 Biological Membranes and Nutrient Transfer (also Biological Sciences 618)**
Spring, alternate years. 2 credits. Prerequisites: courses in animal or plant physiology, quantitative and organic chemistry, and physics and permission of the instructor. Recommended: a course in cellular physiology. Letter grades only. Lectures, T R 11:15. R. H. Wasserman.

An introduction to elementary biophysical properties of biological membranes, theoretical aspects of permeability and transport, mechanism of transfer of inorganic and organic substances primarily across epithelial membranes, and characteristics and properties of transporting macromolecules and ion channels.

**[Bio S 753 Animal Biotechnology**
Fall. 3 credits. Prerequisites: two courses in physiology, two courses in biochemistry, and one course in endocrinology or nutrition. Lecture and discussion, M 11:15; laboratory, M 1:25–4:20; additional hours to be arranged. W. Hansel and staff. Not offered 1990–91.

A course in animal biotechnology designed to prepare students for research in animal genetic engineering. Standard techniques for cloning DNA in bacteria are discussed. Development of expression systems in bacteria, yeast, and mammalian cells; DNA sequencing and analysis; and insertion of DNA into mammalian cells are carried out in the laboratory.]

**[758 Molecular Mechanisms of Hormone Action (also Biological Sciences 658)**
Spring, even-numbered years. 2 credits. Minimum enrollment, 6 students. Prerequisite: permission of instructor. Lectures, T R 10:10. R. A. Corradino. Not offered 1990–91.

An advanced course developed from the current literature on endocrine mechanisms.]

**759 Nutrition and Physiology of Mineral Elements (also Biological Sciences 615 and 659)**
Fall, even-numbered years. 3 credits. Prerequisites: courses in basic physiology, intermediate biochemistry, and general nutrition. Lectures, M W F 9:05. R. Schwartz, course coordinator; D. R. VanCampen; R. H. Wasserman.

Lectures on nutritional aspects and physiological, biochemical, and hormonal relationships of the prominent macroelements and microelements, with emphasis on recent developments. Information is included on methodologies of mineral research and the essentiality, requirements, transport, function, homeostasis, interrelationships, and toxicity of various mineral elements.

**Fundamentals of Endocrinology (Animal Sciences 427)**
Fall. 3 credits. Prerequisite: human or veterinary physiology or permission of the instructor. Lectures, M W F 9:05. W. R. Butler.

The physiology of the endocrine glands and the roles played by each hormone in the regulation of normal body processes. Endocrine regulation of growth, metabolism, and reproduction is emphasized. Examples are selected from domestic species and humans.

Fundamentals of Endocrinology, Laboratory (Animal Sciences 428)
Fall. 2 credits. Each lab limited to 30 students. Prerequisite: concurrent registration in Animal Sciences 427 or permission of the instructor. Laboratory, T or R 1:25–4:25. W. R. Butler.

Laboratory exercises are designed to demonstrate hormonal mechanisms for each of the major endocrine glands. Laboratory techniques include animal surgery, blood collection, and hormone radioimmunoassay.

**811 and 812 Advanced Physiology Methods I and II (also Biological Sciences 811 and 812)**
Fall and spring. 2 credits each. Prerequisites: graduate student status or permission of course coordinator. S-U grades only. Lab to be arranged. Faculty of physiology.

This is a course primarily for graduate students in physiology and related disciplines. Experiments are carried out in the research laboratories of physiology faculty members to acquaint students with the latest techniques and methods in physiological research. Three modules are offered each semester by arrangement with the course coordinator. Enrollment is limited.

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