

*Leadership Training*  
*for veterinary students*

1991 PROGRAM



COLLEGE  
OF  
VETERINARY  
MEDICINE  
CORNELL  
UNIVERSITY



# **LEADERSHIP TRAINING PROGRAM**

**for**

**Veterinary Students**

**College of Veterinary Medicine  
Cornell University  
Ithaca, NY 14853  
(607) 253-3276**





*College of Veterinary Medicine,  
Cornell University*

For the past two years the College of Veterinary Medicine at Cornell University has hosted a Leadership Training Program for Veterinary Students. The program has three major objectives: 1) to acquaint participating students with career opportunities for veterinarians in academic institutions, government and industry; 2) to influence the career decisions of these individuals, and 3) to establish a professional network that would be useful to the students later in their careers. Seventeen students representing 13 veterinary colleges were enrolled in the 1991 program.

The program spanned ten weeks during the months of June, July and August. During this period, the student fellows worked individually or together on research projects in the laboratories of Cornell Veterinary College faculty. They also attended seminars and lectures and participated in a variety of professional enrichment activities that were developed specifically for the program. The program included an informal meeting to discuss ethical issues relating to the conduct of research; a day-long visit organized by scientists and health professionals at the research facilities of Merck & Co. in Rahway, New Jersey; and a three-day course at the Marine Biological Laboratory in Woods Hole, Massachusetts. Career counseling also was a feature of the training experience. Veterinarians who have achieved distinction as research scientists, teachers and administrators visited the College to discuss opportunities in veterinary medicine, and to advise the participating fellows in regard to their career objectives.

The 1991 program was sponsored jointly by the Geraldine R. Dodge Foundation and the Merck Foundation. In addition, recipients of fellowships from the Dorothy Russell Havemeyer Foundation participated in activities connected with the program and availed themselves of its networking features.

The College will track the program participants for the next several years with a view to ascertaining factors that influenced their career choices and whether the program was effective in promoting their professional development.

## PROGRAM EVENTS

<u>Date</u>	<u>Events &amp; Location</u>
June 9	Arrival
June 10	Orientation with Continental Breakfast, James A. Baker Institute for Animal Health
June 10	Tour of College of Veterinary Medicine and Cornell Campus
June 14	Welcome BBQ and Picnic, Baker Institute
June 19	Medical Ethics Discussion, Baker Institute
July 19	Career Counseling Day, Baker Institute
July 19	Program Dinner, Baker Institute
July 22-23	Visit to Research Facilities of Merck, Co., Inc. Rahway, New Jersey
August 5-8	Course in Developmental Biology, Marine Biological Laboratory, Woods Hole, MA
August 14	Student Presentations and Discussion of Research Findings
August 15	Program Review
August 16	Program Ended

## PARTICIPANTS

<u>Student</u>	<u>Sponsor</u>	<u>Mentor</u>	<u>Department</u>
Prema Arasu	Dodge	Prof. Appleton	Baker Institute
David Bainbridge	Dodge	Prof. Antczak	Baker Institute
Linda Berent	Merck	Prof. Sharp	Pharmacology
Allan Berger	Merck	Prof. Cerione	Pharmacology
Ben Blue	Merck	Prof. Ball	Clinical Sciences
Ian Davis	Dodge	Prof. Parrish	Baker Institute
Richard Ellis	Dodge	Prof. Bell	Baker Institute
Dianne Hellwig	Havemeyer	Prof. Appleton	Baker Institute
Judy Hickman	Dodge	Prof. Lust	Baker Institute
Sherwood Johnson	Merck	Prof. Cerione	Pharmacology
Tricia Lucia	Dodge	Prof. Carmichael	Baker Institute
Alison Moore	Merck	Prof. Cerione	Pharmacology
Alan Radford	Dodge	Prof. Appel	Baker Institute
Jean Reichle	Merck	Prof. Tennant	Clinical Sciences
Ann Marie Simmons	Havemeyer	Prof. Antczak	Baker Institute
Jodie Spencer	Merck	Prof. Guan	Pathology
Jessica Tajchman	Merck	Prof. Sharp	Pharmacology

The 17 students enrolled were selected on the basis of their academic record, motivation, and personal achievements — characteristics that mark them for leadership. They were a talented, interactive and energetic group of men and women who made remarkable progress during the ten-week period of the program. But let them speak for themselves.



**“CLASS OF 1991”**

## STUDENT REPORTS



**Prema Arasu**  
**Cornell University**

My education and professional training over the last 12 years has been intimately involved with the biological sciences and its research applications in animal and human parasitic diseases. On completion of a B.S. (Biochemistry) at the National University of Malaysia and a M.S. (Animal Science) at the University of Wyoming, I began building a niche in the field of molecular parasitology. A doctoral dissertation on the cytoskeletal genes of malarial parasites at Hahnemann University, Philadelphia, prepared me for postdoctoral studies at New England Biolabs, Inc. on the molecular biology and immunology of lymphatic filarial infections which are endemic to large areas of Asia, Africa and South America. I subsequently dived into the realm of developmental genetics at Harvard Medical School/Massachusetts General Hospital by studying cell lineage/timing genes in a free-living "worm." My current educational objectives are to be trained in clinical veterinary medicine with a view to developing a systems-oriented approach to animal health issues and to bring a well-rounded perspective to current veterinary problems in infectious disease research. In the context of my career goals, one terrific aspect of the Leadership Training Program was the opportunity to meet and discuss these issues with fellow students and leading veterinary medical scientists!

My summer research as a Dodge Fellow focused on molecular analyses of the excretory-secretory (ES) antigens of *Trichinella spiralis* (Tsp), the parasitic nematode responsible for the severe clinical symptoms of trichinosis. Work published in 1984 by my advisor, Professor Judith A. Appleton, together with Professor Douglas D. McGregor, had shown that rats immunized with ES antigens produced a dramatic protective response against Tsp. Other workers also demonstrated partial immunity in vaccinated pigs. To study the nature and function of these parasite proteins, I had previously constructed a Tsp expression library and identified various recombinant antigens with antisera generated against Tsp ES antigens.

Over the ten-week period of the program, I began characterizing these clones by DNA, RNA and protein analyses. We also successfully generated antibodies in rats against a recombinant clone (Em6) that encodes the putatively protective 45 kD ES antigen. Our next (big) step is to produce large quantities of purified Em6 protein, to immunize rats, and to then conduct challenge experiments to determine if these animals are indeed protected against Tsp.



**David Bainbridge**  
**Cambridge University**

I am a final year veterinary student at Cambridge University Veterinary School, England. I have a Bachelor of Arts degree in Zoology from the first three of my six years at that idyllic "ivory tower" of english academia. I am twenty-two, which to anyone in the U.S. veterinary system must

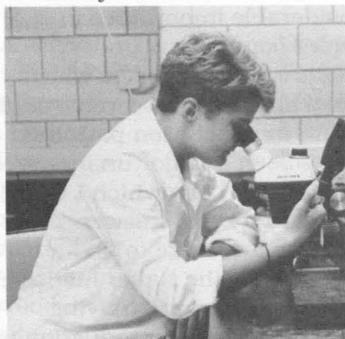
seem a rather young age to be nearly qualified. I applied to veterinary school because I saw it as the best path to the career of my dreams, working with endangered species. Since then my basic goals have changed little, although I have drifted towards special interests in immunology and reproduction — of considerable importance in species populations under pressure. The extent to which formal academic research would feature in my chosen path has always been a major unanswered question, and one which I came to Cornell to try and answer.

I was fortunate to find a laboratory at the Baker Institute actively engaged in studying immunology and reproduction in a species of which I am particularly fond: the horse (and its less glamorous but equally charming cousin, the donkey). Reflecting the wide spectrum of research conducted by Professor Douglas F. Antczak's group, I have had the opportunity to work in several areas. My project involved the use of a panel of monoclonal antibodies to equine lymphocyte antigens to study how lymphocytes in the blood of foals differ from those of their dams and sires. Not only are foals almost "overflowing" with lymphocytes, but there appears to be consistent differences between the cell populations of foals and adult horses. The foal immune system seems to be in a state of immaturity of unknown significance.

A second project was to help analyze data previously collected to determine if a disease called "Uveitis" in Appaloosa horses is related to the genes they carry for the MHC (the molecules involved in the presentation of foreign materials to the immune system). Finally, I spent three afternoons a week helping with the Equine Genetics Centre breeding herd. The latter experience improved my practical ability in equine reproduction inestimably.

My laboratory experience before I came to Cornell was negligible. Now I feel confident to enroll in a Ph.D. program. My

equine reproductive clinical ability was almost as limited as my research experience. Now I am confident to try my hand at that side of equine practice. Most of all, informal conversations with people at the Institute gave me a better understanding of how research can become a significant aspect of my career.

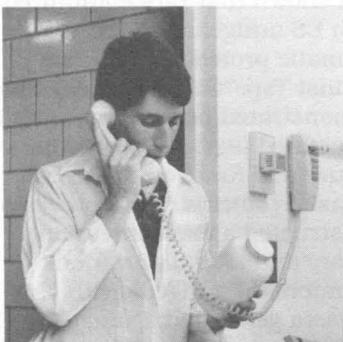


**Linda Berent**  
**University of Illinois**

I will be entering my second year at the University of Illinois - College of Veterinary Medicine. I received my bachelor of science in biology at the same institution in May of 1990. I do not have a formal plan of what I will do with my D.V.M. degree, except that I will most likely work with small animals. I had no previous research experience.

This summer I worked in the Department of Pharmacology in Professor Geoffrey W.G. Sharp's laboratory. There I studied the effect of the protein kinase C inhibitor H-7 on glucose induced insulin release, and time-dependent potentiation in isolated rat islets of Langerhans. Time-dependent potentiation in the beta cell is a process by which the beta cells "remember" that they have been exposed to glucose recently, and then respond more vigorously upon subsequent stimulation. This process is thought to be important in the fine tuning required to control blood glucose levels. The role of protein kinase C (PKC) in the beta cell is unknown, but PKC activity does increase when the beta cell is stimulated to release insulin. By selectively inhibiting the action of PKC, I hoped to see some change in the pattern of insulin release, and possibly an elimination of

beta cell memory. In order to study this, I learned how to isolate islets from the pancreas, construct and use a perfusion system, and how to perform a radioimmunoassay. The project was satisfying because I was able to choose my topic, design the protocol, do the experiments, and generate results all within my ten week stay at Cornell.



**Allan Berger**  
**Cornell University**

When I entered Cornell University's Animal Science Department as an undergraduate, my ambition was to be a practicing veterinarian. I worked in a research laboratory during the summers and completed an honors project involving receptor research in the Department of Pharmacology in the College of Veterinary Medicine. These experiences increased my interest in a research career. When I was accepted by the Veterinary College in 1989, I applied for admission into the D.V.M./Ph.D. program. For the past two years I have been working on my Ph.D. project during the summers and studying veterinary medicine during the academic year.

This summer I worked in Professor Richard A. Cerione's laboratory studying the vertebrate vision signalling pathway. The pathway has three components: rhodopsin, transducin and cGMP phosphodiesterase. Rhodopsin is the light receptor in the retina. When rhodopsin is stimulated by light, it transmits the signal into the rod cell and activates the guanine nucleotide binding protein (G protein), transducin. This activation involves catalyzing the exchange of GTP for GDP on

transducin. The activated transducin then stimulates the phosphodiesterase. The resulting decrease in the second messenger cGMP concentrations ultimately results in light perception. I have been using molecular biology techniques to better characterize the G-protein transducin. To this end, I have been constructing a prokaryotic expression vector for a related G-protein (Gi). This G-protein can be reconstituted with rhodopsin and the phosphodiesterase, and can be used to establish and test the structural domains of a G-protein that are important for the activities of the protein. The construction of an *E. coli* expression vector containing the cDNA for Gi has been a formidable task because it required ligating three different fragments of DNA. However, in trying to achieve this goal, I have gained experience in using a number of molecular biology-based techniques including plasmid preparations, cDNA transfection and expression approaches, and the use of the polymerase chain reaction (PCR).

The Merck Fellowship which supported me in these efforts provided the foundation for this research experience. I also found the exposure to research opportunities in industry to be an interesting and informative aspect of the program. The close contact with other veterinary students involved in similar research helped me to better define my career plans.



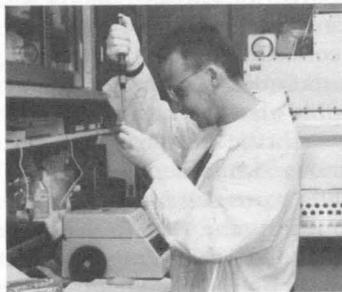
**Bentley Blue**  
**Colorado State University**

I received my undergraduate education at the University of Washington where I earned a

B.Sc. in Zoology in 1985. I then enrolled in a graduate program at Colorado State University and subsequently was awarded a M.Sc. for research aimed at improving the reproductive capacity of stallions and mares. I have a strong interest in equine sports medicine and hope to apply my research experience to the breeding and training of racehorses.

As a Merck Foundation Fellow working in the laboratory of Professor Barry A. Ball, I was engaged in studies aimed at improving procedures for equine in vitro fertilization. Techniques for providing capacitated spermatozoa and matured oocytes were refined. Fertilization in vitro was achieved. The research team of which I was a member also developed a method of culturing equine zygotes in vitro. The goal is to develop a technique that will enable embryos to mature to a stage when they can be successfully transferred to a surrogate mare.

The opportunity I had to work with researchers and clinicians who have conveyed an enthusiasm for applied research gave me valuable insight into the career for which I am preparing myself.



**Ian Davis**  
**Bristol University**

Since my school days, I have been interested in viral disease, and in particular HIV, the virus of AIDS. As a veterinary student at Bristol University, I have been involved to a minor extent in the study of its feline counterpart. While working last summer at the AFRC Institute of Animal Health, I was "bitten by the molecular bug," and have developed an interest in comparative techniques of vaccine production for HIV and FIV. Now

that I am in my final year, I am seriously considering graduate research in this field. I jumped at the chance of a Dodge Foundation Fellowship because it gave me an opportunity not only to see the U.S., but also to learn up-to-date research techniques in one of the top laboratories at one of America's premiere universities.

My project, under the guidance of Professor Colin R. Parrish, involved many techniques of DNA and RNA manipulation of which I had no prior experience. Its main aim was to characterize precisely how several genes are possessed by canine parvovirus (CPV), the agent responsible for one of the most important infectious diseases of canines.

A closely related murine parvovirus has four genes: two coding for capsid proteins (VP-1 and VP-2), and two for non-structural products (NS-1 and NS-2), but so far only the first three have been identified in the canine virus, CPV. Using recombinant DNA techniques, I produced plasmid constructs from the various regions of the CPV genome which seem likely candidates for the fourth gene. The fusion proteins produced by bacteria transfected with these plasmids will subsequently be used to immunize rabbits, and the antibodies thus raised utilized in the detection of any NS-2 gene product produced in virally infected cell cultures.

I also produced viral RNA extracts and used these to create a cDNA library for amplification by the polymerase chain reaction. The products obtained are being used to sequence splice sites within the genome, which so far have never been characterized. This work is fundamental to understanding the pathogenesis and host-specificity of CPV. Since the project has been so successful, I am hoping to return to Cornell at Christmas to continue this investigation, with a view to generating the additional data needed for publication.

I enjoyed my time at Cornell immensely, and have learned a great deal about research. I had a chance to meet like-minded

veterinary students from "across the pond," to work as part of a team, to host meetings and give short presentations, and to critically assess scientific publications. And I still had time to travel within New York State, and to indulge all my other interests. It was a truly memorable summer.



**H. Richard Ellis**  
**Colorado State University**

I completed a B.S. in Computer Science at the University of Michigan in 1986. After working for a company that writes computer aided design/manufacturing software for three years, I decided to return to school to study veterinary medicine. I spent a year at Colorado State University completing prerequisite courses and enrolled in the College of Veterinary Medicine and Biomedical Sciences at Colorado State University in the fall of 1990. I am now ready to start my second year of veterinary school. My only other research experience prior to this summer was in a mycology laboratory where I was engaged in studies of the molecular biology of yeast.

My interests are eclectic. They include brewing beer, growing carnivorous plants, folk music, experiencing the outdoors and collecting comic books. I'm not sure exactly what my career goal is. Participating in this program was helpful in determining whether research would suit me. I'm leaning toward a career in academia where I could combine research with teaching and possibly clinical work (it seems like a good blend for someone who can't make up his mind).

Basically I want to do everything.

My research this summer was conducted in Professor Robin G. Bell's laboratory. I performed in situ hybridization in rats to track the production of various cytokines such as IL4 and TGF Beta and determine which cells are producing these lymphokines during *Trichinella spiralis* infection. Unfortunately, I ran into a snag with my technique. I've spent most of my time trying to isolate the problem and get around it. My main result was verifying that this is indeed a problem! Despite these discouraging results, I learned a great deal about techniques for working with RNA, immunochemistry, laboratory rats, operating a Cryostat, and a lot about the immunology of the gut (it's not all Peyer's patches).

I believe that the Leadership Training Program is an excellent way for veterinary students to expose themselves to animal health related research, and to meet people who are active in and excited about research. The organizers did an excellent job making me feel important as an individual and they took a sincere interest in how I felt about this experience.



**Dianne Hellwig**  
**Iowa State University**

My inclinations have guided me towards work that involves animal handling and care, as well as using practical approaches to solve problems. Although veterinary medicine has always been in the back (or forefront) of my mind, I decided to obtain a doctorate in Animal Science, working in the area of poultry disease research. I will be entering my second year in

veterinary school at the University of Iowa this fall and am delighted with the prospect of adding more letters to the end of my name. My graduate work has given me a unique perspective on veterinary studies, which, in turn, has added a broader dimension to my training.

As an applicant to the Leadership Program, my objectives were to obtain research experience with a species other than (anything but) poultry, to learn new techniques and to meet veterinary students from other parts of the U.S. and the world. My summer experience more than met my expectations. I had the opportunity to work in Professor Judith A. Appleton's laboratory propagating monoclonal antibodies against horse immunoglobulin sub-types. Eventually these may be used to obtain a profile of the horses' humoral immune response to infectious agents. In addition, I was able to obtain valuable practical experience with reproductive management of horses, ponies and donkeys.

My career goals are not yet "set in stone." My experiences at the Baker Institute afforded me the opportunity to see how people with similar credentials have utilized their training in veterinary medicine. I am optimistic that there will be a niche for someone like myself, whether it be in academia, industry, or practice.



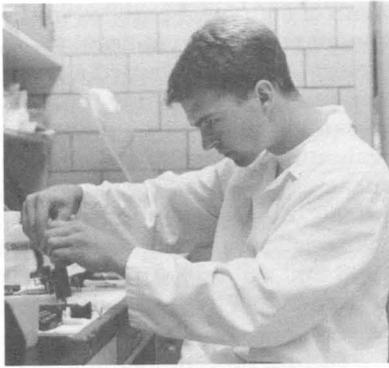
**Judy Hickman**  
**University of Georgia**

During the year and nine months that I worked as a research technician in Pediatric Biochemistry in a children's hospital, I gained experience in handling laboratory animals and using them as research models for

human disease. My respect and love for animals coupled with my interest in medical science makes veterinary medicine an ideal choice for me. As a junior at the University of Georgia, I continue to find that veterinary medicine allows for a wide range of interests and personal growth. The fact that veterinary science is an evolving field ensures my continued education both during training and for the rest of my career. My major interests at this time include teaching and research. I have great interest in animal models of disease and in the moral and ethical questions concerning research. The use of animals in research provides necessary information that cannot easily be obtained in other ways. I have a strong conviction that veterinarians need to be more involved in this aspect of animal use.

My project as a Dodge Foundation Fellow was to conduct research on osteoarthritis under the direction of Professor George Lust and Dr. Nancy B. Wurster. My task was to develop a protocol for isolating dermatan sulfate from normal canine articular cartilage. Dermatan sulfate is a proteoglycan thought to be increased in osteoarthritic cartilage along with fibronectin. The reason for (and the consequences of) the accumulation of fibronectin and possibly also dermatan sulfate in osteoarthritic cartilage are unknown, but recent reports in the literature suggest that fibronectin may bind to dermatan sulfate. Isolated dermatan sulfate could be used to make antibodies which in turn might be used to quantify this proteoglycan in normal and in osteoarthritic animals thereby contributing significantly to the understanding of osteoarthritis.

My fellowship gave me the opportunity to work with and talk to veterinarians actively pursuing careers in research, and it gave me insight into other aspects of veterinary participation in research and related areas. It also enabled me to interact with peers with different educational backgrounds and personal experiences.



**A. Sherwood Johnson**  
North Carolina State  
University

I am a second year veterinary student at the North Carolina State University College of Veterinary Medicine. I obtained my B.S. in Chemistry at Pomona College in Claremont, CA. During my time at Pomona, I participated in research on organometallic reaction pathways and in computer modelling of potential carcinogens and cancer drugs using quantitative structure-activity relationships (QSAR), the latter work resulting in a published paper. I completed my undergraduate thesis on the development of a synthetic enzyme model for  $\alpha$ -chymotrypsin. I also developed an analytical method for the study of sea-surface microlayer carbohydrates at picogram levels while on a summer student fellowship at the Woods Hole Oceanographic Institute.

During a year off between my undergraduate and veterinary education, I did research at the Institute for Animal Health in the world reference laboratory for foot and mouth disease in Pirbright, England, and worked for two mixed animal practices. I am seriously considering a Ph.D. training program in biochemistry (possibly at Cornell) following veterinary school, and am currently torn between practice, research, and academics. The Leadership Training Program helped to clear up this confusion, and increased my awareness of many career options.

This summer, as a Merck Foundation Fellow, I conducted research in the Department of

Pharmacology in Professor Richard A. Cerione's laboratory. My project was concerned with cellular growth stimulation and regulation mechanisms in an attempt to better understand the abnormal biochemical processes resulting in cancer formation. Specifically, I began the summer doing Western blots on eukaryotic cell lysates to screen for the presence and activity of the rat oncogene, *neu*. *Neu* is a transmembrane receptor that is largely homologous to other, better characterized, receptors such as epidermal growth factor receptor (EGFR) that are involved in growth stimulation and regulation and in pathways related to cancer formation. In fact, *erbB2*, the human homolog of *neu*, is overexpressed in a significant proportion of women with breast cancer. The biochemical data obtained in this manner were correlated with previously observed morphological data in cells containing *neu*, EGFR, etc. and exposed to growth factors such as EGF and NGF. Thus, *in vivo* information was obtained to complement *in vitro* research also being carried out.

Upon learning more about the project, my interests turned towards *neu*, itself, and finding its as yet undiscovered ligand. Thus, my second project involved the cloning of *neuN* and *neuT*, the normal and transforming (cancerous) forms of *neu*, into *E. coli* for eventual transfection into insect cells for large scale production. These compounds could then be used in *in vitro* studies of *neu* and its pathways, and in attempts to identify the ligand in serum, cell membrane preparations, etc., for which *neu* is a receptor.

During the ten-week period of my fellowship, I successfully cloned *neuN* into *E. coli*. Although I did not see the project through to completion, I learned many new techniques and had the opportunity to work in an exciting, fast-paced field with a TERRIFIC group of people. Rick Cerione's laboratory is very interactive and supportive, and the people in it are full of energy, among other

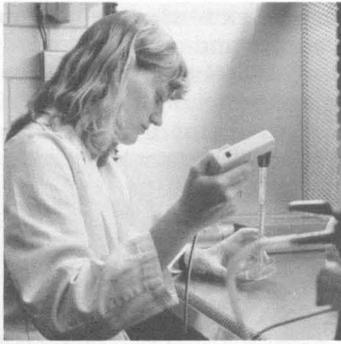
things. Rick is approachable and supportive and puts his colleagues' concerns well above his own needs.



**Patricia Lucia**  
Cornell University

I completed my B.S. in Microbiology from the University of Rhode Island in 1984. Although I was interested in veterinary medicine at the time, I decided to first attend graduate school. I was awarded a Ph.D. in Microbiology and Molecular Genetics from Harvard Medical School in 1990. My thesis was concerned with the entry mechanisms of reovirus, a nonenveloped, segmented RNA virus. Since I was still interested in the clinical aspects of science, I began my veterinary studies at Cornell immediately after finishing my doctorate. I have not yet decided if my career will focus on research or clinical sciences, but I do know that I would like to remain involved with clinical problems.

This summer I worked on a research project in Professor Leland E. Carmichael's laboratory. I worked with MVC (minute virus of canines), a virus which causes abortions in dogs. Since MVC is not easily detected in tissue samples, a DNA probe would greatly aid in its identification in clinical cases. My project was to clone the virus and generate such a probe. This summer I added to my knowledge of molecular biology, and I enjoyed working on a research project which had a short term, practical goal.



**Alison Moore**  
**Ontario Veterinary College**

I enrolled at the University of Guelph in 1987 and, after completing one year of general science, was accepted into the D.V.M. program at the Ontario Veterinary College, also in Guelph. I am presently entering my third year of training.

During the summer following my pre-veterinary year, I embarked on a path that would lead me to three summers of research in developmental biology. I studied bovine embryonic and fetal development and designed a laboratory manual for a course entitled, "Medical Embryology." I also aided other researchers in their work on bovine embryonic development and in vitro culture of oocytes and embryos. The following summer I was appointed to a position at the Metropolitan Toronto Zoo. There I had the opportunity to work on in vitro fertilization in the domestic feline as a model for endangered animals. Animal conservation and propagation is an area in which I hold a strong interest.

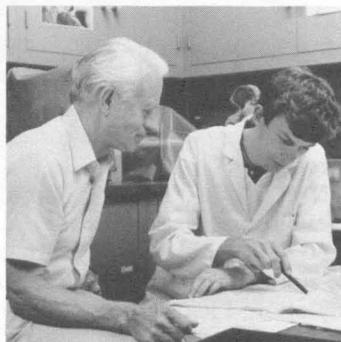
As a Merck Foundation Fellow, I conducted research in the Department of Pharmacology at Cornell under the supervision of Professor Richard A. Cerione. My work entailed studying the morphological and biochemical effects of the neu oncogene in rat pheochromocytoma cells (PC12 cells). Much of my work involved developing optimal growth conditions for cells containing neu and the transforming version of the oncogene. Technically, this involved growth tests and morphological analysis of cells grown on different substrates and exposed to growth factors, namely

epidermal growth factor (EGF) and nerve growth factor (NGF). The biochemical studies involved Western blot analysis to locate the presence of phosphotyrosine activity.

The Leadership Training Program was important for me, not only for the valuable exposure to high-paced research in an exciting field, but also for the opportunity it offered to meet veterinary students from different parts of the world and discuss how their D.V.M. programs are designed. This is important for future consideration about graduate work and can help one recognize and possibly improve weaknesses in one's own program.

Being with students of my own age who had similar aspirations was very exciting, as was knowing that I now have contacts throughout the world. I have also opened my eyes to other career opportunities through talking with other student fellows and visiting Merck & Co.

My experience in Rick Cerione's laboratory gave me insight into how a large research unit can be organized in a way that enables individuals to work independently while supporting one another in mutually beneficial ways. Rick takes everyone's hardships and successes to heart and gives the most of himself to ensure that the laboratory runs smoothly and successfully. He is a great person from whom to learn. He is also an awesome basketball player!



**Alan Radford**  
**Liverpool University**

I began my veterinary training at Liverpool University in England in 1987. After completing three

years of courses, I enrolled in the honors program in Molecular Biology and was awarded a B.Sc. this year. As part of my thesis research, I developed a model for evaluating the health risk of releasing genetically engineered *B. subtilis* into the environment. I will receive my veterinary degree in 1993 and will seek further training to prepare me for an academic career.

During my summer at Cornell as a Dodge Foundation Fellow, I was engaged in canine Lyme disease research under the direction of Professor Max J.G. Appel. The project goal was to develop an experimental model for the study of Lyme disease. I gained experience working with animals (which made me question my viewpoint on animals used for research), and with techniques of pathology and immunocytochemistry. I also acquired tissue culture skills and experience in manipulating DNA. As a student from England, I obtained insight into the training of veterinary students in America and the opportunities for an English graduate in this country. Last but not least, I made many contacts and good friends.



**Jean Reichle**  
**Ohio State University**

I grew up surrounded by cats, dogs, horses, fish, even a few exotic and wild animals as pets, and most importantly, the veterinary care they required. I started riding at the age of five and quickly became acquainted with many lamenesses prevalent in the equine athlete. Early on, I was greatly impressed with our "leg

man," Dr. Tim Cordes, a veterinarian who treated our lame horses. A horse of mine in an accident with a fence (the horse had severe neurological injury and was euthanized 24 hours later) inspired me to be more than a "lameness god" but to have a good understanding of the mechanisms of injury and disease. Two additional animals, a mare with pneumonia and pulmonary abscesses and a cat in gentocin-induced renal failure, inspired me to do more than just practice in a clinic: I wanted to prevent or be able to better treat cases such as these.

The Ohio State University (OSU) College of Veterinary Medicine accepts four New Jersey residents each year. I was one of these. Attending OSU as an undergraduate was a great opportunity to get a feel for the veterinary college as well as experience life in the midwest at one of the largest universities in the nation. I was accepted after three years of enrollment in the OSU College of Agriculture as an animal science major.

While an undergraduate, I worked for a reproductive physiology graduate student performing progesterone radioimmunoassays and heat checking dairy heifers. Next I worked with Dr. George Haibel, a board-certified theriogenologist and food animal clinician at OSU. With him, I ultrasounded goats and sheep, llamas, and miniature horses transabdominally for diagnosis of pregnancy and estimation of fetal age. I also worked at a Standardbred breeding farm which gave me exposure to artificial insemination and problems frequently encountered in the broodmare and foal.

Veterinary college is extremely stimulating to me; sometimes I think I could stay in school forever and just continue learning! The more I encounter, the more my interests change. My career goal involves obtaining a residency in either theriogenology or radiology (with a strong interest in ultrasonography) and doing clinically-oriented research in

either or both of these fields. I have been interested in sharing my knowledge and feel academia may be the place for me; the university setting is continually stimulating, scientifically and culturally.

The Leadership Training Program at Cornell seemed like a wonderful and rare opportunity. It helped me to understand the basics of research, such as identifying a problem, setting up a protocol, performing experiments and analyzing the results. Working in Professor Bud C. Tennant's laboratory I had the opportunity to acquire skills in histochemistry by applying these techniques to liver sections of woodchucks, some infected with woodchuck hepatitis virus, a carcinogenic virus similar to that of Hepatitis B virus in humans. My work involved staining liver tumors and pre-cancerous lesions for gamma-glutamyl transpeptidase, a membrane-bound enzyme which increases in the serum in individuals with cancer, and may help identify pre-cancerous lesions.



**Ann Marie Simmons**  
**North Carolina State University**

I received a B.S. in Zoology from North Carolina State University and will begin my sophomore year in veterinary college this fall. Before coming to Cornell, I worked in several veterinary practices, but my research experience was minimal. The Havemeyer Fellowship that I was awarded this summer allowed me to gain that experience. I now see research as an option for my veterinary career.

My project involved isolating

mitochondrial DNA from horses, donkeys, mules and hinnies. Because mitochondrial DNA is inherited maternally, it is possible to distinguish mules (horse mother and donkey father) from hinnies (donkey mother and horse father) by examining the restriction enzyme fragment lengths of their mitochondrial DNA. Mules should have horse mitochondrial DNA and hinnies should have donkey mitochondrial DNA. I isolated mitochondrial DNA from a group of horse-donkey hybrids of unknown parentage and found that all were mules.

I also participated in managing the Equine Genetics Center breeding herd. I gained experience in rectal examinations, ultrasound, artificial insemination, and management of horses that are part of a research program of the kind organized by my supervisor, Professor Douglas F. Antczak.



**Jodie Spencer**  
**Michigan State University**

I completed three years undergraduate education in the basic sciences at Michigan State University. This fall I will enter my junior year of veterinary school in the same institution. I have tentative plans to pursue an internship or clinical residency after graduation. My previous research experience was as a summer fellow in the Biomedical Student Research Program at Michigan State. During that period I was engaged in research on Lyme disease in the parasitology laboratory of the Animal Health Diagnostic Laboratory.

Through Cornell's Leadership

Training Program for Veterinary Students I had the opportunity to work in Professor Jun-Lin Guan's laboratory in the Department of Pathology. My project involved exploring biochemical mechanisms underlying the metastasis of cancer cells. Specifically, I measured changes in intracellular protein phosphorylation when fibroblasts bind to an extracellular matrix through receptors called integrins. I used a wide variety of research techniques such as Western Blotting, immunoprecipitation, tissue culture and transformation of *E. coli*. The most valuable aspect of the program was the opportunity to discover the advantages and disadvantages of academic research. I would recommend this program to anyone considering a career in biomedical research.



**Jessica Tajchman**  
**Kansas State University**

In the fall of 1991, I will begin my third year in the College of Veterinary Medicine at Kansas State University. My interests lie primarily in food animal medicine, and I look forward to a career involving clinical practice, teaching and research in that area.

As a Merck Foundation Fellow, I had the opportunity to work in Professor Geoffrey W.G. Sharp's laboratory. My first week there consisted of reviewing the research of others, reading in the area of beta pancreatic islet cell secretion. I then developed a hypothesis that formed the basis of my own research. My project was concerned with the long-term effect of TPA, an active phorbol ester, on isolated rat pancreas islets. Specifically, I measured the

effect of down-regulation of Protein Kinase C on priming of the beta cell and glucose-stimulated insulin secretion.

During my ten-week stay, I learned several techniques including isolating rat islets, perfusion, and radioimmunoassay. I also improved my communications skills both verbally and written in composing and analyzing the data I accumulated.



*Cooling off in one of Ithaca's State Parks*

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