2001 Leadership Program for Veterinary Students

A Commitment to Excellence

Cornell University's College of Veterinary Medicine has hosted a summer leadership program since 1990. The program's tradition of excellence has drawn thousands of applicants, but only 255 of the most promising students representing 49 veterinary colleges worldwide have been selected to participate. Although the life experiences, culture, and academic backgrounds of program fellows are diverse, all have completed at least one year of professional study and are recognized as possessing both the motivation and ability to become future leaders in academic veterinary medicine and the life sciences at large.

Research is the foundation of the Leadership Program for Veterinary Students. Leadership Program fellows conduct research in state-of-the-art facilities and the unsurpassed intellectual environment of an Ivy League university. They also participate in carefully designed modules, workshops, and discussions facilitated by distinguished consultants. Topics range from biomedical ethics and career exploration to leadership and its associated responsibilities. Fellows gain further insights on field trips to federal research facilities.

The Leadership Program, now in its twelfth year, has fulfilled its principal objective—to provide future veterinary medical leaders with unique learning experiences that both clarify and strengthen their commitment to a career in science. A legacy of the program has been the creation of a network of animal health professionals who have the motivation and ability to advance the veterinary profession, contribute to the discovery process, and nurture the professional development of more junior colleagues who have similar career aspirations.

Douglas D. McGregor, MD, DPhil
Program Director
Acknowledgements

The Leadership Program for Veterinary Students is made possible through awards from federal agencies, corporations, foundations, and other private-sector sponsors. For their generous support this year, the program organizers thank:

The National Institutes of Health
The Merck Company Foundation
Pfizer Inc
Bayer AG
The Marilyn M. Simpson Charitable Trust
The Wellcome Trust
The Albert C. Bostwick Foundation
The R. K. Mellon Family Foundation
The Auxiliary to the New York State Veterinary Medical Society

The program organizers also thank the facilitators, counselors, and mentors who took part in the 2001 program. Thanks, too, to college staff members Ms. Diane Colf, Ms. Alexis Wenski-Roberts, and Mr. David Frank for their assistance. Special thanks to Dr. David Fraser and program coordinator Ms. Nicole Boosembark.

Finally, the organizers congratulate the Leadership Program fellows themselves. Their academic excellence coupled with their dedication to discovery and service mark these extraordinary individuals as future leaders of the veterinary profession.
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2001 Leadership Program Agenda

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June 6  Library Orientation
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June 7  Radiation Safety Training
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2001 Leadership Program Activities

The Leadership Program combines faculty-guided research with on-campus learning modules, workshops, group discussions, and field trips to federal research facilities. The activities are student-driven. All encourage responsible leadership; the development of analytical, critical-thinking, and teamwork skills; and an awareness of ethical issues related to the proper conduct of research.

Research

Independent research is the foundation of the program. Each fellow is assigned a research project and a faculty mentor to guide his or her investigations. The projects enable students to gain practical experience in using investigative methods to explore problems of interest to them. Participation enables the fellows to observe the way in which a world-class research laboratory utilizes its professional and material resources. Fellows gain public-speaking experience by participating in group modules and presenting their research findings in a public forum at the conclusion of the program.

Ethics

Ethical issues connected with the proper conduct of research are subjects of a formal discussion. This year's fellows were provided with videotapes and printed materials that raised issues concerning the sharing of research data. The discussion was moderated by Dr. David Lee.

Leadership

Leadership and its associated responsibilities are a central consideration in the Leadership Program. Critical thinking and decision-making are featured in the context of a module that raises veterinary, public health, economic, political, and social issues. The architect and moderator of this year's module, Dr. David Fraser, was assisted by Dean Donald Smith, Dr. Patricia Chisholm, Mr. Robert Neimeth, and Dr. David Sargan. The 25 students and four facilitators each were assigned a role that obliged them to state, defend, and sometimes alter their positions as details of the scenario were revealed. At the conclusion of the module, the facilitators commented on the exercise and discussed leadership principles that have guided their own careers.
Program Activities continued

Career Exploration

Six meetings scheduled during the ten-week program addressed various aspects of career planning. Drs. David Fraser, Michelle Haven, David Lee, and Susanna Ryan commented on the range of careers open to veterinary graduates. On two other occasions, the students and guest facilitators explored research careers in industry. Dr. Gerard Hickey described career opportunities for veterinarians in a research-intensive pharmaceutical company using Merck as an example. In a separate meeting, Drs. Michelle Haven and Donald Mann, both of Pfizer, engaged the fellows in an exercise that encouraged creativity and teamwork in resolving assigned problems connected with the discovery, development, and marketing of drugs. Still other career discussions focused on residency, graduate research training, and the reconciliation of personal and professional responsibilities during a protracted period of postgraduate study. All emphasized the need to make informed decisions. The discussions were facilitated by members of Cornell’s veterinary college faculty and staff, including Drs. Susan Bliss, Stuart Bliss, James Flanders, Lisa Fortier, James MacLeod, Douglas McGregor, Rodney Page, and Kenneth Simpson. Dr. Franziska Grieder, from the NIH, took part in the meeting concerned with graduate research training.

Emerging Diseases

A workshop on emerging infectious diseases has become a signature module of the Leadership Program. The proceedings this year were organized by Drs. Colin Parrish and Frederick Murphy. The participating fellows selected four examples from a prepared list of diseases that illustrated principles of disease emergence. They then assembled themselves into groups, conducted library research on the selected topics, and engaged their peers and the two facilitators in animated discussions. The event was filmed for archival purposes and with a view to sharing the workshop proceedings with veterinary students in other institutions.
Cornell's Partnership with the National Institutes of Health

Topics and Speakers

Welcome and Introduction Dr. Richard Wyatt, Executive Director, NIH Office of Intramural Research

The Cornell/NIH Partnership Dr. Douglas McGregor, Professor of Immunology, College of Veterinary Medicine, Cornell University

Myosin V: A Processive Motor for Vesicle Transport Dr. James Sellers, Chief, Section on Cellular and Molecular Motility, Laboratory of Molecular Cardiology, National Heart, Lung, and Blood Institute

Migration of LHRH Cells from Nose to Brain Dr. Susan Wray, Chief, Cellular and Developmental Neurobiology Section, National Institute of Neurological Disorders and Stroke

Animal Models and AIDS Vaccine Development Dr. Gary Nabel, Director, Vaccine Research Center, National Institute of Allergy and Infectious Diseases

Hematopoietic Gene Therapy in Nonhuman Primates Dr. Robert Donahue, Director, Simian Gene Transfer Program, National Heart, Lung, and Blood Institute

Neuronal Mechanisms of Attention Dr. Robert Desimone, Scientific Director, National Institute of Mental Health

The National Institutes of Health and the College of Veterinary Medicine at Cornell University have forged a partnership that offers program fellows an opportunity to learn about government research at the highest level. This year's fellows gathered at the NIH for a full day of scientific presentations and discussions. Speakers included distinguished scientists and administrators drawn from the agency's intramural research program.
The USDA and Animal Agriculture

The United States Department of Agriculture has been both a sponsor and a participant in the Leadership Program. This year's fellows visited the USDA's Animal and Natural Resources Institute in Beltsville, Maryland. There they learned about research activities and opportunities for advanced training at the Institute.
Topics and Speakers

Introduction to the Beltsville Agricultural Research Center Dr. Thomas J. Sexton, Institute Director

Transgenesis Dr. Robert Wall, Gene Evaluation and Mapping Laboratory

Neosporiasis and Abortions in Cattle Dr. J. P. Dubey, Parasite Biology, Epidemiology, and Systematics Laboratory

Control of Nematodiases in Cattle by Rotational Grazing Dr. Louis Gasbarre, Immunology and Disease Resistance Laboratory

Ecologically Based Technologies for Controlling Deer Ticks Dr. Dolores Hill, Parasite Biology, Epidemiology, and Systematics Laboratory
Presentations and Prizes

The student fellows discussed their research in a series of presentations over two days at the conclusion of the program. A book prize was awarded to Robin Yates for the best overall project as judged by the underlying hypothesis, project design, research results, and presentation. Additional prizes were awarded to Timothy Myshrall, Simon Starkey, and Stephanie Janeczko for exceptional projects in integrative biology, cell biology, and molecular biology, respectively. The Selection Committee for the 2001 Leadership Program salutes these individuals and congratulates all the fellows for their commitment to research and the excellence of their presentations.

Program Prize
Robin Yates: *The U,33 Protein of Herpes simplex Virus Type 1*

Integrative Biology Prize
Timothy Myshrall: *Effects of Mastitis on Milk Yield in Dairy Cows*

Cell Biology Prize
Simon Starkey: *Integrin Binding Proteins*

Molecular Biology Prize
Stephanie Janeczko: *Localization of Yeast Rabs in Mammalian Cells*
Danielle Cain  
North Carolina State University; Reproductive Biology

Effect of Embryo Culture Conditions on Embryo Viability

During the summer preceding my first year at North Carolina State University, I was a keeper at the Carnivore Preservation Trust in Pittsboro, North Carolina. This experience sparked my interest in reproduction of endangered species and led me to apply to the Leadership Program.

Many factors contribute to the successful rearing of a wild animal. Behaviorists are studying the environmental factors needed to breed healthy, happy animals. For some species, however, the time to determine those needs is running out. New reproductive techniques may be our last resort in the fight to preserve endangered species.

This summer, I conducted research in the laboratory of Dr. Jonathan Hill on the effects of embryo culture conditions, nuclear transfer, and in-vitro fertilization on embryo viability. Terminal deoxynucleotidyl transferase-mediated dUTP nick end labeling (TUNEL) and total cell counts were used to determine embryo viability. The hypothesis that embryo growth is hindered by metabolites produced by epithelial cells lining the uterus was not supported by the results. We also determined that fetal calf serum, a frequent component of culture media, had negligible effects on the growth of cultured embryos. In addition, we observed that cells of nuclear-transfer embryos underwent apoptosis more often than similarly cultured cells of in-vitro fertilization embryos.

I have considered pursuing a residency in theriogenology, internal medicine, emergency medicine, or zoo/wildlife medicine, but it is too early in my education to decide on an area of specialization. I would like to combine research and teaching into a primarily clinical position. The Cornell Leadership Program has helped in three outstanding ways: 1) it focused my career path; 2) it expanded my view of veterinary medicine to a global scale with modules such as Dr. Fraser's leadership discussion and the Emerging Diseases Workshop; and 3) I have lived with the most interesting, talented, and impressive people whom I hope to call friends for life.

I especially want to thank Dr. Hill for his patience and instruction, and for sharing his expertise as a researcher.
Julie Chevrette  
University of Montreal; Cell Biology

Refractory Cellular Response to Erythropoietin

I have always been fascinated by medical science, and this is part of the reason why I decided to enter veterinary medicine. After agreeing to put up the Leadership Program’s poster in my classroom, I thought that the program might provide a nice opportunity for me to improve both my research skills and my English. I must admit that I was also really interested in the participation of international veterinary students in this program because I love to travel and to meet new people.

This summer I had the privilege of working in Dr. James MacLeod’s laboratory at the Baker Institute. The goal of my project was to determine why erythroid progenitor cells become refractory to mitogenic stimulation at high erythropoietin concentrations. In order to answer this question, I used an in-vitro bioactivity assay based on the incorporation of tritiated thymidine into newly synthesized DNA of murine erythroid cells. I demonstrated that components found in the diluent, such as benzyl alcohol, and not high erythropoietin concentrations, inhibit the proliferation of erythroid cells when present in high concentrations in the culture medium. Data from our experiments provided a definitive answer, but not the one we had originally considered. Such unexpected results are what make scientific discovery so much fun.

With its career discussions, workshops, and research, the Leadership Program has made me aware of career opportunities and has given me ample skills for the future. I am also confident that this program will help me to choose my own career path.

Sincere thanks to Dr. MacLeod and his research team for making my time here enjoyable and for providing me with help, support, and guidance. I would like also to thank Dr. McGregor for giving me this unique opportunity. Finally, this program would not have been the same without my Leadership Program colleagues. I wish them all a successful and happy life.

Yohann Glennie  
Royal Veterinary College; Bacteriology

Antibiotic Susceptibility of Staphylococcus aureus in Organic Dairy Herds

As a final-year student at the Royal Veterinary College in London I applied for admission to the Leadership Program in order to explore aspects of the veterinary profession not fully covered in the basic veterinary curriculum. The Program offered a valuable insight into the world of research and exposed me to other avenues for continuing veterinary education and possible career paths.

During my time at Cornell, I worked alongside Dr. Linda Tikofsky and Dr. Ynte Schukken from the Quality Milk Promotion Service. My project involved studying antibiotic susceptibility patterns of Staphylococcus aureus isolates from organic dairy herds by means of the Kirby-Bauer Disc Diffusion method. Using statistical tests, we then compared these results to those obtained previously from matched conventional herds. The objective was to investigate the potential difference in resistance related to the extent of antibiotic use. The project was useful in teaching me various laboratory skills as well as in providing a more in-depth view of mastitis and antibiotic resistance. I was also able to take part in a two-week-long mastitis elective and to witness aspects of dairy farming in New York.

In addition to helping me decide on a future career, the Leadership Program has shown me the huge breadth of opportunities that a veterinary degree provides. Each new talk filled me with excitement at the potential challenges ahead. I now feel better equipped to make informed decisions on a continuing veterinary or medical education, although I still initially plan to experience clinical practice.

I wish to thank Dr. Tikofsky and Dr. Schukken for their constant support and good cheer. I am also very grateful to Dr. McGregor, the Wellcome Trust, and especially the other Leadership students for making this a truly memorable and rewarding experience.
Megan Green
Auburn University; Animal Behavior

Effects of Castration on Behavior Problems in Dogs

When I first heard of the Leadership Program, I was in the middle of my first year at Auburn University in Alabama, and I simply wanted to learn about my chosen topic of animal behavior. Fortunately, I have gotten a lot more than I bargained for. I was bitten by the research bug, and am now planning on undertaking a PhD upon graduation from veterinary school. My long-range plans include possibly working for a pharmaceutical company or pursuing a government research career.

I worked with Dr. Katherine Houpt in a number of areas this summer. Our study evaluated common behavior problems in dogs before and after castration as well as changes in appetite and activity level. Behavioral problems evaluated included the presence of roaming, marking, and mounting, as well as aggressive behaviors toward humans and other animals. In addition to my project, I was able to assist Dr. Houpt's other students on projects studying such behaviors as cribbing in horses. I also worked with cases referred to the Animal Behavior Clinic for consultation and took an active role in questioning clients, diagnosing disorders, and planning treatment regimens.

My experience here has been invaluable, and the Leadership Program has given me the tools to accomplish much in my career. Dr. Houpt has been a wonderful mentor and taught me a great deal. The other modules in the program have helped to teach me the intricate maneuvering required to have a successful professional career in science. I have gained important skills in leadership, scientific research, and career planning. I will also forever treasure the friendships I have made this summer with my colleagues from around the world.

Jocelyn Hawkins
Cornell University; Ion Transport

Renal Management of Magnesium: The Killifish Kidney Model

I am entering the second year of the veterinary curriculum at Cornell. During my first year, an instructor mentioned the Leadership Program to me. At the time, I realized I would not be satisfied working in a practice for the rest of my life, and I sought to discover other career possibilities for a DVM graduate.

Fortunately, I had a great mentor, Dr. Klaus Beyenbach, whose research interests are epithelial transport, kidney function, and magnesium homeostasis. This summer, I investigated magnesium transport in killifish renal tissue using Western blots and immunohistochemistry staining. Killifish are ideal physiological models for studying magnesium regulation because they live in both freshwater and seawater. Freshwater magnesium concentrations are about two millimolars per kilogram, while seawater magnesium is around 55 millimolars per kilogram. Since glomerular filtration produces a small percentage of the total urinary magnesium, some renal epithelial transport mechanism must be present to support magnesium secretion into the lumen in seawater conditions and magnesium absorption from the tubule lumen in freshwater conditions.

Using Western blots, we found the killifish kidney expresses the V-Type H+ ATPase pump. This electrogenic pump has recently been found to power transepithelial transport. Previous magnesium transport models relied on the Na+/K+ pump for energy. Hence, my project was to confirm the presence of the V-Type H+ ATPase pump and the calcium/magnesium receptor in the killifish kidney using Western blots and then localize these two proteins using immunohistochemistry staining. Depending on the results found, we may propose a new model for transepithelial transport of magnesium in the killifish kidney.

I loved my experience in the Leadership Program. I discovered alternative pathways I could pursue with my DVM degree, and I discovered that I enjoy research. Most importantly, I met great people who also wanted to do something other than work in a practice. I have made lifelong friends, and I will forever cherish my Leadership Program memories.
Luke Hearnden  
University of Queensland; Parasitology  

Immunity in Parasitic Infection  

This December I will graduate with the class of 2001 from the School of Veterinary Science at the University of Queensland. My decision to apply for admission to the Cornell Leadership Program stemmed from a desire to explore the many career opportunities that such a versatile degree affords, and to do so in the stimulating intellectual environment of an Ivy League university.

This summer I had the good fortune to work at the Baker Institute under the guidance of Dr. Judith Appleton. Her work focuses primarily on host-parasite interactions involving the parasitic nematode *Trichinella spiralis*. Relatively little is known about the local immune response to the muscle, or nurse-cell, phase of infection with *T. spiralis*, or why the host's immune system does so little to remove this structure. The parasite secretes a highly antigenic product from a specialized organ called the stichosome that enables *T. spiralis* to parasitize muscle cells and remain in place indefinitely.

My project investigated the effects of irradiation on the larval stage of *T. spiralis*, in particular stichosome development, and on the infectivity of the parasite and the inflammatory cell aggregates around the nurse cell. These effects were documented via immunohistochemistry staining and tissue histology.

My participation in the Leadership Program has been an invaluable experience. In addition to gaining research experience, it has made me aware of the many career opportunities for veterinarians in research, industry, and the clinical arena. I am especially thankful for the opportunity to build friendships with fellow veterinary students from all over the world.

Sincere thanks to Professor Appleton and her laboratory group at Baker for their support and guidance this summer; to Dr. McGregor for allowing me this once-in-a-lifetime experience, and to the R. K. Mellon Family Foundation for its generous support. Finally, I want to thank my fellow students for an extraordinary ten weeks.

Karin Hölzer  
School of Veterinary Medicine, Hannover; Molecular Virology  

Role of Endosomal Trafficking in Parvovirus Infection  

I made the choice to become a veterinarian at a very tender age, but since my enrollment in veterinary college in 1999 my focus has changed from clinical studies to science. I applied to the Leadership Program because it promised the opportunity to extend my research experience in a university known for the excellence of its academic programs and scientific achievements.

I had the opportunity to work in the laboratory of Dr. Colin Parrish at the Baker Institute, where I studied the endocytotic pathway of canine parvovirus (CPV), a variant form of feline panleukopenia virus (FPV) that gained the ability to infect canine cells through slight changes in the viral capsid. Although both CPV and FPV are of great clinical relevance, the pathway of viral entry into susceptible cells is not yet fully understood.

In my project, I studied the uptake of wild-type CPV into feline cells showing altered expression of proteins marking the endocytotic pathway (i.e. Rab proteins 5, 7, and 11 and RME-1). I compared results following different methods of transfection (i.e. lipofectamine-mediated, electroporation). Additionally, the relationship between expression of green fluorescent protein (GFP) and infection rate was investigated using two-dimensional flow cytometry of cells expressing the GFP molecule. Although my research was conducted at a basic level, it is plausible to think that better understanding of the endocytotic pathway will lead to the development of improved vaccines and more effective treatments of animals infected with the subject viruses.

I would like to thank Dr. Parrish and everyone in his laboratory for the guidance and support I received, and for their patience and encouragement whenever things went wrong. Also I wish to thank Dr. McGregor and everyone else involved with organizing the program for this extraordinary summer.
Katherine Hughes
University of Liverpool; Cell Biology

The Role of Transforming Growth Factor Beta 3 in Chondrocyte Differentiation

I have completed three years of the veterinary degree program at Liverpool University, having incorporated study for an intercalated degree in Anatomy this year. Working on my Anatomy degree dissertation afforded me my first taste of research and this inspired me to apply for the Leadership Program.

This summer I have worked in the laboratory of Dr. Alan Nixon. This research group is investigating chondrogenic determination by mesenchymal stem cells (MSC) with a view to utilizing them as a source of chondrocytes for repair of damaged equine cartilage.

My project involved observing the effects of transforming growth factor beta 3 (TGFβ3) on MSC differentiation into chondrocytes. Having cultured MSC in a monolayer, I used in-situ hybridization, immunofluorescence, and Northern blotting to assess levels of phenotypic markers of chondrogenic determination such as aggrecan, collagen I, and collagen II. Using a colorimetric assay, I observed a proliferative effect of TGFβ3 on MSC, although I also showed that TGFβ3 is toxic at high concentrations.

Participation in the Leadership Program has widened my horizons appreciably. In addition to the intellectual stimulation of the research project, I have relished the opportunity to evaluate the multitude of career paths open to veterinarians with an interest in research. It has also been a pleasure to spend the summer living and working alongside veterinary students from around the globe.

With three years of my veterinary degree remaining, it is a little early to pinpoint the exact direction my career will take, but I envisage working in a research environment, possibly in industry. My aim is to pursue a career that allows me to relate basic research to clinical applications.

As a result of my participation in the Leadership Program, I enter my fourth year of veterinary study with renewed inspiration and enthusiasm. I would like to thank everyone who has contributed to making this summer’s program such an enriching experience.

Stephanie Janeczko
Cornell University; Cell Biology

Localization of Yeast Rabs in Mammalian Cells

I am a second-year veterinary student at Cornell University. I have known since high school that I wanted to be a veterinarian, but have also been considering career options other than private practice. I felt that the Leadership Program would be a good opportunity to explore the world of research. The experience has been invaluable not only for the research experience but also for the trips, workshops, and people involved with the program. It has been encouraging and an immense help to me.

I spent the summer working in Dr. Ruth Collins’s laboratory on a project involving Rab proteins. These are small GTPase molecules vital for intracellular transport. Each is localized to a specific intracellular compartment. Because of their functional importance, Rab proteins show a high level of evolutionary conservation that allows one to compare homologs between species. The aim of my project was to clone all eleven of the yeast Rabs (an entire genome’s worth!) and to transfect them into a human cell line. Since the Rabs were fused to a green fluorescent marker, we were able to visualize the localization of each protein with fluorescent microscopy and make comparisons between the species. This work will serve as a base for further research into the function of Rab proteins.

I would like to thank Dr. McGregor for the incredible opportunity that he has afforded to me, and for his dedication and enthusiasm for the program. I would like to thank Dr. Collins for being an excellent mentor and for the tremendous amount of time, resources, and knowledge that she imparted to me during these ten weeks. Finally, I would also like to thank my fellow program participants for making the summer an exceptional, unforgettable experience.
Charles Johnson  
**Minnesota State University; Molecular Virology**

Cloning and Sequence Analysis of Viral IL-8 from Marek's Disease Virus Pathotypes

I have had the privilege of knowing several veterinarians who are both accomplished researchers and near-perfect examples of what it means to be a professional. Their examples have inspired me to pursue additional training in pathology and to be involved in applied research.

This past summer I worked in Dr. Karel Schat's friendly and highly productive laboratory. My project involved the cloning and sequence analysis of a Marek's disease virus (MDV)-encoded interleukin-8 (vIL-8) homolog present in different MDV pathotypes. It has been observed that the more highly virulent strains of MDV more consistently express vIL-8 RNA. My goal was to determine if there are any sequence differences in the vIL-8 gene that might explain why the vIL-8 RNA is more commonly expressed in highly virulent pathotypes.

I wish to extend a sincere thank-you to Dr. McGregor for his unwavering commitment to the program and its participants. I am also fortunate to have met Dr. Fraser, whose pleasant disposition and subtle encouragement were greatly appreciated. Thanks are also in order to Dr. Schat, Keith Jarosinski, and Priscilla O'Connell for having the patience to deal with my unending questions. I am also grateful to the rest of the Schat crew (Myrna Miller, Min Zhu, Dave Lechtenberg, Carrie Grimsrud, and Reem Yunis) for making my experience in the lab enjoyable. Lastly, I would like to thank Pfizer and the NIH for sponsoring me this summer.

Although the research and associated program events were important in my professional development, it was the friendships established and the new perspectives gained that were, in my mind, the most significant benefit of the program. To my fellow leadership participants, I wish you nothing but the best in your future careers and personal lives.

Robert Klopfleisch  
**University of Leipzig; Immunology**

Mechanisms against *Ichthyophthirius multifiliis*

Next year I will graduate from the University of Leipzig. The opportunities I have had to participate in research both within and outside the academy have persuaded me that my future lies in a science-based career. I applied to the Leadership Program because I wanted further exposure to research career opportunities for veterinarians.

This summer I studied immunity against the common fish parasite *Ichthyophthirius multifiliis* in Dr. Theodore Clark's laboratory. My project involved ascertaining the level of expression of different immobilization antigens (I-AGs) on the surface of the parasite at different developmental stages. These I-AGs are of special interest because antibodies made by the fish and bound to I-AGs immobilize the parasite. By doing so, the antibodies contribute to the resistance of the host to infection. Hence, I-AGs are potential candidates for a vaccine against *I. multifiliis*.

My project this summer was to quantify I-AG gene expression at the RNA level. To this end I used the TaqMan real-time reverse-transcription PCR. I also tried to explore with almost the same technique the mechanism of DNA transmission between different developmental stages of the parasite.

The time in the Leadership Program confirmed my wish to pursue a career in the pharmaceutical industry. I want to thank Dr. Clark for his encouraging guidance and the opportunity to work in his laboratory.
Rebecca Lin  
Cornell University; Hematology

Mechanisms of Platelet Procoagulant Activity

I applied to the Leadership Program in order to gain a better idea of how I could apply my clinical training and knowledge to broader pursuits in science. As I prepare to start my second year of school here at Cornell, I am even more excited after this summer by the many possible career paths that lie ahead for me as a veterinarian.

This summer I had the good fortune to work with Dr. James Catalfamo and Dr. Marjory Brooks in the Coagulation Section of the Diagnostic Laboratory. Many areas in our understanding of hemostatic processes remain incomplete; cell-signaled changes in platelet-surface membrane reorganization are one such example. In hopes of shedding light on the mysteries of platelet activation, the goal of my research project was to evaluate changes in platelet protein tyrosine phosphorylation in response to stimulation by agonists such as collagen. We evaluated platelets from normal dogs as well as those with procoagulant defects. Specifically, I worked to develop conditions for platelet isolation, solubilization, electrophoresis, immunoblotting, and detection. Despite the twists and turns of the project, we were able to determine that there are indeed temporal and quantitative variations in phosphorylation patterns between normal and affected dogs. Further studies will be necessary to elucidate the significance of this variation.

I am very satisfied with my experiences this summer. I learned a great deal about the possibilities and challenges of a research career and picked up many new technical skills. I would like to thank Dr. Catalfamo and Dr. Brooks not only for inviting me into their lab, but for sharing their enthusiasm, patience, and wisdom with me.

David Loch  
University of Queensland; Cardiology

Electrocardiographic Changes in the Growing Dog

Embarking on my final six months of veterinary school at the University of Queensland, I felt undecided concerning my career path and long-term goals and decided that the Leadership Program was an ideal opportunity to explore my options while interacting with students from all over the globe.

My interest in research was sparked last year by a project in which I investigated cardiovascular changes in rats with thyroid dysfunction. This interest was reinforced by work conducted under the guidance of Dr. Sydney Moïse. We studied electrocardiographic (ECG) changes associated with growth and development in research beagles and mongrels, with particular reference to repolarization, and how these findings might be important in drug and clinical trials. I was also involved in the general care and maintenance of Dr. Moïse's German shepherd dog colony, which provided me with the opportunity to combine clinical and research procedures.

From the Leadership Program I have gained an appreciation of the dedication that is required to be an active researcher and a desire to participate in future research, although I remain undecided on my exact career path. I would like to thank Dr. McGregor for his guidance and allowing me to take part in such a prestigious experience. Special thanks to Dr. Moïse and the members of the "cardiocrew" for their support, advice, and humor over ten fascinating weeks. Finally, I would like to wish all 2001 Leadership Program participants good luck in their future endeavors, whether they be clinically, academically, or industry-based.
Maeva Louis  
North Carolina State University; Cell Biology

Development of an Assay for Immunoglobulin E-Mediated Mast-Cell Degranulation

This fall I will be entering my second year as a veterinary student at North Carolina State University. Although I have long wanted to be a veterinarian, over the course of my first year in veterinary school I began to have the sneaking suspicion that “just” being a clinician would not quench my unending thirst for knowledge. I applied to the Leadership Program to explore the opportunities available to me as a veterinarian.

Under the guidance of Dr. Alexander Brown, I sought to understand the role of phospholipase D (PLD) in mast-cell degranulation. The mast cell is involved in chronic inflammation and is found in elevated numbers in the lungs of asthmatic patients and horses with small-airway disease. I helped characterize a novel technique called reversible permeabilization in order to insert dominant negative mutants of PLD activators into RBL-2H3 cells (a mucosal mast-cell line). Through this process, I was able to create pores in the cells using streptolysin-O, insert the proteins of interest, reseal the cells, and observe their effect on degranulation after antigen stimulation. If the molecular mechanisms for mast-cell degranulation can be deciphered, the hope is to find a pharmacological agent that can impede this process.

Through discussions, workshops, and my research project I have broadened my perspective of career paths. I hope to complete an internship/residency in equine medicine before pursuing a PhD.

My sincerest thanks go to Dr. Brown for the opportunity to work on an exciting project, to Dr. Seana Thrasher for her guidance and unwavering support, and to Dr. McGregor for creating this unique, once-in-a-lifetime experience. Last but not least, thanks to my fellow participants for reminding me that, as Tommy Lasorda said, “The difference between the impossible and the possible lies in a person’s determination.” I will miss you dearly.

Timothy Myshrall  
Cornell University; Epidemiology

Effects of Mastitis on Milk Yield in Dairy Cows

I will enter my third year of veterinary school at Cornell University this fall. I am interested in pursuing a career in veterinary epidemiology and public health that possibly involves research. The Leadership Program provided me with the opportunity to conduct epidemiological research as well as to broaden my understanding of career opportunities for veterinarians in research settings.

My research project focused on the role of clinical mastitis in the health of dairy-cow herds. A greater understanding of the epidemiology of clinical mastitis may contribute to more appropriate and cost-effective decisions by dairy producers and veterinarians regarding management of affected cows. To conduct my research, I used three computer-based statistical approaches: logistic regression, mixed models with repeated measures, and survival analysis. Using these statistical tools, I studied risk factors for mastitis, the impact of mastitis on milk yield, and the effect of mastitis on future culling. This research experience has improved my understanding of the application of mathematical models to answer epidemiological questions.

I am grateful for the opportunity to take part in this year’s Leadership Program because it has been a greatly rewarding and educational experience. I will certainly make a more informed decision concerning career alternatives as a consequence of my participation in this program. I would like to thank those who had a major role in making it such an inspiring summer, including my mentor, Dr. Yrjo Grohn, and his research group; the program organizer, Dr. McGregor; my sponsor, the NIH; the module facilitators; and all of my fellow Leadership Program participants.
Seung-Jin Park
Seoul National University; Bacteriology

Molecular Characterization of *Mycobacterium avium* Isolates

I am a second-year student at the Seoul National University of Korea. I applied to the Cornell Leadership Program in order to broaden my personal and professional experience. I have greatly enjoyed my time here.

I spent this summer in Dr. Sung Kim's laboratory studying *Mycobacterium avium* subspecies *paratuberculosis* (MAP). MAP is a pathogen of the intestinal tract of herbivores and the cause of Johne's disease. I studied the growth characteristics of MAPs in feces from cows that were shedding many, some, or few organisms. Each group exhibited a different growth pattern.

In another project I attempted to isolate MAP from unpasteurized milk samples. Some features of Crohn's disease in humans resemble Johne's disease in cattle. MAP has been found in some human intestinal samples, leading to the speculation that this bacterium is also the cause of intestinal pathology in patients with Crohn's disease. MAP has also been found in unpasteurized bovine milk samples, fueling speculation that Crohn's disease may be associated with the consumption of cow's milk. As it transpired, I was able to isolate MAP from raw milk.

My research project and the group modules - leadership discussion, emerging-diseases workshop, ethics discussion, and drug-development workshop - gave me deeper insight into possible career paths. All were interesting and informative. The opportunity to meet people from a range of cultures was also very meaningful to me. My sincere thanks go to Drs. Sang Shin, Leland Carmichael, and Sung Kim for providing me with endless support and advice and to Dr. McGregor and everybody involved in this program.

Judith Phillips
Cornell University; Bacterial Pathogenesis

Colonization of Cats by *Helicobacter pylori*

I'm a rising second year veterinary student at Cornell University. After beginning veterinary school I found that I missed the research environment to which I'd been exposed as an undergraduate. I applied to the Leadership Program in order to deepen my understanding of what veterinary research (as opposed to pure-science research) was about.

I spent the summer in Dr. Kenneth Simpson's laboratory working on chronic *Helicobacter pylori* co-infection in two colonies of cats with different combinations of two different human-origin strains of *H. pylori*. Genuine co-existence of competing strains is rare, since one strain almost inevitably acquires a selective advantage that allows it to overwhelm the other. My project focused on determining whether these two combinations of strains were co-existing by colonizing different ecological niches within the gastric mucosa. Endoscopic biopsies were taken from the pylorus, fundus, and cardia of each cat and analyzed by a combination of differential PCR and restriction-enzyme digestion to identify the strains present in each. Several biopsies contained both strains, but a clear pattern of distribution was not evident, indicating that the strains were competing for the same macroscopic territory. We then began using fluorescence in-situ hybridization microscopy to determine whether the strains are colonizing different microscopic niches within the mucosa.

The Leadership Program has really been a wonderful experience. I definitely know I want to continue doing research, and I'll be reapplying to Cornell's combined DVM/PhD program in the fall. I enjoyed my project; while my fellow participants may not have seen much of me, I enjoyed their company even more. They are a really astounding group, and I look forward to keeping in touch. I would like to thank Dr. McGregor, Dr. Simpson, and everyone else involved in the program for making this summer such an incredible experience.
Kis Robertson
Tuskegee University; Bacteriology

PCR Fingerprinting of *Salmonella* Isolates

As someone who has career aspirations that differ from those of the typical, clinic-bound veterinary student, I applied to the Leadership Program because I recognized it as a chance to gain a better understanding of the full range of opportunities that are available to individuals with a veterinary degree. This program not only surpassed my expectations in this area, but was surprisingly enriching in other areas as well.

This summer I had the opportunity to work under the counsel of Dr. Lorin Warnick in the Department of Population Medicine and Diagnostic Sciences in collaboration with Dr. Anthony Hay in the Department of Microbiology. The aim of my project was to evaluate the success of PCR fingerprinting in isolates of *Salmonella* taken from New York dairy farms. We sought to determine whether two techniques that employ PCR were effective in distinguishing between serotypes of *Salmonella* and then in differentiating between strains within serotypes. Band comparison of the isolates following gel electrophoresis allowed us to conclude that serotype differentiation is possible using rep-PCR and RISA in conjunction with RFLP analysis, but strain differentiation is more difficult using these methods. The project is relevant to epidemiology because our findings suggest that PCR fingerprinting can provide a relatively quick and inexpensive means of characterizing the distribution of an offending pathogen. The incorporation of PCR techniques into diagnostic protocols might greatly benefit the tracking of a disease agent like *Salmonella* in a population.

I would like to thank all the people involved in putting together the Leadership Program, especially Dr. McGregor and Ms. Diane Coif for all their hard work. I am also grateful to Dr. Warnick and Dr. Hay for giving me a place to work and learn, and Ms. Mary Ellen Charter for helping me in the early stages of my project.

Simon Starkey
University of Sydney; Signal Transduction

Integrin Binding Protein

Having entered my final year of veterinary science in February this year I decided to apply for the Cornell Leadership program. I spent the year 2000 researching diabetes in cats as part of a BSc honors program at the University of Sydney. Having enjoyed this research experience I felt that the Cornell program would offer an insight into research in a world-class facility. I also felt that another key benefit of the program would be the chance to meet veterinary students from around the world who have goals similar to my own.

My project was conducted in Dr. Jun-Lin Guan’s laboratory in the Department of Molecular Medicine. There I worked closely with graduate student Luis Rodriguez. We focused on a particular facet of cell signaling. Our goal was to modify the intracellular component of the β1-integrin receptor, blocking its interaction with a second messenger protein, 14-3-3β. The ultimate aim of this work is to allow further understanding of the integrin signaling pathways. Using PCR techniques we set about mutating the integrin and cloning these mutants. After confirming with the use of DNA sequencing that our mutant had been cloned, we transfected yeast cells with the mutant. A yeast two-hybrid system was then used to determine if the mutants blocked the second messenger from binding.

The Leadership Program has also offered incredible experiences outside the laboratory. Highlights included the USDA and NIH visits in Washington, D.C., the career discussions, and the leadership module. All of these events added significantly to the value of the program.

As the summer draws to a close, I am increasingly convinced that a biomedical research career awaits me. Upon graduating in December of this year I aim to consolidate my small-animal medical skills in practice prior to applying for a PhD position at a university in the U.S. or the U.K.
Jason Stayt  
University of Sydney; Cell Biology

A Novel 65-Kilodalton Guanosine Triphosphate-Binding Protein Found in the Pancreas

I am a fourth-year student at the University of Sydney. After completing a bachelor of science degree, I developed a keen interest in research. This provided me with the motivation to undertake the Leadership Program this summer.

During my time here, I had the opportunity to work with Dr. Richard Cerione and his team investigating tissue transglutaminase (TGase). TGase is a unique enzyme that exhibits both enzymatic transamidation activity that crosslinks proteins to other proteins or polyamines and a guanosine triphosphate (GTP)-binding capability similar to other classical GTP-binding proteins. TGase has been implicated in a variety of normal cellular processes and in diseased states such as neoplastic disease. Initially, Western blot analysis was performed on a battery of normal canine tissues to determine the baseline expression levels of TGase protein. Unexpectedly, a novel protein found only in the pancreas cross-reacted with the anti-TGase antibody. Further investigation revealed that, like TGase, this protein was capable of binding GTP but that, unlike TGase, it showed no transamidation activity. Western blot analysis also showed that this protein has a mass of approximately 60-65 kilodaltons, nearly 30 kilodaltons less than TGase. Northern blot analysis revealed an RNA transcript that was smaller than the full-length TGase transcript, indicating that the novel protein was either a related gene product or an alternate splice of the TGase and not a proteolytic cleavage product of the TGase protein. Since this novel protein displayed TGase-like characteristics, RT-PCR technology was also employed in an attempt to amplify alternate-sized TGase transcripts.

I am indebted to Dr. Cerione for welcoming me into his group and to Dr. Marc Antonyak for his continued enthusiasm and exposing me to “the burn” of research. Finally, my warmfelt thanks go to Dr. McGregor for creating a fantastic program, and I also thank my sponsor, Merck/Merial.

Tracy Stein  
University of California, Davis; Reproductive Biology

How Sperm are Stored in the Bovine Oviduct

My motivation to participate in the Leadership Program came from my desire to conduct research and explore career opportunities available to veterinarians while developing my personal and professional skills. The experiences and knowledge I gained from the Cornell Leadership Program have inspired my interest in pursuing residency training in theriogenology.

During my time at Cornell, I conducted research in the field of sperm biology under the guidance of Dr. Susan Suarez. I worked closely with Dr. Suarez and with Dr. George Ignotz to purify and characterize antibodies against a sperm lectin, PDC-109. PDC-109 is thought to be partially responsible for creating the bovine oviductal sperm reservoir. A sperm reservoir is also present in hamsters and horses, although no specific protein related to the reservoir has yet been identified in those species. Dr. Suarez's laboratory has produced and purified PDC-109 (bovine seminal protein A1/A2) from seminal plasma. Sperm incubated with PDC-109 exhibited an increased ability to bind a specific fucosylated molecule on the mucosal epithelium of the bovine oviduct.

PDC-109 is localized to the acrosome region on non-capacitated sperm heads. A polyclonal antibody was produced by injecting rabbits with purified PDC-109. The antibody was used to probe Western blots for the presence of PDC-109 on capacitated and non-capacitated sperm. Anti-PDC-109 antibodies also were used to immunofluorescently label fixed non-capacitated and fixed capacitated sperm to determine whether PDC-109 is lost or modified during capacitation. Time did not permit this aspect of the project to be completed.

The Leadership Program has been an enlightening experience, offering a unique opportunity to explore many career paths while providing a framework that supports personal and professional development. The personal and professional relationships I developed during my stay at Cornell will be invaluable.
Amy Warren  
University of Queensland; Bacterial Pathogenesis

Evaluating Granuloma Formation in *Mycobacterium tuberculosis*

My initial aim when I started a degree in veterinary science was to pursue medical research. The Leadership Program has not only confirmed that aim but has given me a breadth of understanding of issues connected with a research career. Upon graduating in December of this year I aim to do an internship in small-animal medicine. I plan then to enroll in a PhD program to study the molecular pathogenesis of infectious diseases.

I spent the summer in Dr. David Russell's laboratory studying *Mycobacterium tuberculosis*. The formation of granulomas in *M. tuberculosis* infection is central to the pathogenesis and latency of the disease. My project involved developing both quantitative and qualitative assays to evaluate immune-cell migration and cell-signaling pathways involved in granuloma formation. After several attempts, a quantitative protocol was established that involved labeling migrating cells with horseradish peroxidase to measure migration through a neuroprobe chamber. Qualitative assays included histological sectioning of matrigel-embedded granulomas, migration in cell-chamber slides, and time-lapse tracking of cell migration. As these assays had not previously been used to study granuloma investigation, I found the difficulties of starting a protocol from scratch exceedingly challenging.

The program was a wonderfully positive experience, particularly the people I shared the program with. The adjunct activities to the research projects were enjoyable and illuminating. I would like to thank Dr. Russell and Dr. Beth Rhoades for their guidance and patience, and Dr. Douglas McGregor for putting together a fantastic program.

Rachel Windsor  
University of Bristol; Developmental Biology

Induction of Avian Head Myogenesis by Brain-Derived Signals

I am entering my final year of the veterinary program at Bristol. Having fallen out of love with the idea of general practice I applied to the Leadership Program hoping to discover other options available to veterinary graduates.

I spent this summer under the guidance of Dr. Drew Noden investigating myogenic triggers in the head of developing chick embryos. In the trunk, signals from the ectoderm and spinal cord prompt skeletal muscle development from mesoderm cells initially located beside the brain or spinal cord. However, the interactions underlying myogenesis in the head are unknown.

Beside and behind the embryonic midbrain lie precursors of the dorsal oblique (DO) and lateral rectus (LR) muscles. Local release of FGF8 (fibroblast growth factor 8) activates several regulator genes including one called *engrailed*. My hypothesis is that FGF8-induced signals from the brain induce formation of DO and LR muscle cells from nearby mesoderm cells, as well as expression of the *engrailed* protein. To test this, beads soaked in recombinant FGF8 were placed into the hindbrain or forebrain of stage-11 chick embryos (1.5 days before the onset of LR and DO differentiation). Preliminary trials in which beads were soaked in a fluorescent marker (Dil) proved that diffusible signals from the beads are incorporated into adjacent neuroepithelial cells. Forty-eight to 84 hours after surgeries, whole-embryo immunoassays were undertaken for *engrailed* (4D9 antibody) or myosin heavy-chain (F59 antibody) proteins, and in-situ hybridizations were performed to detect *myf5* transcripts.

FGF8 beads placed in the forebrain or hindbrain regions induce ectopic expression of *engrailed* proteins in adjacent neuroepithelium, suggesting that FGF8 is involved in the initiation of head myogenesis.

The Leadership Program has vastly widened my professional and personal horizons through laboratory experiences, workshops, and communal living. I extend my warm gratitude to Dr. McGregor for being the initiator of such a valuable program. My thanks also to Dr. Noden for his kindness, endless patience, and many trips to the Dairy Bar.
Robin Yates  
University of Queensland; Molecular Virology

The U₃₃ Protein of *Herpes simplex* Virus Type 1

I am currently completing the final year of the veterinary science course at the University of Queensland in Australia. I have always aspired to a career in research, and over the course of my scientific and veterinary training my interests have gravitated towards infectious disease. The Cornell Leadership Program seemed an ideal program to develop and broaden my interests and experience in veterinary and medical research.

Working under the supervision of Dr. Joel Baines, I investigated the interactions of a protein produced by *Herpes simplex* virus 1 (HSV-1), named U₃₃. It was noted that the U₃₃ deletion mutant of HSV-1 produces a smaller quantity of late-phase viral proteins than the wild-type strain. Upon further investigation, evidence suggested that this might be mediated through a direct interaction of the U₃₃ protein with the eukaryotic translation initiation factor, 2 alpha (eIF2α). The eIF2α protein is a host protein essential for the initiation of translation, and is also an important protein involved in the cell’s viral defense strategy. When a cell is infected with HSV-1, eIF2α is phosphorylated by double-stranded RNA-activated protein kinase (PKR), which in turn inhibits the initiation of translation and hence prevents synthesis of viral proteins. In-vitro GST "pull-down" experiments demonstrated that the U₃₃ protein binds to an eIF2α-GST fusion protein. In the later stages of the project my efforts focused first on the effects that U₃₃ has on the phosphorylation and dephosphorylation of eIF2α, and secondly on the quantification of synthesis of early- and late-phase HSV-1 proteins in the wild-type and U₃₃-deletion mutant strains.

Many thanks must go to Dr. Baines and to all who work in the Baines laboratory, as well as to the dedicated program organizers.

Bevin Zimmerman  
North Carolina State University; Molecular Genetics

A Cartilage-Specific Fibronectin Isoform

This fall I will be entering my third year at North Carolina State University's College of Veterinary Medicine. I was drawn to the Leadership Program because it provides students the opportunity to work independently on a research project while having the unique experience of the leadership modules.

This summer I worked at the Baker Institute in the laboratory of Dr. Nancy Burton-Wurster and Dr. George Lust. Their laboratory is interested in the role of fibronectin in articular cartilage. Fibronectin is a glycoprotein found in the extracellular matrix. It has binding affinity for collagen, heparin, decorin, and integrins and is believed to play an important part in cell-matrix interactions.

Fibronectin is encoded by a single gene, but alternative splicing of pre-mRNA results in several isoforms. Fifty to 80 percent of total cartilage fibronectin is in the cartilage-specific isoform, which lacks the V and C segments. The cartilage-specific isoform's role in cartilage remains unclear, but there is evidence that it has a higher binding affinity than other isoforms for decorin, a small proteoglycan thought to be important in cartilage matrix assembly.

My goal was to generate recombinant "mininectins," small segments in the C-terminal region of the fibronectin isoforms that span the alternatively spliced V and C regions. These "mininectins" will aid in identifying the site responsible for high-affinity decorin binding and the epitope recognized by a monoclonal antibody that detects the cartilage-specific isoform without cross-recognition of other isoforms.

I would like to thank Dr. McGregor, Ms. Diane Colf, and Ms. Nicole Boosembark for their tireless efforts to make this program a success. The unique experience of living with people from around the world and sharing in their knowledge and life experience, coupled with the opportunity to broaden my career goals, has made these ten weeks extraordinary.
Counselors and Facilitators for the 2001 Leadership Program

Dr. Stuart Bliss - Counselor
Instructor, Small-Animal Surgery
Cornell University College of Veterinary Medicine

Dr. Susan Bliss - Counselor
Research Associate, Immunology
Cornell University College of Veterinary Medicine

Dr. Patricia Chisholm - Facilitator
Scientific Program Manager (Veterinary)
The Wellcome Trust

Dr. James Flanders - Counselor
Associate Professor, Small-Animal Surgery
Cornell University College of Veterinary Medicine

Dr. Lisa Fortier - Counselor
Assistant Professor, Molecular Medicine
Cornell University College of Veterinary Medicine

Dr. David Fraser - Counselor, Facilitator
Professor, Animal Science
University of Sydney

Dr. Franziska Grieder - Counselor
Director, Laboratory Animal Science Program
National Center for Research Resources, NIH

Dr. Michelle Haven - Counselor, Facilitator
Assistant Director, Animal Health Discovery
Pfizer Inc

Dr. Gerard Hickey - Facilitator
Senior Director, Animal Drug Evaluation
Merck Research Laboratories

Dr. David Lee - Counselor, Facilitator
Executive Director, Strategic Planning and Business Development
Cornell University College of Veterinary Medicine

Dr. James MacLeod - Counselor
Associate Professor, Molecular Genetics
Cornell University College of Veterinary Medicine

Dr. Donald Mann - Facilitator
Senior Research Investigator, Animal Health Discovery
Pfizer Inc

Dr. Douglas McGregor - Counselor
Professor, Immunology
Cornell University College of Veterinary Medicine

Dr. Frederick Murphy - Facilitator
Professor, Virology
University of California, Davis

Mr. Robert Neimeth - Facilitator
Chairman (Retired)
Pfizer International

Dr. Rodney Page - Counselor
Director, Comparative Cancer Program
Cornell University College of Veterinary Medicine

Dr. Colin Parrish - Facilitator
Associate Professor, Virology
Cornell University College of Veterinary Medicine

Dr. Susanna Ryan - Facilitator
Wellcome Trust Immunology Unit
University of Cambridge

Dr. David Sargan - Facilitator
Senior Lecturer, Molecular Pathology
University of Cambridge

Dr. Kenneth Simpson - Counselor
Associate Professor, Small-Animal Medicine
Cornell University College of Veterinary Medicine

Dr. Donald Smith - Facilitator
Dean
Cornell University College of Veterinary Medicine
Housing

Participants in the 2001 Leadership Program were housed in Zeta Psi Fraternity on the Cornell University campus in Ithaca, New York. They had exclusive use of the building for the ten-week period that the program was in session. Several events connected with the program were scheduled there. The living arrangements enabled the fellows to socialize and relax in a convenient and pleasant campus environment.

Program Coordinator

Ms. Nicole Boosembark

Class of 2002, Cornell University School of Hotel Administration

I am a senior in the School of Hotel Administration at Cornell. Although the position of coordinator for a veterinary college program may seem remote from my discipline and future career, it actually coincides with that outcome quite nicely. The program coordinator position tested my event-planning, organizational, and people-management skills. I gained experience in planning for the unexpected and an opportunity to explore whether event planning might be the career path I will choose.

Beyond the requirements of the position, I had the wonderful opportunity to meet and work with students and facilitators from around the world. From observing participants in the program this summer, I would strongly recommend the program to those who are very interested in research and wish to determine what it takes to succeed in this arena. I want to thank Dr. McGregor, Ms. Diane Colf, and all the students for giving me a summer I will never forget.
The Leadership Program fellows hosted a dinner for their mentors, module facilitators, and other guests at Willard Straight Hall on the Cornell University campus.
Time Out

In addition to the intensive summer learning experience, the fellows found time for personal pleasures. They also visited Niagara Falls, New York City, Montreal, Philadelphia, Washington, D.C., and the Bostwick Great Camp in New York's Adirondack Mountains.
Where Are They Now?

The program organizers maintain contact with Leadership Program graduates in order to strengthen the professional network created at Cornell and to uphold the program's tradition of excellence for the benefit of future fellows. Listed below are the positions currently occupied by program graduates who have completed their veterinary education and are pursuing science careers in academia, government, or industry.

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<tr>
<th>Year</th>
<th>Name</th>
<th>Position/Institution</th>
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<tbody>
<tr>
<td>1990</td>
<td>John Angelos</td>
<td>PhD Student, Epidemiology, University of California, Davis</td>
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<tr>
<td></td>
<td>William Carr</td>
<td>PhD Student, Immunology, Stanford University</td>
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<td></td>
<td>Laura Gumprecht</td>
<td>Veterinary Pathologist, Merck Research Laboratories</td>
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<td></td>
<td>Elizabeth Lyon Hannah</td>
<td>Veterinary Epidemiologist, PRO-West, Inc.</td>
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<td>Richard Haworth</td>
<td>Molecular Pathologist, Glaxo SmithKline</td>
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<td>Stacy Hoffman</td>
<td>Resident, Small-Animal Medicine, University of Wisconsin</td>
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<td></td>
<td>Melissa Mazan</td>
<td>Director of Sports Medicine and Assistant Professor, Tufts University</td>
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<td></td>
<td>Rebecca Papendick</td>
<td>Associate Pathologist, Zoological Society of San Diego</td>
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<td></td>
<td>Dawn Shore</td>
<td>Associate Professor, Theriogenology, University of Missouri</td>
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<td></td>
<td>Alexander Tucker</td>
<td>Head, Veterinary Services Unit, Immutran-Novartis</td>
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<td></td>
<td>Thomas Vahlenkamp</td>
<td>Postdoctoral Fellow, Virology, North Carolina State University</td>
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<td></td>
<td>Brent Wilkens</td>
<td>Staff Surgeon, Dallas Veterinary Surgical Center</td>
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<td></td>
<td>Prema Arasu</td>
<td>Associate Professor, Parasitology, North Carolina State University</td>
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<tr>
<td>1991</td>
<td>David Bainbridge</td>
<td>Lecturer, Veterinary Science, Royal Veterinary College</td>
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<tr>
<td></td>
<td>Linda Berent</td>
<td>Resident, Clinical Pathology, University of Illinois</td>
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<td></td>
<td>Allan Berger</td>
<td>Postdoctoral Fellow, Molecular Pharmacology, University of Iowa</td>
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<td></td>
<td>Ian Davis</td>
<td>Postdoctoral Fellow, Comparative Medicine, University of Alabama</td>
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<td></td>
<td>Dianne Hellwig</td>
<td>Assistant Professor, Animal Science, University of Arkansas</td>
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<td></td>
<td>Judy Hickman-Davis</td>
<td>Research Assistant Professor, Anesthesiology, University of Alabama</td>
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<td></td>
<td>Alan Radford</td>
<td>Lecturer, Small-Animal Studies, University of Liverpool</td>
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<td></td>
<td>Jean Reichle</td>
<td>Medical Director, Animal Imaging, West Los Angeles, California</td>
</tr>
<tr>
<td>1992</td>
<td>Tomasz Betkowski</td>
<td>Medical Representative, Eli Lilly Co.</td>
</tr>
<tr>
<td></td>
<td>Stephen Davies</td>
<td>Postdoctoral Fellow, Tropical Diseases, University of California, San Francisco</td>
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<td></td>
<td>Mathew Gerard</td>
<td>PhD Student, Exercise Physiology, University of Sydney</td>
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<td></td>
<td>Christine Hawke</td>
<td>PhD Student, Immunology, University of Sydney</td>
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<td>Joanne L'Anglais</td>
<td>Inspector, Canadian Food Inspection Agency</td>
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<td></td>
<td>Julio Montero-Oliver</td>
<td>Chief, Animal Medicine, U.S. Army, Fayetteville, North Carolina</td>
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<td></td>
<td>Jacqueline Phillips</td>
<td>Lecturer, Physiology, Murdoch University</td>
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<td></td>
<td>Timothy Rocha</td>
<td>Staff Oncologist, Manhattan Veterinary Group</td>
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<td></td>
<td>Cristina Rodriguez-Sanchez</td>
<td>Senior Research Associate, University of Mexico</td>
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<td></td>
<td>Johanna Sherrill</td>
<td>Staff Veterinarian, Aquarium of the Pacific, Long Beach, California</td>
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<td></td>
<td>Louise Southwood</td>
<td>PhD Student, Clinical Sciences, Colorado State University</td>
</tr>
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<td></td>
<td>Reinhard Straubinger</td>
<td>Research Associate, Institute for Veterinary Immunology, University of Leipzig</td>
</tr>
</tbody>
</table>

(continued on page 34)
Where Are They Now? (continued)

1993

John Benson  Clinical Fellow, Animal Medical Center
Virginia Fajt  Adjunct Assistant Professor, Veterinary Antimicrobial Decision Support System, Iowa State University
Deborah Hoyle  Postdoctoral Research Assistant, University of Edinburgh
Christopher Laing  Postdoctoral Fellow, Molecular Biology, University of Pennsylvania
Emma Massey  PhD Student, Immunology, Bristol University
Joanne Rainger  Resident, Anesthesia, University of Sydney
Ashley Reynolds  PhD Student, Virology, Cornell University
Susanna Ryan  Postdoctoral Research Scientist, Immunology, Cambridge University
Veiko Saluste  Representative, Interchemi, Estonia

1994

Melissa Beall  PhD Student, Parasitology, Cornell University
Larissa Bowman  Diagnostic Pathologist, Mission St. Joseph Hospital, Asheville, North Carolina
Leslie Gabor  Veterinary Pathologist, Department of Agriculture, Tasmania, Australia
Amanda Gaskin  Resident, Small-Animal Medicine, North Carolina State University
Paige Langdon  Clinical Instructor, Small-Animal Medicine, University of Missouri
Maria Lara-Tejero  Postdoctoral Fellow, Sloan-Kettering Cancer Center
John MacGregor  Resident, Cardiology, Tufts University
Christopher Mariani  Resident, Neurology/Neurosurgery, University of Florida
Jeffrey Phillips  Intern, Small Animal Medicine/Surgery, North Carolina State University
Julie Pomerantz  Field Veterinarian, Wildlife Trust, Palisades, New York
Stacy Pritt  Veterinarian/Study Director, Toxikon Corporation
Oliver Turner  Resident, Pathology, Colorado State University

1995

Elizabeth Adkins  Resident, Ophthalmology, University of Tennessee
Gertraut Altreuther  Postdoctoral Fellow, Bayer Animal Health
Philippa Beard  Postdoctoral Fellow, Virology, Cornell University
Adrienne Bentley  Resident, Large-Animal Medicine, University of Georgia
Rachel Gray  PhD Student, Marine Mammal Pathology, University of Sydney
Krista-Britt Halling  Resident, Small-Animal Clinical Sciences, University of Florida
Wendy Harrison  PhD Student, Cardiovascular Pharmacology, St. Georges Hospital Medical School, London
Andrew Moorhead  MS Student, Parasitology, Purdue University
Caroline Murray  Veterinarian, Department for Environment, Food, and Rural Affairs, U.K.
Tony Mutsaers  Resident, Oncology, Purdue University

1996

Felicity Cole  PhD Student, Clinical Science, University of Sydney
Patricia Gearhart  Resident, Ophthalmology, Michigan State University
Jessica Geyer  Resident, Laboratory Animal Medicine, Glaxo SmithKline
Tamara Gull  Resident, Large-Animal Medicine and Surgery, Texas A&M University
Antonia Jameson-Jordan  PhD Student, Molecular Medicine, Cornell University
Polly Peterson  Resident, Small-Animal Medicine, Texas A&M University
Ralph Senften-Rupp  Project Planning Consultant, Berne, Switzerland
John Stein  Resident, Small-Animal Medicine, Colorado State University
Allison Stewart  Resident, Equine Medicine, Ohio State University
Ilse van Vonderen  PhD Student, Physiology, University voor Gezelschapsdieren
Constantin Von der Heyden  DPhil Student, Environmental Studies, Oxford University

1997

Dennis Bailey  Resident, Oncology, Cornell University
Antony Clements  Junior Clinical Scholar, Equine Studies, Glasgow University
Jennifer Fryer  Intern, Small-Animal Medicine, Texas A&M University
Esther Kornalijnslijper  PhD Student, Farm Animal Health, University of Utrecht
Tanya LeRoth  Resident, Pathology, Washington State University
1997, ctd.  

Lucy Neave MA Student, Creative Writing, New York University  
Patricia Pesavento Resident, Pathology, University of California, Davis  
Paul Plummer Intern, Large-Animal Medicine, Texas A&M University  
Deborah Prattley Veterinary Inspector, Department for Environment, Food, and Rural Affairs, U.K.  
Melinda Story Resident, Equine Surgery, Kansas State University  
Rachel Walker Professional Service Veterinarian, Novartis Animal Health  
Tristan Weinkle Resident, Internal Medicine, Clinical Sciences, Cornell University  
Jonathan Werner Resident, Pathology, University of California, Davis  
Rebecca Wilcox PhD Student, Virology, Melbourne University  
Esther Wissink PhD Student, Immunology, Erasmus University  

1998  
Max Bastian PhD Student, Swiss Tropical Institute, Basel  
Erin Crotty Intern, Equine Medicine and Surgery, Rochester, New York  
Karsten Hüffer PhD Student, Virology, Cornell University  
Mary Klinc Intern, Large-Animal Medicine and Surgery, Western College of Veterinary Medicine  
Christopher Kunze Resident, Radiology, Texas A&M University  
Karen Liljebjelke PhD Student, Microbiology, University of Georgia  
Amanda Murphie PhD Student, Genetics, Australian National University  
Monica Murphy Intern, Small-Animal Surgery, University of Pennsylvania  
Harish Narayanaswamy Intern, Small-Animal Medicine and Surgery, Los Angeles  
Katleen Nickerson Intern, Littleton Large-Animal Clinic, Colorado  
Amy Shumaker Intern, South Shore Animal Hospital, Florida  
Anne-Marije Sparmniej Registration Department, Intervet International, Boxmeer, Netherlands  

1999  
Carl Holmgren PhD Student, Neural Sciences, Karolinska Institute  
Rachel Mo Resident, Pathology, Cornell University  
Paula Stewart Intern, Friendship Hospital, Washington, D.C.  
Holger Volk PhD Student, Pharmacology, School of Veterinary Medicine, Hannover  

2000  
Tanya Babu Veterinary Surgeon, Department of Environment, Food, and Rural Affairs, U.K.  
Beatrice Böhme MS Student, Dermatology, Frankfurt University  
Katharine Evans Resident, Anesthesia, University of Bristol  
Rachel Geisel PhD Student, Virology, Cornell University  
Birgit Hingerl PhD Student, Immunology, University of Munich  
Natalie Krekeeler Doctoral Student, Orthopedics, Free University of Berlin  
Joost Uilenreef Intern, Companion Animal Medicine, University of Utrecht  

Mini-reunion: former program fellows
In the Limelight

Prema Arasu participated in the Leadership Program in 1991. She took an unusual route to get there: after completing her PhD in 1985, she spent the following five years as a postdoctoral fellow in molecular parasitology at New England Biolabs, Inc. and in developmental genetics at Massachusetts General Hospital/Harvard University. It was only in 1990 that she decided to join the DVM program at Cornell. She did so for two reasons: first, she wanted to fulfill a childhood dream, and second, she strongly believed clinical and whole-organism studies would complement her future research interests.

While attending DVM classes at Cornell, Dr. Arasu conducted research in the laboratory of Dr. Judith Appleton on the *Trichinella spiralis* nematode. She continued this work during her summer in the Leadership Program and later won first prize in the veterinary student research poster competition. For her, the highlights of the program were meeting students from other veterinary colleges in the United States, Germany, and England and having in-depth discussions about career paths with invited program guests and faculty counselors. The program also involved a site visit to Merck Pharmaceutical that later provided Dr. Arasu with the contacts and insight to weight job opportunities with industry versus academia.

Originally from Malaysia, Dr. Arasu also was interested in international veterinary opportunities. Through Cornell's Expanding Horizons program and Dr. Gordon Campbell's support, she spent the first few weeks of the summer of 1991 in Indonesia on a project studying fluke infections in sheep, funded by the U.S. Agency for International Development. Raising funds from various sources, she spent the following summer doing research on *Mycoplasma* infections in small ruminants in Kenya and visiting veterinary institutions in Uganda and Ethiopia. She used externship opportunities in the DVM program to work on malaria and pregnancy in Kenyan women at the Centers for Disease Control in Atlanta, and she also went to Australia to further studies with Dr. Rob Gilbert on artificial insemination and embryo transfer in sheep.

After graduating from Cornell in 1994, Dr. Arasu decided that her strongest preference was for a career in the academy that would encompass research and teaching. Her student evaluations reflect her commitment to reaching every student and ensuring that learning occurs in an interactive and progressive manner. In developing her research program, Dr. Arasu selected an area of investigation that would have high likelihood for extramural funding, span the breadth of basic-to-applied experimental questions, and incorporate the whole-organism clinical perspective. She now works on aspects of developmental arrest and reactivation in parasitic nematodes using the canine blood-feeding hookworm as a model system. She currently has funding from the National Institutes of Health to study the effect of pregnancy on reactivation of arrested hookworm infection, and she recently obtained a second award from the North Carolina Biotechnology Center to study the effects of crowding inhibition in larval populations.

Dr. Arasu's current international interests include working to establish an Asia/U.S. grassroots network of scientists in infectious disease research. She also is developing a collaborative research project in the Philippines that will encompass the gamut from field studies to immunological and microarray analyses on human hookworm strains. In the last six years, she has advised seven graduate students for the MS and PhD degrees and mentored several undergraduate and veterinary students, and she currently sponsors three graduate students and two postdoctoral fellows in her laboratory.

One of the first people Dr. Arasu met at Cornell was Dr. Douglas McGregor, who strongly supported her career decision and continues to be one of her senior mentors. On looking back, she feels that she did take a big step — but the right step — and she is currently enjoying her position as a tenured associate professor at the College of Veterinary Medicine at North Carolina State University in Raleigh. She is married to Constantin Fasolt, who is a professor of history at the University of Chicago.
For more information about the Leadership Program, contact:

Dr. Douglas D. McGregor, Director
Leadership Program for Veterinary Students
S2-056 Schurman Hall
College of Veterinary Medicine
Cornell University
Ithaca, NY 14853-6401

Telephone: 1 607-253-3777
Fax: 1 607-253-3701
Email: ddm7@cornell.edu

Interested parties are also invited to visit the program website at: web.vet.cornell.edu/public/research/leadership
The site also can be accessed directly by entering “Cornell Leadership Program” into any web browser.

Credits

Photography: Alexis Wenski-Roberts, Cornell Image Lab
Design: Barbara Van Dyk, DBA COMMUNICATIONS
Leadership Program for Veterinary Students

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