



*Leadership Program
for Veterinary Students*

2005 Annual Report



2005

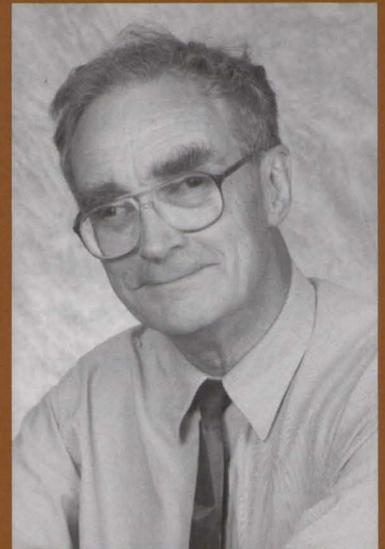


2005 Leadership Program for Veterinary Students *A Commitment to Excellence*

The College of Veterinary Medicine at Cornell has hosted a summer leadership program since 1990. The program's tradition of excellence has drawn thousands of applicants, but only 359 of the most promising students, representing 54 veterinary colleges worldwide, have been selected to participate. Although the life experiences, culture, and academic backgrounds of program fellows are diverse, all have distinguished themselves in a variety of professional and personal pursuits. They are highly motivated individuals who possess the ability to excel as research scientists and public health professionals.

Research is the foundation of the Leadership Program, and the activity around which all other activities are structured. Program fellows pursue individual projects under the guidance of Cornell faculty members, who are successful scientists and experienced mentors. Their investigations are conducted in state-of-the-art facilities within the unsurpassed intellectual environment of Cornell University, an Ivy League institution located in the scenic Finger Lakes region of New York State. Program fellows also participate in carefully designed modules and workshops. All are structured as student-directed learning experiences. Topics include emerging infectious diseases and biodefense, leadership and its associated responsibilities, and exercises which illustrate career opportunities for veterinary graduates in the pharmaceutical industry. Vocational counseling and field trips to federal research facilities are additional features of the program.

The Leadership Program, now in its sixteenth year, has fulfilled its principal objective-to provide veterinary students with unique learning experiences that both clarify and strengthen their commitment to careers in science. A legacy of the program has been the establishment of a network of animal-health professionals who have the motivation to function at the forefront of discovery and the ability to contribute broadly to the biomedical sciences.



A handwritten signature in white ink, appearing to read "D. McGregor". The signature is stylized and fluid, with a long, sweeping underline.

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 Albert C. Bostwick Foundation

The Merck Company Foundation

The National Institutes of Health

Pfizer Inc

The Wellcome Trust

The program organizers also thank the facilitators, counselors, and mentors who took part in the 2005 program. Thanks, too, to Ms. Munira Hyder-Adam, the Program Coordinator, and to Ms. Susan Williams, Ms. Alexis Wenski-Roberts, and Mr. David Frank for their assistance. Special thanks to Dr. David Fraser, who has had a pivotal role in the Leadership Program in each of the past 14 years. Finally, the organizers congratulate the Leadership Program fellows. Their academic achievements, coupled with their dedication to discovery and service, mark these extraordinary individuals as future leaders of the veterinary profession.

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2005 Leadership Program Agenda

- June 6** Opening Meeting
- June 7** Library Orientation
Biological and Chemical Safety Training
- June 8** Laboratory Orientation
- June 11** Career Discussion
Leadership Discussion
- June 13** Scenario-based Leadership Module
Program Dinner
- June 16** National Institutes of Health
- June 17** United States Department of Agriculture
- June 30** Emerging Diseases
- July 1** Biodefense and Public Health
- July 11** Careers in Industry
- July 13** Reunion Dinner
- July 15** Drug Design and Development
- July 19** Leadership in Action
- July 25** Residency Discussion
- July 26** Research Training
- July 27** Translational Science
- August 10** Research Presentations
- August 11** Research Presentations
- August 12** Exit Meeting



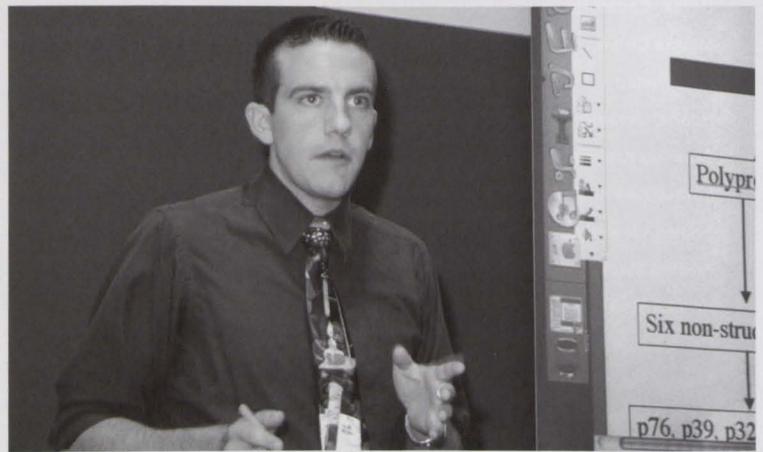
2005 Leadership Program Participants

Fellow	College	Mentor	Department Affiliation	Sponsor
Krystal Allen	Cornell University	Mark Roberson	Biomedical Sciences	NIH
Melanie Ammersbach	University of Guelph	James Catafamo/ Marjory Brooks	Population Medicine/ Diagnostic Sci	Merck/Bostwick
Hannah Bender	University of Sydney	Kenneth Simpson	Clinical Sciences	Merck/Bostwick
Derek Cavatorta	Cornell University	Julia Flaminio	Clinical Sciences	NIH
Marcia Chien	University of Illinois	Rick Cerione	Molecular Medicine	NIH
Hille Fieten	Utrecht University	Alexander Nikitin	Biomedical Sciences	Pfizer
Hilarie Jerauld	Va-Md Regional College	Martin Wiedmann	Food Science	NIH/Bostwick
Amanda Kreuder	Iowa State University	Hélène Marquis	Microbiology/Immunology	NIH
Louise Le Flufy	University of Bristol	Alex Travis	Baker Institute	Wellcome Trust
Shawn Llewellyn	Atlantic University	Tracy Stokol	Biomedical Sciences	Pfizer
Andrea MacDonald	University of Sydney	Joel Baines	Microbiology/Immunology	Pfizer
Kanika McAlpine	Auburn University	Ted Clark	Microbiology/Immunology	NIH
Rebecca Mitchell	Cornell University	David Russell	Microbiology/Immunology	NIH
Teresa Negus	Iowa State University	Lorin Warnick	Population Medicine	NIH
Emily Nestor	Cornell University	W. Lee Kraus	Molec Biology & Genetics	NIH
Marieke Opsteegh	Utrecht University	Ton Schat	Microbiology/Immunology	Merck
Emily Orchard-Mills	University of Sydney	George Lust/Nancy Burton-Wurster	Baker Institute	Pfizer
Trisha Oura	Tufts University	Gary Whittaker	Microbiology/Immunology	NIH/Bostwick
Heidi Perreault	N C State University	Ynte Schukken	Population Medicine	NIH/Bostwick
Trisha Pullos	University of Queensland	Lisa Fortier	Clinical Sciences	Pfizer
Bo Raphael	University of Queensland	Klaus Osterrieder	Microbiology/Immunology	Merck
Johanna Rigas	Oregon State University	Yrjö Gröhn	Population Medicine	NIH
Klara Saville	University of Cambridge	Douglas Antczak	Baker Institute	Wellcome Trust
Ruth Schmitte	University of Hannover	Teresa Gunn	Biomedical Sciences	Merck
Kai-Biu Shiu	University of Glasgow	Colin Parrish	Baker Institute	Wellcome Trust
Timothy Stell	Cornell University	John Parker	Baker Institute	NIH
Catherine Trickett	University of Bristol	Katherine Houpt	Clinical Sciences	Wellcome Trust
Nina Weishaupt	University of Hannover	Ruth Collins	Microbiology/Immunology	Pfizer

The Leadership Program combines faculty-guided research with student-directed learning through participation in modules, workshops, and group discussions. The activities encourage responsible leadership; the development of analytical, critical thinking, and teamwork skills, and an awareness of professional opportunities to broadly impact the veterinary profession.



Activities



Research

Independent research is the foundation of the program. Each fellow is assigned a project and a faculty mentor to guide his or her investigations. The projects enable scholars to gain practical experience by exploring problems of interest to them. Simultaneously, they hone their public-speaking skills by participating in group modules and presenting their research findings in a public forum at the conclusion of the program.



Leadership

Leadership and its associated responsibilities are central considerations in the Leadership Program. This year, critical thinking and decision-making were featured in a module that explored veterinary public health, economic, political, and social issues. Scholars and facilitators were assigned roles which obliged them to state, defend, and sometimes alter their positions as details of the scenario unfolded. At the conclusion of the module, the facilitators commented on the exercise and discussed leadership principles that have guided their own careers. Dr. David Fraser moderated the discussion with assistance from Dr. Prema Arasu, Professor Gavin Brown, Professor Malden Nesheim and Mr. Andrew Sage II.



Leadership in Action

A film on the life of Irwin Rommel was used as a basis for discussion of the challenges and responsibilities of Leadership

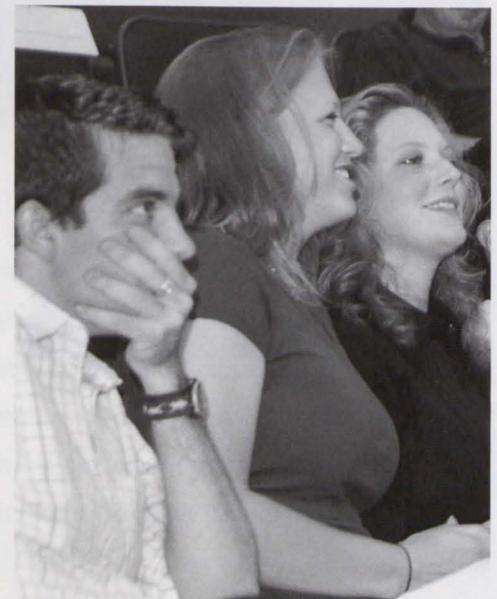


Emerging Diseases



A workshop moderated by Drs. Colin Parrish and John Parker featured a discussion of diseases which are emerging or re-emerging in nature. From a prepared list that illustrated principles of disease emergence, the program fellows selected four diseases on which to focus. They conducted library research on the diseases, then engaged their peers and the facilitators in lively and an informative discussion.

Later that evening, the facilitators commented on related issues and the need for veterinary scientists who contemplate careers in infectious disease research.





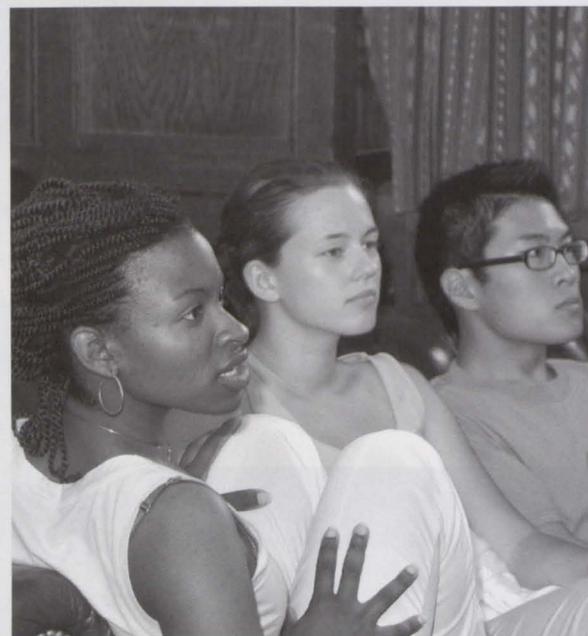
Biodefense and Public Health

A similarly structured workshop addressed problems connected with the deliberate release of infectious agents which could have catastrophic consequences for the health of animals and people. Here, as in the Emerging Diseases Workshop, the fellows worked cooperatively in preparing and presenting their findings. The proceedings were moderated by Dr. Philip Carter and Dr. Peter Jahrling.



During the evening session, the facilitators commented on their own experiences and the preparation required for veterinarians to function as public health professionals.

Dr. Michelle Haven of Pfizer, Inc. moderated a mock competition in which the students exhibited creativity and teamwork in resolving problems connected with the discovery, development and marketing of therapeutic drugs. Dr. Haven was assisted by two colleagues from Pfizer, Dr. Scott Brown and Dr. Donald Mann.



Drug Design



Career Explorations



In a separate meeting, Dr. Gerard Hickey, Dr. Terry Adams and Dr. Veronica Jennings conducted mock interviews with program scholars. The students prepared for the interviews by reviewing three announcements of job positions and three hypothetical résumés of veterinarians who were candidates for those positions.



Graduate Training

Career planning is featured prominently in the Leadership Program. Five meetings were convened this year to consider opportunities for veterinary graduates to broadly influence their profession.

Drs. David Fraser, Bruce Kornreich and Amy Warren commented on the importance of a veterinary degree for individuals who aspire to careers in science. They also emphasized the importance of selecting a superior environment for research training and a mentor who has a successful training record.

Dr. Sean McDonough commented on residency programs in anatomical pathology. He outlined factors one should consider in seeking a residency, the expectations of program organizers, and the satisfaction of a career in anatomical pathology.



In a separate meeting, Drs. Rodney Page, Kenneth Simpson and Edward Breitschwerdt illustrated translational science in which veterinary specialty practice is combined with basic biomedical research.





Still another meeting addressed issues relevant to graduate research training. Drs. Franziska Grieder, Richard Cerione, Robin Yates and Douglas McGregor emphasized factors one should weigh in selecting an institution and the individual to guide one's research training.





NIH



Cornell's Partnership with the National Institutes of Health



Topics and Speakers

Welcome and Introduction

*Joan P. Schwartz, Ph.D., Assistant Director,
NIH Office of Intramural Research*

The Cornell/NIH Partnership

*Douglas D. McGregor, M.D., D. Phil,
Director, Cornell Leadership Program for Veterinary Students*

Acute SIV Infection: Setting the Stage for Immunodeficiency

*Mario Roederer, Ph.D.
Chief, ImmunoTechnology Section, VRC, NIAID*

Nasal Placode to Reproductive Control: GnRH-1 Neurons

*Susan Wray, Ph.D.
Chief, Cellular and Developmental Neurobiology Section,
National Institute of Neurological Disorders and Stroke (NINDS)*

Role of Susceptibility Factors in Drug-Induced Liver Disease

*Lance R. Pohl, Pharm.D., Ph.D.
Chief, Molecular and Cellular Toxicology Section,
Laboratory of Molecular Immunology,
National, Heart, Lung, and Blood Institute (NHLBI)*

How Gene-Environment Interactions Shape Biobehavioral Development in Rhesus Monkeys

*Stephen Suomi, Ph.D.
Chief, Laboratory of Comparative Ethology (NICHD)*

Gene Transfer in Hematopoietic Cells of Non-human Primates

*Robert Donahue, V.M.D., S.M., Director
Simian Gene Transfer Program, National, Heart, Lung, and Blood Institute (NHLBI)*

2005

The National Institutes of Health and the Cornell University College of Veterinary Medicine have forged a partnership which offers program fellows an opportunity to learn about research conducted at the National Institutes of Health, the nation's premier biomedical research institution. This year's fellows gathered on the main campus of 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. Institute scientists commented on their research and opportunities for advanced training at this prestigious institution.

USDA



Topics and Speakers

Introduction and Overview of the Beltsville Agriculture Research Center (BARC)

Dr. David Granstrom, Associate Director, Animal and Natural Resources Institute

Genetic Engineering in Livestock

Dr. Robert Wall, Research Physiologist, Biotechnology and Germplasm Laboratory

Searching for Genes that Control Resistance to Internal Parasites of Cattle

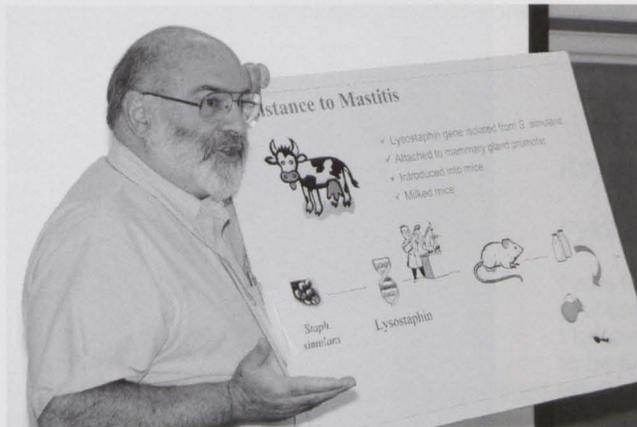
Dr. Louis Gasbarre, Research Leader, Bovine Functional Genomics Laboratory

Ecology of Foodborne Pathogens on the Dairy Farm

Dr. JoAnn Van Kessel, Research Animal Scientist, Environmental Microbial Safety Laboratory

Approaches to Controlling Cryptosporidiosis in Man and Animals

Dr. Mark Jenkins, Microbiologist, Animal Parasitic Diseases 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 Marcia Chien for best overall project as judged by the underlying hypothesis, project design, research results, and presentation. Additional prizes were awarded to Hille Fieten, Andrea MacDonald and Krystal Allen for exceptional projects in integrative biology, cell biology, and molecular biology, respectively. The Selection Committee for the 2005 Leadership Program salutes these individuals and congratulates each of the fellows for their commitment to research and the excellence of their presentations.



Program Prize

Marcia Chien

The Role of Tissue Transglutaminase in Cell Mobility and Invasion



Integrative Biology Prize

Hille Fieten

Expression of the Rb Family Genes in the Developing Mouse Pituitary Gland



Cell Biology Prize

Andrea MacDonald

Capsid Movement of HSV-1 Packaging and Replication Mutants

Molecular Biology Prize

Krystal Allen

Pyk2 Structure Function Mutants and Interactions with Calmodulin

Program Fellows and Their Research

2005

Krystal Allen | Cornell University, *Molecular Biology*

Pyk2 Structure Function Mutants and Interactions with Calmodulin

I was first attracted to veterinary medicine by my curiosity about physiological processes and the different mechanisms by which these processes operate. As I began to explore the veterinary career pathway I discovered a remarkable role to be filled by veterinary scientists. I was drawn to the idea of using the comparative background of a veterinary doctor to approach problems faced by medical science. It was at this juncture that I decided a combined DVM/PhD program was right for me.

This summer I had the pleasure of working under the direction of Dr. Mark Roberson. My project involved the examination of an enzyme called Proline-rich Tyrosine Kinase or Pyk2. This enzyme and various other tyrosine kinases are implicated in a variety of cellular processes including cell growth, differentiation and metabolism. Pyk2 can be activated by a multitude of extracellular signals that elevate intracellular calcium concentration in some cell types. This apparent role for calcium has led the Roberson lab to examine the interaction of Pyk2 and a calcium - binding protein, calmodulin. My work this summer has been to generate Pyk2 structure-function mutants and examine their binding to calmodulin. The work that I have done this summer indicates that Pyk2 does in fact bind calmodulin and that one or two specific domains within the Pyk2 may be the target for calmodulin binding in the presence of calcium.

The Veterinary Leadership Program is an outstanding tool to bring together an international community of individuals and help them to establish a comprehensive understanding of the roles veterinarians may play in research. I found this program beneficial in examining my own career pathway. I would like to thank the members of the Roberson Lab, the directors and all the participants in the Leadership Program for making this summer a truly rewarding experience.



Mélanie Ammersbach | Ontario Veterinary College, *Blood Coagulation*

Platelet Function Studies of Canine Scott's SyndrTTT

I became interested in veterinary medicine because it involves a combination of people and animal contact along with science. After experience in the clinics, I became curious about research and for one summer became a research assistant at the Ontario Veterinary College. I enjoyed it so much that I decided to make research a significant part of my career. I therefore applied for admission to the Cornell Leadership Program because I wanted to gain more research knowledge, laboratory techniques and I wanted to learn more about the opportunities for DVMs in alternative careers.

I worked with Dr. Marjory Brooks and Dr. James Catalfamo on an inherited bleeding disorder of German Shepherd Dogs (GSD) that is similar to Scott's Syndrome in humans. The platelets from affected dogs fail to expose phosphatidylserine (PS) and form microvesicles causing them to have an impaired procoagulant activity. A recent human study suggested that a lipid transporter, ABCA1 was mutated and had decreased expression in a human Scott's patient. This protein is known to be in deficient people with Tangier Disease (TD) so we investigated whether the Scott GSD also had features of TD such as platelet cholesterol content, impaired platelet aggregation, and platelet granule defects. We also investigated whether Scott lymphocytes expressed the Scott's platelet phenotype of impaired exposure of PS. My results showed that Scott's platelets do not express signs of TD but they revealed a defect of PS exposure in Scott's lymphocytes.

The Cornell Leadership Program met all my expectations and I will leave with a better knowledge of research and industry as well as having gained a better ability to make good career decisions. I have also enjoyed meeting students and facilitators from all over the world. I would like to thank the organizers of the program and most importantly my mentors for ensuring that my experience in the program was enjoyable and productive.



Hannah Bender | University of Sydney, *Infectious Disease*

Pre Mucosal-Associated Flora in Cats with Inflammatory Bowel Disease

I am in the final stretch of my veterinary degree at the University of Sydney and expect to graduate in December this year. Not wanting to follow the traditional post-graduation path into general practice, I applied to the Cornell Leadership Program to develop my interest in research and to discover alternative opportunities for veterinarians outside Australia.

I spent the summer in Dr. Kenneth Simpson's laboratory examining biopsy samples of small intestine from cats with inflammatory bowel disease (IBD) using fluorescent in situ hybridization (FISH). IBD is a leading diagnosis in cats presented for the investigation of gastrointestinal causes of vomiting, diarrhea, weight loss and anorexia; however the basis of the inflammatory response in feline IBD is unknown. It remains to be determined if it is due to the presence of undefined pathogens or an inappropriate response to dietary antigens or commensal bacteria. The aim of my study was to examine bacterial populations closely associated with the small intestinal mucosa of cats with IBD compared with control subjects, and test the hypothesis that "an abnormal mucosa-associated microflora is driving mucosal inflammation in cats with IBD." I evaluated bacteria in intestinal mucosal samples using fluorochrome-labeled oligonucleotide probes targeting specific organisms in tissue samples. The probes are directed against regions of 16S and 23S rRNA which permit phylogenetic differentiation of bacteria. The distribution, relative abundance and morphology of bacteria within tissue samples are then examined by fluorescent microscopy. This study has important implications for treatment of IBD, particularly therapies that aim to modify the bacterial groups contributing to the pathogenesis of disease.

The Leadership Program has been a fantastic experience. The facilitators were an inspiration and the excellent residents of Zeta Psi made this summer unforgettable. Thank you to Dr. McGregor and Professor Fraser as well as everyone in Dr. Simpson's laboratory.

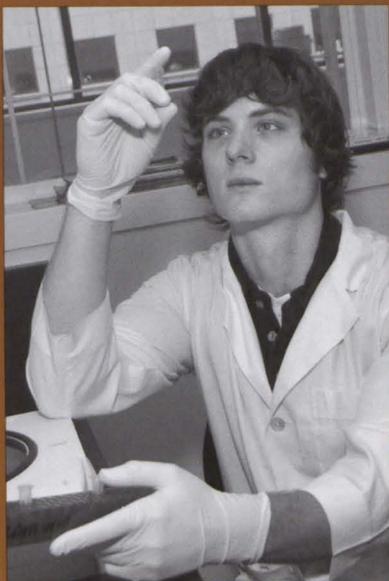


Derek Cavatorta | Cornell University, *Infectious Disease*

Equine Herpesvirus 5 Infections in Common Variable Immunodeficient Horses

I have completed the first year of the DVM/PhD program at the College of Veterinary Medicine at Cornell. I joined the Leadership Program to gain a better understanding of opportunities for veterinarians in biomedical research. This program revealed the diversity of positions available in the academy, government and industry; what they entail, and how to best prepare oneself to succeed in this field. In addition, it helped me to develop the skills required for a leading role in the biomedical sciences, such as public speaking and presentation skills. My ultimate goal is to become a translational scientist in a school of veterinary medicine.

My research project for this summer is entitled "Experimental Equine Herpesvirus 5 Infection of a Foal." Dr. Julia Flaminio's lab isolated this virus from several Common Variable Immunodeficient horses. We are interested in investigating the relationship of the virus to the immunodeficient state. As a pilot study, we isolated a foal immediately after birth and bottle fed it bovine colostrum. This allowed us to prevent the foal from passively acquiring neutralizing antibodies and to monitor the endogenous production of antibodies by the foal. At five days of age we infected the foal with equine herpesvirus 5 from tissue culture and monitored clinical manifestations of the induced disease including the foal's temperature, blood cell counts, immunoglobulin production, viremia, lymphadenopathy and uveitis.



Marcia Chien | University of Illinois, *Oncogenesis*

The Role of Tissue Transglutaminase in Cell Mobility and Invasion

I am a rising second year veterinary student at the University of Illinois at Urbana-Champaign, and have long been interested in pursuing a career that encompasses clinical work and basic science research. For this reason, I felt that the Leadership Program was a unique opportunity for me to explore potential career options. Taking part in the program not only reinforced my desire to be involved in research, but also through the workshops and personal interactions with clinicians doing research, I have gained a deeper appreciation for how 'benchwork' will improve my skills as a veterinarian. After graduating, I plan to join a residency program in pathology and pursue postdoctoral research training that will focus on animal models of disease.

This summer I was fortunate to work in Dr. Richard Cerione's laboratory where I investigated the role of tissue transglutaminase (TGase) in oncogenesis. Previously, our lab has shown that epidermal growth factor (EGF)-stimulation of breast cancer cells activated the enzymatic crosslinking ability of TGase, and that this activation was crucial for EGF-mediated chemoresistance. I expanded upon these findings by determining whether EGF-induced TGase activity influenced other aspects of oncogenesis, namely cell motility and invasion. Using the cervical carcinoma cell line, HeLa, we found that EGF potently activated TGase and caused an accumulation of TGase at the leading edge of cells. However, exposure of the cells to a TGase inhibitor did not alter the ability of EGF to translocate TGase to the leading edge of cells, but it did block EGF-mediated cell migration and invasion. These findings suggest for the first time that EGF-induced TGase activation contributes to the oncogenic potential of HeLa cells by promoting cell migration and invasion.

Thank you to the organizers and participants in the program and the Cerione lab for a truly rewarding experience.



Hille Fieten | Utrecht University, *Oncology*

Expression of the Rb Family Genes in the Developing Mouse Pituitary Gland

Becoming a veterinarian has been a dream for me since I was very young. As a veterinary student, I learned that there was more to the profession than just “curing animals”. I was fascinated by underlying disease mechanisms and especially the process of carcinogenesis. While in Utrecht, I was able to combine clinical work with basic research on canine osteosarcoma. The experience confirmed my interest in oncology and demonstrated that research was fun.

I applied to the Leadership Program because I thought it would be a valuable addition to my education and a stepping stone for my future career. I pursued my research project under the guidance of Dr. Alex Nikitin. The Nikitin lab is focusing on a comparative characterization of the early stages of carcinogenesis associated with inactivation of the tumor suppressor genes, *P53* and *Rb*. Mouse models have been established that mimic human cancers. My role was to investigate early expression patterns of the *Rb* tumor suppressor gene and its family members *p107* and *p130* in the pituitary gland of the mouse embryo.

I have just finished my fifth year of vet school and I have one more year of clinical rotation in small animal medicine to complete. After graduating I would like to do an internship to obtain clinical experience before applying for a residency in oncology. Furthermore, I would like to continue in cancer research and strive for a PhD.

The Leadership Program has been a great experience to me. It has broadened my horizons and provided an opportunity to meet people who are in positions to which I aspire. I want to thank the program organizers for granting me this wonderful experience.



Hilarie Jerauld | Virginia-Maryland Regional College, *Infectious Disease*

Characterization of Genetic Mutations in *Listeria monocytogenes*

Listeria monocytogenes causes severe disease in humans and animals. It is present in many environments, but the most common route of infection is contaminated food. The gene internalin A (*inlA*) codes for a protein that is important in this organism's ability to cause disease. My project this summer in Dr. Martin Wiedmann's Food Safety Lab consisted of two main parts. First, I created a strain of *L. monocytogenes* that had a mutation in the *inlA* gene. I used this mutant to show that a single mutation in this gene results in a bacterium that has reduced ability to infect human cells. The second part of my project consisted of initiating an ongoing study to screen *L. monocytogenes* isolates for reduced capacity to infect human intestinal cells.

This Fall I will begin my second year at the Virginia-Maryland Regional College of Veterinary Medicine in Blacksburg, Virginia. I applied to the Leadership Program because I was interested in getting back into the lab and learning some new microbiological techniques. I was also interested in learning more about alternative roles veterinarians perform outside of private practice. As a result of participating in the Program, I have learned that there is a need for veterinarians in research and there are great opportunities to make significant contributions to science and society by choosing a career outside of private practice. I also learned how to work more effectively in groups and what it takes to be a good leader. In the future I plan to use the lessons gained this summer to continue to cultivate my communication skills and leadership skills. The program has helped me to focus my vision of what I want to achieve in my career and in my life.



Amanda Kreuder | Iowa State University, *Infectious Disease*

An Attenuated *Listeria monocytogenes* Mutant that fails to Compartmentalize PC-PLC Activity

I entered the veterinary profession because I believe that veterinarians have a unique ability to broadly influence the health and lives of both animals and humans. It is this belief that has led me to an interest in research and discovery and encouraged me to apply to the Leadership Program. I will soon be entering my second year of veterinary school, and upon graduation, I plan to practice clinical medicine for a few years, and then possibly return to complete a residency/PhD.

My research this summer in the Marquis lab involved working with *Listeria monocytogenes*, an intracellular bacterial pathogen that has the ability to spread to neighboring cells without entering the extracellular matrix. *L. monocytogenes* secretes a phospholipase (PC-PLC), which is activated specifically in vacuoles formed upon cell-to-cell spread, and contributes to lysis of the vacuolar membrane. A mutant form of *Listeria* that produces constitutively active PC-PLC shows an intracellular growth defect and is attenuated *in vivo*. We tested the hypothesis that attenuation was due to permeabilization of membrane filopodia formed by bacteria during cell-to-cell spread. Intracellular growth assays revealed that compensation for this defect could be achieved by preventing bacterial cell-to-cell spread. Therefore, attenuation of this mutant *in vivo* could be a consequence of release of the bacteria into the extracellular matrix where it can be phagocytosed by neutrophils or attacked by the humoral immune system.

Participation in the Leadership Program has been a very challenging and rewarding experience for me. It has provided me with a greater understanding of the amazing careers that are available to veterinarians, and it has given me the opportunity to get to know some wonderful people from around the world. Thank you to Dr. Marquis, Dr. McGregor, Dr. Fraser, the great people in my lab, and my fellow Leadership Students for a very enjoyable summer.



Louise Le Flufy | Bristol University, *Reproductive Biology*

Potential Functions of PITP-alpha in Capacitation and Acrosomal Exocytosis in Mouse Sperm

I am currently studying Veterinary Science at the University of Bristol and have just finished an intercalated BSc in Veterinary Pathogenesis. I entered veterinary school with a keen interest in research, and applied to the Leadership Program to further explore possibilities for research careers in veterinary science.

During the program I worked in Dr. Alex Travis's lab at the Baker Institute. I was mainly working under the tutelage of Dr Vimal Selvaja, who has been investigating the nature and dynamics of membrane sub-domains in sperm and how they are regulated and maintained. As part of this investigation, Dr. Selvaja has been characterizing the functional properties of phosphatidylinositol transfer protein (PITP α) in sperm. PITPs catalyze the transfer of phospholipid monomers between membrane bilayers *in vitro*, and are thought to be important in the PLC signalling pathway. Their function in sperm is unknown but their functions in other mammalian cells suggest they could be important in membrane sub-domain regulation, and cross talk between the acrosome plasma membrane and the outer acrosomal membrane during capacitation and acrosome reaction.

Using western blot analysis, I investigated molecular weight changes in PITP α in capacitation and the dynamics of its membrane-associated distribution during acrosome reaction. PITP α ^{-/-} mice have been developed but die 4-14 days post partum; thus mature sperm cannot be collected from them. Functional properties of PITP α ^{-/-} sperm could be studied by grafting nullizygous testes onto wild-type mice and transplanting PITP α ^{-/-} germ cells into wild-type testes to produce mature PITP α ^{-/-} sperm. I used immunohistochemistry to identify the presence of germ cells in these testes by the presence of Oct-4. Further work will involve assessing proliferation of these cells and initiating grafting.

I would like to thank all at the Travis lab for helping me.



Shawn Llewellyn | Atlantic University, *Cancer Biology*

Growth Factor-Induced Secretion of Matrix Metalloproteinases by Cancer Cells

My decision to pursue a career in the veterinary profession was sparked by my interest in science and medicine, as well as my love of animals. From my undergraduate degree studies, and from hands-on research in molecular genetics, I became interested in zoonotic diseases and public health. The Leadership Program offered me the chance to further my interests in research and in non-traditional veterinary career paths, as well as the opportunity to discuss with facilitators strategies for pursuing a profession in public health.

This summer I worked in Dr. Tracy Stokol's lab, researching cancer metastasis. We looked at the effects of basic fibroblastic growth factor (bFGF) induced secretion of matrix metalloproteinases, MMP-2 and -9, and the role of focal adhesion kinase (FAK). Current theories suggest FAK may be involved in the secretion of MMP-9, resulting in increased potential for metastasis. I looked at dose responses to bFGF and the resulting MMP-2 and -9 secretion in the osteosarcoma cell line, U2-OS. I then eliminated FAK by the use of siRNA via an adenovirus vector. The levels of MMP-2 and -9 within the control and infected treatments were evaluated using gel zymography, and FAK elimination was confirmed by western blot analysis. My findings showed that FAK does indeed play a role in an increased secretion of MMP-9 when cells are exposed to bFGF. Therefore, further research in tumor metastasis should involve FAK mutagen studies, as well as the clinical relevance of bFGF induced MMP-9 secretion.

I would like to thank Dr. McGregor and Dr. Fraser for making this program a success, and giving us the chance to explore other avenues in veterinary medicine. I would also like to thank Dr. Stokol, and Janelle Daddona for all their help in the lab, and providing me with this great opportunity and learning experience.



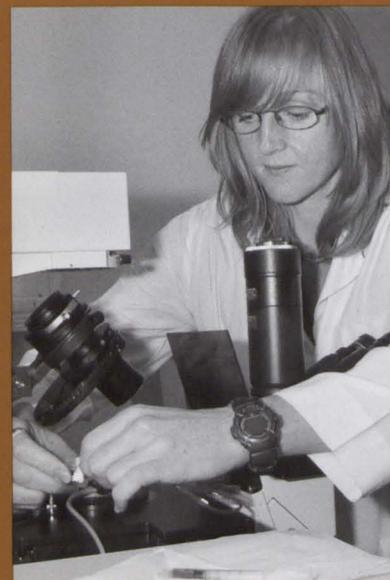
Andrea MacDonald | University of Sydney, *Virology*

Capsid Movement of HSV-1 Packaging and Replication Mutants

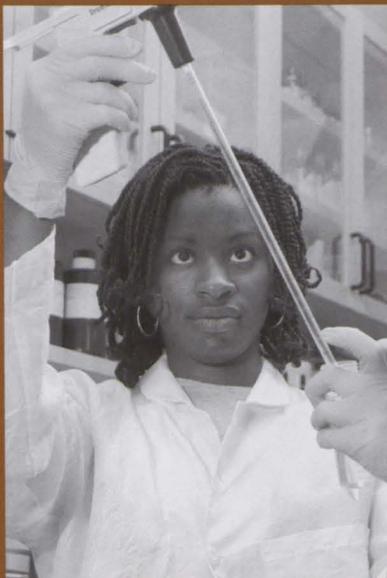
After I completed a BSc in Human Movement Science at the University of Wollongong, I commenced a post-graduate research project in exercise physiology, but soon realized the limitations associated with research in a small field. I subsequently commenced a BVSc at Sydney University with the aim of undertaking more meaningful research. My goals in applying to the Cornell Leadership Program were to gain experience in veterinary research and explore the career opportunities associated with a career in that area.

My project in Dr. Joel Baines's virology laboratory was to examine the role of Herpes Simplex Virus-1 packaging proteins in capsid movement, assembly of the virion, viral egress and apoptosis. It is known that seven HSV-1 proteins are required for viral DNA to be packaged into preformed capsids, that intranuclear capsid movement is ATP-dependent, and that aggregates of capsids, called assemblons, form late in infection. However it wasn't known whether DNA packaging was required for assemblon formation or whether capsid movement was due to DNA packaging. There was no difference between wild type HSV-1 or any of the packaging mutants in my results, indicating that DNA packaging is not required for either assemblon formation or nuclear capsid movement. In addition, my results indicated two of the packaging mutants may allow empty capsids to egress from the nucleus. These questions will be further investigated by Dr. Carol Duffy.

I would like to extend my warmest thanks to Dr Carol Duffy, whose superb teaching and unlimited patience and kindness I will always cherish. My thanks also to Dr. Baines, Liz, Kui, Jarek, Luella and Fan, who generously accepted me into their lab with a wonderful sense of humor that made this summer thoroughly enjoyable. To Dr. McGregor and Prof. Fraser, thank you and congratulations on providing such an extraordinary program.



Kanika McAlpine | Auburn University, *Parasitology*



Protease Characterization Toward the Development of Broad Acting *I. multifilis* Vaccines

Making the transition from undergraduate science to veterinary medicine has given me many experiences that have heightened my awareness of the multitude of career possibilities in this profession. At the present time, my vision for the future lies in research and development in industry, focusing on treatment in the area of mobility-hindering autoimmune diseases such as multiple sclerosis.

This summer I have gained insight into the importance of controlling *I. multifilis* in the fish farming industry. Working with esteemed scientists Dr. Theodore Clark, Yelena Biryshani I characterized *I. multifilis* proteases for use in the development of *I. multifilis* vaccines. As a result of the ongoing project utilizing high-throughput sequencing for *I. multifilis* cDNA libraries, the possibility for peptide sequence matching makes *I. multifilis* proteases a very feasible vaccine candidate. Also, *I. multifilis* proteases are thought to be virulence factors and if successfully targeted could become a safe alternative to the current treatment methods. I performed the isolation of these proteases using two-dimensional zymography. This electrophoretic technique accomplishes protein separation based on isoelectric point and molecular weight to pinpoint the protease activity through the enzymatic degradation of the copolymerized substrate. Once isolated, the protease will be excised, analyzed via mass spectroscopy, sequenced and hopefully paired with matching peptide sequences within an *I. multifilis* cDNA library.

The Leadership Program has been a wonderful experience. My exposure to veterinary scientists in academia, industry and government has helped me realize the benefit of my broad based education for the world of research. As a result of this program, I have been exposed to networking opportunities, a challenging and enlightening research experience, and lasting friendships with people who share my interests. For these experiences I am grateful.



Rebecca Mitchell | Cornell University, *Infectious Disease*

In Vitro Survival of *M. Avium* Susp. In Macrophages

As a dual degree (DVM/PhD) student, I have been involved in veterinary research for the past two years. Over this summer I had the opportunity to integrate a research semester with the Leadership Program.

My project focused on evaluating the survival of strains of *Mycobacterium avium subsp. paratuberculosis (Map)* of differing host specificities in an *in vitro* setting. The goal of the project was to determine if strains of *Map* with restricted host ranges produced different phenotypes of bacterial propagation or cytotoxicity in host macrophages. Five strains of *Map*, including several of bovine origin, one isolated from bison and one from sheep, were used to infect bone marrow derived mouse macrophages. Cells were harvested at four timepoints over ten days following infection. Staining of live *Map* with a green fluorescent dye (carboxyfluorescein diacetate) allowed visualization of bacterial survival and propagation. *Map* cytotoxicity to macrophages was evaluated by comparing density of macrophages in experimental and control wells. Controls included a negative (media only) control and two positive controls (*M. avium* and *M. intracellulare*). These staining techniques were used as validation of a quantitative realtime PCR assay developed to determine bacterial and cellular survival through the four timepoints. This assay will also be used to examine survival of *Map* in macrophages from susceptible and resistant host animals.

I would like to take this opportunity to thank everyone in the Russell lab for a wonderful educational experience over the summer and in the months preceding. It has certainly been a steep learning curve and I value the chance to work in such a stimulating environment.

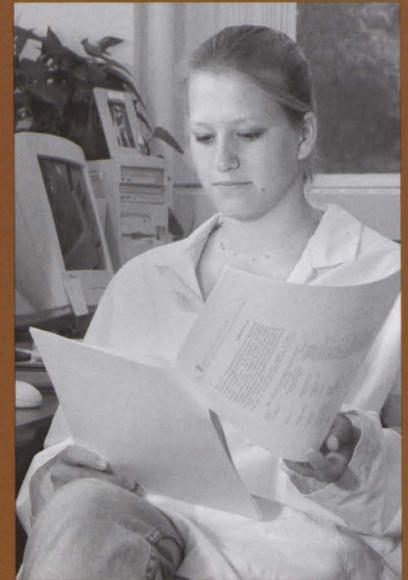
Teresa Negus | Iowa State University, *Epidemiology*

Ceftiofur and Ceftriaxone Resistance in *Salmonella* Isolates from Dairy Cattle

For as long as I can remember I have wanted to pursue a career in veterinary medicine. During my undergraduate training I discovered my love for science, problem solving, and my fascination with research. I want to use my veterinary training and combine it with my passion for science and work as a zoonotic disease researcher, perhaps with vector borne diseases. I have just finished my first year at Iowa State University and have had an unbelievable experience in the Leadership Program here at Cornell.

This summer I worked in the epidemiology lab of a wonderful mentor, Dr. Lorin Warnick. My project involved an analysis of antimicrobial resistance of *Salmonella* isolates from dairy farms in New York, specifically to the third generation cephalosporins- ceftiofur and ceftriaxone. I showed that there is a strong association of ceftiofur resistance with an accompanying ceftriaxone reduced susceptibility. The reduced susceptibility is widespread throughout New York State. This is important because ceftiofur antibiotics have widespread use on dairy farms, and ceftriaxone is currently one of the best treatments to combat *Salmonella* infections in children. I also used a spatial analysis program to show that the ceftiofur/ceftriaxone resistant farms were not clustered, but were randomly located throughout the state and not likely spread by clonal dissemination. In addition to data analysis I also collected fecal and blood samples from farms.

The Leadership Program provided many wonderful opportunities to speak with individuals at the forefront of their careers. I would like to give a special thanks to my lab, specifically Dr. Warnick, Kim Ray, and Kelly Reed. Another thanks to Dr. McGregor and Dr. Fraser for all the time they spent organizing such wonderful experiences for us.



Emily Nestor | Cornell University, *Endocrinology*

Transcriptional Activation by AP-1 Elements

I became interested in veterinary medicine because of the way that it melds the biological sciences with clinical practice. Recently I have been exploring another aspect of this linkage, to see how problems in human and veterinary medicine are solved through research. The Leadership Program has given me a wonderful opportunity to pursue this interest.

In the Kraus lab I have been studying the intricate process of activation of genetic transcription from mRNA to protein by a regulatory element known as AP-1. Activation starts when two transcription factors (c-Fos and c-Jun) combine together and then bind to the AP-1 enhancer element. This complex can then stimulate translation when the factor, c-Jun, is phosphorylated by the enzyme JNK, a mitogen-activated protein kinase (MAPK). It is known also that a receptor protein for estrogen (ER) can interact with this complex and that when estrogen is bound to this receptor, transcriptional activation occurs under certain conditions.

I have been investigating this sequence of events in three ways. Firstly I treated cells with one of three agents: either estrogen, or an activator of MAPK, or a selective modulator of ER, and I then isolated the mRNA from these cells. After producing cDNA from the mRNA I looked at genes specifically activated through an AP-1 element to find out which had been switched on by the different treatments. My results showed that the c-myc gene was activated by estrogen treatment.

My second approach was to introduce into these cells some AP-1 elements linked to the marker, luciferase. Then I treated these cells as before and was able to determine activation by assaying for luciferase. Finally I did a cloning project and deleted the AP-1 elements from a luciferase construct that I can now introduce into cells to use as a control.



Marieke Opsteegh | Utrecht University, *Virology*

Mutation of E Box-Like Element in Chicken Anemia Virus

As a child, I already aspired to become a veterinarian. I started Veterinary Medicine at Utrecht University in 1999. During my studies I became increasingly interested in a career in research. While still in school I had the opportunity to acquire a year of research experience, which I really enjoyed. I applied to the Leadership Program to see whether my affinity for research would be confirmed, and to learn more about career options in veterinary science.

This summer I worked in Dr. K.A. Schat's lab. The aim of my project was to learn more about the replication of Chicken Anemia Virus (CAV). In previous experiments the use of a promoter/enhancer construct that extended into the first open reading frame indicated the presence of downstream repressor elements. One of these elements represented an E box-like sequence, and mutations of this sequence resulted in increased transcription of enhanced green fluorescent protein. We hypothesized that mutation of the E box-like element in an infectious virus results in increased replication of CAV. To test this hypothesis, two different mutations were made in the genomes of two strains of CAV. Further research will analyze the effects of these mutations.

The Leadership Program has been a rewarding experience. I enjoyed my time in the lab, as well as the modules and workshops. The opportunity to meet veterinary professionals with such amazing careers has been inspirational. The program has further encouraged me to pursue a research career, in which I would like to focus on tropical infectious diseases.

I want to thank Dr. McGregor, Dr. Fraser, and all other contributors for enabling me to participate in this great program. Special thanks to Ton Schat, and everyone in the Schat lab, for their support and encouragement.



Emily Orchard-Mills | University of Sydney, *Genetics*

Validation of Gene Expression Levels in an In Vitro Model of Early Osteoarthritis

I am currently in the fifth year of my veterinary program. I chose veterinary medicine because I wanted to combine the study of biological science with my desire to work with animals. Having completed almost the entire clinical course, I have learned that general practice does not satisfy my ambition. The Leadership Program was a fantastic opportunity to gain insights into non-traditional career paths available to veterinarians. The chance to interact with like-minded people from around the globe and find out about options outside of Australia was an invaluable experience.

This summer I worked in the laboratory of Professor George Lust and Dr. Nancy Burton-Wurster with the patient assistance of Dr. Raluca Mateescu, a postdoctoral associate. The laboratory is investigating osteoarthritis and hip dysplasia in dogs. I aimed to use the technique of quantitative real time reverse transcription polymerase chain reaction to validate the results of an oligonucleotide microarray experiment conducted on mechanically loaded and control cartilage samples collected from an in vitro model of early osteoarthritis. The objective of the project was to identify genes with differential expression in this model that would be candidates for biochemical markers or as targets for therapeutic agents. The genes of interest were cyclooxygenase2, annexin 2, activating transcription factor 3, laminin 5, selenoproteinX and interleukin 18.

The Leadership Program has exposed me to a variety of career options and paths with which I was previously unfamiliar. It broadened my understanding of the international veterinary community and the role of the veterinarian in the wider medical and scientific community. It has been an amazing experience and I thank all those that made it so rewarding; your time and interest in helping me this summer will not be forgotten.



Trisha Oura | Tufts University, *Virology*

Analysis of FIPV Entry into Host Cells

After finishing my first year of veterinary school, I was overwhelmed by the range of career opportunities available to me. I applied to the Leadership Program in hopes of narrowing my interests, yet I am now considering even more career paths than before. Ideally I would like to combine teaching, clinical medicine, and research in an area such as zoological medicine or wildlife and emerging diseases.

I welcomed the opportunity to work in Dr. Gary Whittaker's lab. The lab seeks an understanding of the mechanism by which influenza and coronaviruses enter cells. My task was to investigate the method of entry of Feline Infectious Peritonitis Virus (FIPV), a Group 1 coronavirus. Drugs such as monensin and chlorpromazine inhibit pH-dependent and clathrin-mediated endocytosis, respectively. I used these treatments to compare FIPV entry into host cells with the known endocytic mechanisms of influenza and infectious bronchitis virus (IBV), an avian coronavirus. The experience enabled me to learn a variety of techniques including cell culture, fluorescence microscopy, western blotting, antibody virus collection from chicken eggs, and plasmid transfection. Preliminary data indicate that FIPV may act similarly to IBV with decreased infectivity following monensin and chlorpromazine treatment.

My short time with the Leadership Program has given me a chance to witness the role that veterinarians can play in advancing scientific research. Though my future plans are not yet firm, I enjoyed the challenge of working on a new project and found the experience to be an excellent lesson in critical thinking and creativity. Many thanks to the Whittaker lab for their guidance, patience, and good humor!



Heidi Perreault | North Carolina State University, *Infectious Disease*

MLST of *Streptococcus canis* from Dogs and Dairy Cattle

Like many of my colleagues, my love of animals and desire to help is what initiated my dream of becoming a veterinarian. However, as I become more aware of other opportunities for veterinarians, my future goals have shifted from treating individual animals to herd and global health. As a rising third year student, I now desire to become a part of veterinary public health, specifically centering on zoonotic disease prevention, control and emergency responses on a national level.

This summer I had the privilege of working at Cornell's Quality Milk Production Services (QMPS) molecular laboratory under the guidance of Drs. Ynte Schukken and Ruth Zadoks. My project concerned Multi-Locus Sequence Typing (MLST) of bacteria that cause mastitis in dairy cows. MLST is a powerful technique for distinguishing bacterial strains using DNA sequences. Sequence data can be compared in statistical programs and over the internet so that a global reference database can be created and accessed. MLST has been applied to *Streptococcus uberis* in our laboratory. My goal was to apply MLST to *Streptococcus canis* using four housekeeping genes. Dogs can become infected with many different strains of *S. canis*; however, preliminary work suggests that there is limited variability in strains that produce mastitis in cattle. Comparison of MLST data from canine and bovine isolates was initiated to confirm this.

The Leadership Program was truly an eye opening experience for me, as it highlighted less known career paths in government, industry and the academy, and allowed me the opportunity to interact with top scientists. I am grateful for Dr. Schukken's and Dr. Zadoks' mentorship as well as insights gleaned from program facilitators. I would especially like to thank Dr. McGregor and Dr. Fraser for making this program possible and my fellow participants for their friendship, fond memories and valuable perspectives.





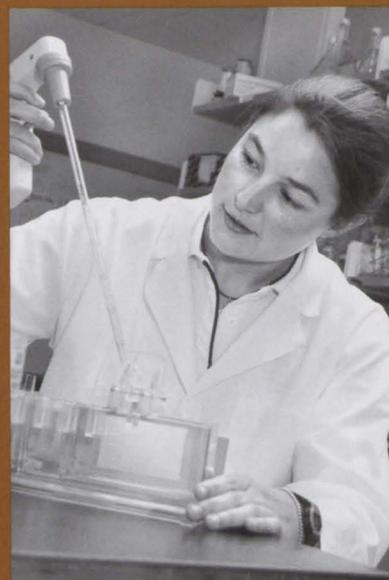
Trisha Pullos | University of Queensland, *Osteoarthritis*

Proteomic Differences in Response to IL-1 Alpha Treatment of Synoviocyte and Cartilage Co-Cultures

The enjoyment I derived from acquiring my undergraduate degree in Biomedical Science combined with a strong desire to become an equine surgeon inspired me to seek a Veterinary degree. However, I soon realized that in order to rise to the peak of my chosen field I would have to combine cutting edge research with surgical aspects of equine practice. I applied to the Leadership Program with a view to determining how I might achieve my career goals. I had the privilege of working with a truly inspiring mentor, Dr. Lisa Fortier, whose primary interest is in osteoarthritis. I participated in two research projects. The first project made use of a canine model of the disease in horses. Canine cartilage and synovial tissue were co-cultured in order to identify the presence of any protective proteins released from the synovial tissue after degradative enzymes were added to the cultures. Identification of protective proteins could have important applications in the treatment of osteoarthritis in both humans and animals.

In my second project, I measured Caspase-3 in equine cartilage samples. Caspase-3 has a key role in triggering apoptosis in chondrocytes. Impeding the process may have therapeutic applications in the management of osteoarthritis.

I would like to thank Dr. McGregor and Professor Fraser for revealing career opportunities for veterinary graduates, and also everyone in the Fortier/Nixon laboratories for their generous support and fun times! For me, the Leadership Program has been an enlightening experience. I now have a clear path to follow as I seek to realize my career aspirations and future dreams.



Bo Raphael | University of Queensland, *Infectious Disease*

The Role of MHC Class I Downregulation in Herpes Virus Infections

My pursuit of the Bachelor of Veterinary Science degree was prompted by my passion for environmental science and the assurance by many that this degree would provide a solid foundation for a scientific career. I sought admission to the Leadership Program because I wanted to gain more experience in laboratory research, and learn more about career options.

I conducted research on equine herpes virus type 1 (EHV-1) in the lab of Dr. Klaus Osterrieder. EHV-1 causes respiratory disease, abortion and neurological disorders in equines worldwide. I endeavored to separate two functions of a protein called UL49.5. One function is expressed in MHC class I downregulation; the other involved is also responsible for maturation of glycoprotein M, another viral protein in virus egress and cell to cell spread. I measured the ability of the UL49.5 proteins of other herpes viruses to facilitate maturation of EHV-1 gM. Using cotransfection experiments and Western blot analysis, I found that the UL49.5 of canine herpes virus (CHV), Varicella-Zoster virus (VZV) and Marek's disease virus (MDV), all of which do not downregulate MHC class I, were able to promote EHV-1 gM maturation. These findings were supported by preliminary infection experiments using a UL49.5-negative virus. Construction of recombinant viruses expressing UL49.5 of MDV and VZV, instead of EHV-1 UL49.5, is underway. Knowledge gained from these studies may eventually be exploited in the design of a novel vaccine.

I learned much about career options this summer, and have been greatly impressed by the understanding and enthusiasm of my lab associates for their chosen field of study. The experience has inspired me to identify a field where I can become equally motivated. Thanks to all in the Osterrieder Lab, to the program organizers and, most importantly, to the other students in the program for the lasting friendships I have made.

Johanna Rigas | Oregon State University, *Epidemiology*

A Deterministic Mathematical Model of *S.typhimurium* DT104 on Commercial U.S. Dairy Farms

With new diseases arising and old ones evolving, there is ample opportunity for research. My question is, "Where do I fit in?"

Before embarking on my career in veterinary medicine, I was working intimately in the world of biochemistry. Instead of finding a career, I realized that this was just one of many stepping stones. The next step will be to apply my scientific knowledge to clinical applications. After finishing my training in veterinary medicine, I intend to mix my knowledge of medicine and research and see what results.

This summer, I had the opportunity to explore what for me was a new area of research. I worked with Dr. Yrjö Gröhn on a mathematical model of *Salmonella typhimurium*, DT104. This pathogen is of significance to both human and animal medicine as it is a potent zoonotic pathogen. Using a computer program to model the spread of *S. typhimurium* in a population, I determined the effects of population size and vaccination strategies on commercial dairy farms. With adequate knowledge of the spread of the pathogen through a population, we can better devise a method to treat and inhibit outbreaks within the population.

There are limitless possibilities of careers related to veterinary medicine; however, the challenge is finding those that best suit an individual. The Leadership Program has given me the opportunity to study an area of curiosity for me that I otherwise might never have explored. It has been a privilege working with Dr. Gröhn, and I thank him for his patience and understanding in teaching me the ways of mathematical modeling. I am especially thankful for the great times with my temporary family at the house. Each person made an already fabulous summer an extraordinary one.

Klara Saville | University of Cambridge, *Reproductive Biology*

Amplification of paternal DNA from equine endometrial cups

Throughout the veterinary medicine course at Cambridge I have been inspired by both research and clinical experience. The Leadership Program offered the opportunity to build upon these interests and shaped my career decisions. My long term goal is to conduct research into infectious diseases affecting production animals in the developing world and also attempt to improve veterinary services to people in such countries.

During my summer at Cornell I worked with Dr. Doug Antczak and Don Miller. I investigated the phenomenon of persistent endometrial cups in Mare Reproductive Loss Syndrome, an outbreak of which occurred in Kentucky in 2001 and 2002. Endometrial cups are derived from invasive trophoblast cells of the chorionic girdle region of the placenta, and normally degenerate at day 100 of pregnancy. Endoscope-guided biopsies taken from retained endometrial cups following abortion have been sent to the Antczak laboratory for assay and for the study. I have been working with tissues from normal pregnancies to devise a method to confirm the presence of endometrial cup tissue within the biopsy samples. Due to the large population of maternal leukocytes surrounding the cups it was necessary to design specific nested primers in order to amplify paternal DNA within the foetal genome. I successfully amplified Y chromosome microsatellites, but was unable to definitely amplify paternal UM011, a somatic microsatellite and concluded that this is probably due to competition for primers with the maternal DNA which is present at a much higher copy number.

I have thoroughly enjoyed participating in this stimulating program. The student-directed learning approach has increased my confidence and enhanced my appreciation of career opportunities open to veterinary graduates. I thank Dr. McGregor, Dr. Fraser and my sponsors The Wellcome Trust for this privilege. I would also like to thank everyone in the Antczak lab and acknowledge the invaluable help and guidance from Don Miller.





Ruth Schmitte | University of Hannover, *Genetics*

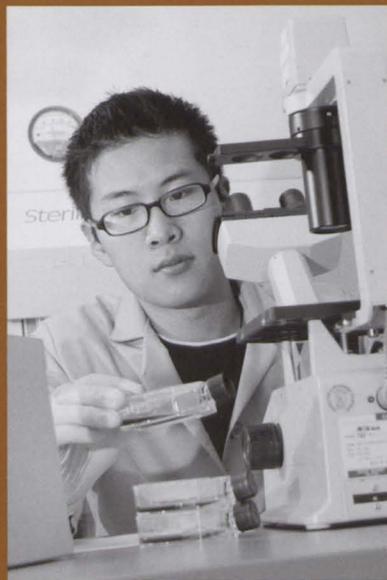
Mahogunin Interacting Proteins

I have always been interested in animals as well as in natural sciences, so veterinary medicine seemed to be the perfect combination. I began my veterinary studies in 2002, and during this period developed a research interest in biochemistry and genetics. I applied to the Leadership Program to gain experience in research and to learn more about career options.

This summer I had the good fortune to work in Dr. Teresa Gunn's lab. My project involved identifying and confirming the interaction of proteins with Mahogunin. Mahogunin ring finger 1 (Mgrn 1), a RING-containing E3 ubiquitin ligase, is involved in ubiquitination, a process that is important for protein trafficking and degradation. Mutant mice which lack Mahogunin develop spongiform neurodegeneration later in life. The disease has features of prion-mediated neurological diseases, and may also be related to Alzheimer's and Parkinson's disease. We hypothesize that Mgrn 1 has a role in neuronal cell development.

For my study I tried to isolate Mahogunin and proteins associated with it from brain proteins using an antibody. I also cloned the Mahogunin gene as well as putative interactor genes in tagged vectors and transfected them into a mammalian cell line to confirm their interaction *in vivo*. Identification of further interactors is expected to provide insights into signaling pathways involving Mahogunin.

The Leadership Program has strengthened my interest in research and given me a clearer view about my career path. I have learned much and had the opportunity to meet many great people. I would like to thank the Gunn lab for all the help and support they have given me as well as Merck for giving me a fellowship and for hosting the symposium in which I participated.



Kai-Biu Shiu | University of Glasgow, *Virology*

Characterization of Potential Evolutionary Intermediates of Canine Parvovirus

As I progressed through my veterinary degree at the University of Glasgow, I found myself intrigued by mechanisms of disease, particularly those caused by viruses. After my third year, I undertook a degree in veterinary pathology at the Royal Veterinary College, which had an emphasis on molecular pathogenesis and emerging diseases. This experience confirmed that my interest in disease was sufficient to fuel a career in research.

My research at Cornell contributed to Professor Colin Parrish's studies into the evolution of Canine Parvovirus (CPV). CPV-2 emerged clinically in 1978 and spread to cause dramatic disease in dogs worldwide within a year. Soon after, a new clade of variants (CPV-2a) emerged that had four amino acid capsid changes, regained the ability to infect cats, and within a year replaced CPV-2 in nature. This suggests that CPV-2a had a higher relative fitness than CPV-2, which may be attributed to the four changes in the capsid protein. My project was to create and characterize intermediate viruses with combinations of 1, 2 or 4 of the mutations to try and determine how CPV-2 evolved to its successor. My results suggest that intermediates analyzed thus far may be less fit relative to both CPV-2 and CPV-2a. Thus, CPV provides a potential model for addressing an unsolved process in evolutionary biology: how does one fit organism evolve to a successor of greater fitness when the intermediates are relatively less fit?

When I graduate next year, I hope to become a clinician in an academic environment before pursuing training in science, with the ultimate goal of working in the field of infectious diseases. I thank Dr McGregor for organizing this influential program, Professor Parrish and Karla Stucker for their guidance, and Wellcome Trust for providing me with a fellowship.

Timothy Stell | Cornell University, *Virology*

Investigations into the Distributions and Putative Functions of the Feline Calicivirus Nonstructural Proteins

Although I have always wanted to become a veterinarian, I am still exploring where I intend to go next. One year's experience as a laboratory technician at a pharmaceutical company has shown me that I enjoy benchwork and experimental design. Having completed my first year of veterinary school, the Leadership Program offered an ideal opportunity to discover careers within veterinary research.

This summer, I worked with Feline Calicivirus (FCV) under the guidance of Dr. John Parker. FCV is a positive-sense, single-stranded RNA virus that produces two structural proteins and six non-structural proteins. Thus far, all positive-sense, single-stranded RNA viruses have been found to replicate in association with intracellular membranes. We therefore examined the FCV non-structural proteins to determine where within the cell they are localizing. Understanding localization is a means to begin understanding viral replication. Previously in the Parker Lab, four of the proteins were cloned into vectors that encode Green Fluorescent Protein, transfected into HeLa cells, and viewed on a fluorescent microscope. I continued this work by repeating the same steps with the remaining two proteins. Three of the proteins were found not localizing to membranes, but rather concentrating in the nucleus. Of these three, I studied the non-structural protein, p5.6, in more depth. P5.6 was predicted by online databases to have a nuclear localization signal and a nuclear export signal, indicating that the protein may be cycling into and out of the nucleus. Experiments are being conducted to determine if these predictions are accurate. If so, p5.6 could prove essential to viral replication, and a potential target for vaccine or drug therapy.

I thank everyone in the Parker Lab for welcoming me into the lab and assisting me with my project. I also thank Dr. McGregor and Dr. Fraser for organizing and facilitating the Leadership Program.

Catherine Trickett | University of Bristol, *Animal Behavior*

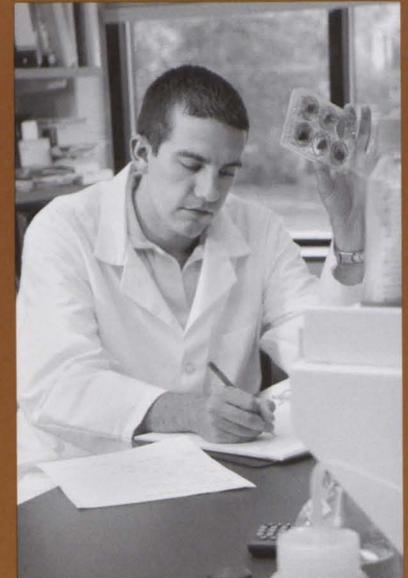
Investigation Into The Effect Of Opioids On The Behavior Of Crib Biting Horses

A love of working with animals and people, plus an interest in science encouraged me to pursue a career in veterinary science. An intercalated degree in Animal Behavior and Welfare enabled me to study personal areas of interest to a greater depth. I felt that the Leadership Program would be an opportunity to enhance my research skills and explore the various career paths available to a veterinary science graduate.

This summer I had the enormous pleasure of working with Dr. Katherine Houpt whose current area of interest is crib biting in horses. The practice is thought to be linked to the endogenous release of opiates. It is hypothesized that crib biting horses are more sensitive to endogenous opiates because they have a higher number of opiate receptors in the area of the brain controlling motor movements involved in the behavior. In order to investigate the neuronal pathways and receptors involved, my study measured the effect of exogenous opioid drugs on the behavior of horses with an established cribbing pattern. We administered intramuscular injections of morphine, butorphanol, naloxone and apomorphine to six horses over the course of ten weeks.

After videotaping the horses overnight on a time lapse recorder, we watched and analyzed the lapse to identify differences in cribbing frequency compared with saline controls. We hope the results will also inspire pharmacological measures for controlling the behavior.

The Leadership Program has given me the confidence and understanding to embark on a career in research. I have enjoyed immensely the opportunity to work and develop with like minded people from all over the world. My sincerest appreciation and thanks go to all those involved in making this formative experience possible.



Nina Weishaupt | University of Hannover, *Cell Biology*

Localization of ELP Couples from Parents in Living Mammalian Cells



After completing the third year of my veterinary education in Hannover, Germany I had my first opportunity to pursue scientific research as a participant in the Leadership Program. I began vet school with the objective of becoming a small animal veterinarian. However, a strong interest in neuroscience later directed me more towards a career in science.

My project in Dr. Ruth Collins' lab was concerned with the topographic localization of ELP complex proteins in human cells. The Elongator Complex consists of six subunits designated ELP1-6. Dr. Collins and Pete Rahl demonstrated that ELP proteins are involved in vesicle trafficking and are abundant in the cytoplasm, but absent from the nucleus of yeast. Their findings are important because mutations in ELP have been linked to the human neurodegenerative disease, Familial Dysautonomia (FD). To further explore the relationship of the ELP mutation to FD we decided to extend our research to mammalian cells. In order to localize the subject proteins in human cells, we created plasmids containing individual ELP subunits fused to enhanced green fluorescent protein or eGFP. After transfection, we were able to localize the ELP subunits using fluorescence microscopy. To determine if the ELP subunits are nuclear-shuttling proteins, we added the drug leptomycin B to transfected cells to trap proteins inside the nucleus.

The Leadership Program has been a highly valuable and encouraging experience. It was demanding and exciting, and provided useful insights into future career paths. I would like to thank the members of Dr. Collins' lab, Dr. McGregor and Dr. Fraser as well as all program participants for making this summer a unique and highly enjoyable experience.

2005



Terry Adams



Prema Arasu



Edward Breitschwerdt



Gavin Brown



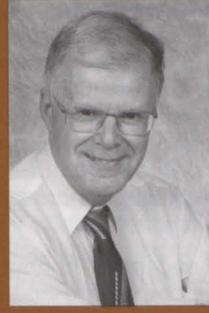
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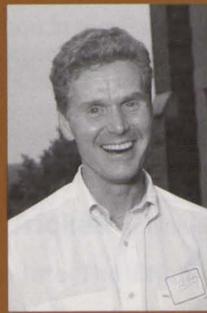
David Fraser



Franziska Grieder



Michelle Haven



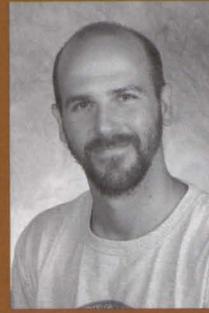
Gerard Hickey



Peter Jahrling



Veronica Jennings



Bruce Kornreich



Donald Mann



Sean McDonough



Douglas McGregor



Malden Nesheim



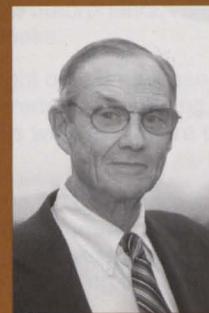
Rodney Page



John Parker



Colin Parrish



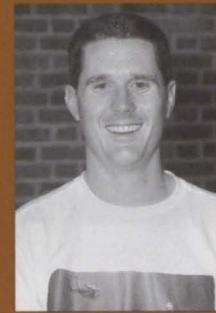
Andrew Sage II



Kenneth Simpson



Amy Warren



Robin Yates

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Dr. Scott Brown, **Facilitator**
Senior Director,
Metabolism Safety
Pfizer Inc.

Dr. Philip Carter, **Facilitator**
Professor, Microbiology
North Carolina State University

Dr. Richard Cerione, **Counselor**
Professor, Molecular Medicine
Cornell University

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

Dr. Franziska Grieder, **Counselor**
Associate Director, Comparative Medicine Program
National Center for Research Resources
National Institutes of Health

Dr. Michelle Haven, **Facilitator**
Senior Director, Veterinary Medicine,
Pharmaceuticals
Pfizer Inc.

Dr. Gerard Hickey, **Facilitator**
Co-Director, Pharmacology, Animal Health
Merck & Co., Inc

Dr. Peter Jahrling, **Facilitator**
Senior Scientist, NIAID
National Institutes of Health

Dr. Veronica Jennings, **Facilitator**
Research Veterinarian
Merck & Co., Inc

Dr. Bruce Kornreich, **Counselor**
Postdoctoral Fellow, Molecular Medicine
Cornell University

Dr. Donald Mann, **Facilitator**
Associate Research Fellow
Pfizer, Inc.

Dr. Sean McDonough, **Counselor**
Associate Professor, Pathology
Cornell University

Dr. Douglas McGregor, **Counselor**
Director, Leadership and Training Initiatives
Cornell University

Dr. Malden Nesheim, **Facilitator**
Provost Emeritus
Cornell University

Dr. Rodney Page, **Counselor**
Professor and Department Chair, Clinical Sciences
Cornell University

Dr. John Parker, **Facilitator**
Assistant Professor, Virology
Cornell University

Dr. Colin Parrish, **Facilitator**
Professor, Virology
Cornell University

Mr. Andrew Sage II, **Facilitator**
President,
Sage Capital Corp

Dr. Kenneth Simpson, **Counselor**
Associate Professor, Clinical Sciences
Cornell University

Dr. Amy Warren, **Counselor**
Resident, Pathology
Cornell University

Dr. Robin Yates, **Counselor**
PhD Graduate Student, Microbiology and Immunology
Cornell University



Housing

Participants in the 2005 Leadership Program were housed in the Zeta Psi fraternity house on the Cornell campus. They had exclusive use of the building for the ten-week period that the program was in session. Several events were scheduled there, typically in the evening in conjunction with a catered meal. The living arrangements enabled the fellows to socialize and relax in a convenient and pleasant campus environment

Program Coordinator

Ms. Munira Hyder-Adam



I immensely enjoyed my position as Coordinator of the 2005 Leadership Program. I especially appreciated working with an outstanding group of students, and the exceptional facilitators and counselors who took part in the various modules, workshops and participant-initiated activities. My position enabled me to better appreciate the world of veterinary medicine and offered a unique opportunity to share experiences with future leaders of veterinary science and public health. It has also been a tremendous pleasure to work with Dr. McGregor, Dr. Fraser, Susan Williams and Joyce Reyna, and I am grateful for their support and confidence.

Program Dinner



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

Apart from their intensive schedule, program fellows found time for many personal pleasures. They capitalized on local Ithaca amenities and visited Boston, Montreal, Niagara Falls, New York City and Washington, DC.



Where Are They Now?

The program organizers maintain contact with Leadership Program graduates in order to strengthen the professional network forged 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 careers in science or public health.

- 1989**
- John Angelos** Assistant Professor, Food Animal Medicine, University of California, Davis
 - William Carr** Scientist, Doris Duke, Research Institute, Durban, S. Africa
- 1990**
- Laura Gumprecht** Veterinary Pathologist, Merck Research Laboratories, Rahway, New Jersey
 - Elizabeth Lyon Hannah** Research Faculty, Boise State University, Idaho
 - Richard Haworth** Molecular Pathologist, GlaxoSmithKline, Middlesex, United Kingdom
 - Melissa Mazan** Assistant Professor and Director, Sports Medicine, Tufts University
 - Rebecca Papendick** Associate Pathologist, Zoological Society of San Diego
 - Susan Schaefer** Clinical Assistant Professor, Surgery, University of Wisconsin
 - Dawn Shore** Veterinary Specialist, Equine Theriogenology, University of Missouri
 - A. W. (Dan) Tucker** Lecturer, Veterinary Public Health, University of Cambridge
 - Thomas Vahlenkamp** Assistant to the President, Friedrich-Loeffler Institute, Riems
- 1991**
- Prema Arasu** Associate Professor, Parasitology, North Carolina State University
 - David Bainbridge** Clinical Veterinary Anatomist, Cambridge University
 - Linda Berent** Clinical Assistant Professor, University of Missouri
 - Allan Berger** Research Scientist, Department of Molecular Pharmacology, University of Iowa
 - Ian Davis** Research Instructor, Genomics and Pathobiology, University of Alabama, Birmingham
 - Judy Hickman-Davis** Assistant Professor, Anesthesiology, University of Alabama, Birmingham
 - Dianne Hellwig** Associate Professor, Agriculture and Natural Resources, Berea College, Ohio
 - Alan Radford** Lecturer, Small-Animal Studies, University of Liverpool
 - Jean Reichle** Medical Director, Animal Imaging, West Los Angeles, California
- 1992**
- Tomasz Betkowski** Medical Representative, Eli Lilly Co., Indianapolis, Indiana
 - Stephen Davies** Assistant Professor, Parasitology, Uniformed Services College, Washington, DC
 - Mathew Gerard** Assistant Professor, Surgery, North Carolina State University
 - Christine Hawke** Lecturer, Clinical Instruction, University of Sydney
 - Julio Montero-Oliver** Command Veterinarian, HQ US Army South
 - Jacqueline Phillips** Senior Lecturer, Physiology, Murdoch University, Perth, Australia
 - Cristina Rodriguez-Sanchez** Senior Research Associate, University of Mexico
 - Johanna Sherrill** Staff Veterinarian, Los Angeles Aquarium, Long Beach, California
 - Louise Southwood** Assistant Professor, Emergency and Critical Care, University of Pennsylvania
 - Reinhard Straubinger** Lecturer, Institute for Immunology, University of Leipzig

- 1993**
- Virginia Fajt** Adjunct Assistant Professor, Veterinary Antimicrobial Support System, Iowa State University
- Deborah Hoyle** Postdoctoral Research Associate, Epidemiology, University of Edinburgh
- Christopher Laing** Post Doctoral Fellow, Molecular Biology, University of Pennsylvania
- Emma O'Neill** Lecturer, Small Animal Medicine, University College, Dublin
- Joanne Rainger** Registrar, Anesthesia, University of Sydney
- Ashley Reynolds** Research Staff Member, Virology, Princeton University
- Susanna Ryan** Senior Medical Writer, MediTech Media, London, U.K
- Veiko Saluste** Executive, Interchemi, Estonia
- Lynn Wachtman** Postdoctoral Fellow and MPH Student, Johns Hopkins University
- Melissa Beall** Research Scientist, IDEXX Inc.
- Larissa Bowman** Director, Mountain Veterinary Pathology, Ashville, N.C
- 1994**
- Leslie Gabor** Assistant Professor, Pathology, Atlantic Veterinary College, Prince Edward Island
- Paige Langdon** Clinical Instructor, Small Animal Medicine, University of Missouri
- María Lara-Tejero** Postdoctoral Fellow, Department of Microbiology, Yale University
- Christopher Mariani** PhD Student, Neuroscience, University of Florida
- Sonia Mumford** Veterinary Medical Officer, Fish Health Center, Olympia, Washington
- Jeffrey Phillips** Assistant Professor, Oncology, University of Tennessee
- Julie Pomerantz** Associate Research Scientist, Wildlife Trust, Palisades, New York
- Stacy Pritt** Associate Director, Center for Animal Resources, Harvard University
- Oliver Turner** Pathologist, Novartis Inc
- Gertraut Altreuther** Project Manager, Parasitology, Bayer Animal Health, Leverkusen Germany
- Adrienne Bentley** Resident, Surgery, University of Pennsylvania
- 1995**
- Philippa Beard** Postdoctoral Fellow, Virology, Imperial College, London
- Kate Creevy** Resident, Small Animal Medicine, University of Georgia
- Rachael Gray** Lecturer, Veterinary Anatomy, University of Sydney
- Krista-Britt Halling** Assistant Professor, Surgery, Ontario Veterinary College
- Wendy Harrison** Research Scientist, GlaxoSmithKline, Middlesex, United Kingdom
- Kellie Lorsch** Technical Service Specialist, Pfizer, Australia
- Andrew Moorhead** PhD Student, Microbiology, Cornell University
- Tony Mutsaers** PhD Student, University of Toronto
- Michelle Dries-Kellaway** Research Project Manager, Meat and Livestock, Australia
- Margaret Fleischli** Research Intern, US Geological Survey National Wildlife Health Center, Madison, WI
- 1996**
- Patricia Gearhart** Adjunct Assistant Professor, Ophthalmology, Michigan State University
- Jessica Geyer** Resident, Laboratory Animal Medicine, GlaxoSmithKline, King of Prussia, PA
- Tamara Gull** PhD Student, Texas A&M University
- Antonia Jameson-Jordan** PhD Student, Molecular Medicine, Cornell University
- Ralph Senften-Rupp** Project Planning Consultant, Berne, Switzerland

Allison Stewart Assistant Professor, Large Animal Medicine, Auburn University

Edwin van Duijnhoven Research Scientist, NOTOX, Netherlands

Constantin Von der Heyden Coordinator, Oxford Center for Water Research

Antony Clements Clinical Scholar, Equine Studies, University of Glasgow

Alexandra Doernath Exotic Animal Specialist, Berlin Zoo

1997

Jennifer Fryer Resident, Small Animal Medicine, Texas A&M University

Jonathan Happold MS Student, Epidemiology, University College, London

Esther Kornalijnslipper Postdoctoral Associate, Department of Farm Animal Health, U. Utrecht

Tanya LeRoith Assistant Professor, Pathology, Virginia-Maryland College of Veterinary Medicine

Lucy Neave Lecturer, Creative Writing, Australian National University

Patricia Pesavento Research Assistant Professor, Pathology, University of California, Davis

Paul Plummer PhD Student, Iowa State University

Deborah Prattley PhD Student, Epidemiology, Massey University

Melinda Story Assistant Professor, Equine Surgery, Kansas State University

Rachel Walker Professional Service Veterinarian, Novartis Animal Health, Sydney, Australia

Jonathan Werner PhD Student, Pathobiology, University of California, Davis

Rebecca Wilcox PhD Student, Virology, Melbourne University

Esther Wissink Postdoctoral Fellow, Netherlands Cancer Institute

Nicolette Zarday MPH Student, U. California, Berkeley

Max Bastian Postdoctoral Fellow, Institute for Plinische Microbiologie, Erlangen

Stephen Fleischer Biologist, US Food and Drug Administration

1998

Karsten Hüffer Postdoctoral Fellow, Microbiology, Yale University

Zoe Lenard Resident, Radiology, Murdoch University

Karen Liljebjelke Postdoctoral Fellow, Veterinary Diagnostic Laboratory, University of Georgia

Larissa Minicucci Epidermic Intelligence Service Officer, Fort Collins, Colorado

Amanda Murphie de Mestre Postdoctoral Fellow, Baker Institute, Cornell University

Anne-Marije Sparnaay Senior Policy Advisor, Ministry of Agriculture, Netherlands

Sophia Tzannes Resident, Small Animal Medicine, Liverpool

Elmer Ahrens Postdoctoral Fellow, Genetics, Swiss Institute of Technology

Erica Behling-Kelly PhD Student, University of Wisconsin

1999

Robert Dickens Risk Management Veterinarian, North Carolina Department of Agriculture

Joshua Fine PhD Student, University of Kentucky

Peter Florian Principal Scientist, Pfizer Inc., Sandwich, Kent, UK

Carl Holmgren PhD Student, Neural Sciences, Karolinaska Institute

Emily Meseck Pathologist, Charles River Laboratory

Rachel Mo-Peters PhD Student, Microbiology, Cornell University

Mary Nabity Resident, Clinical Pathology, Texas A&M University

Kimberly Newkirk Resident, Pathology, The Ohio State University

Christopher Premanandan Resident, Pathology, The Ohio State University

Rachel Tarlinton Biotechnologist, Vaccine Delivery Group, Queensland

Holger Volk Resident, Neurology, Royal Veterinary College

Tanya Babu Veterinary Surgeon, Department of Environment, Food and Rural Affairs, UK

Beatrice Bohme Resident, Small Animal Surgery, Liege, Belgium

2000

Steven Daley Rhodes Scholar, DPhil. Student, Sir Wm. Dunn School of Pathology, Oxford

David Detweiler Resident, Radiology, University of California, Davis

Katharine Evans Deputy Veterinary Surgeon, Babraham Institute, Cambridge Univ.

Rachel Geisel Resident, Pathology, Ontario Veterinary College

Samuel Hamilton PhD Student, Epidemiology, University of Sydney

Birgit Hingerl Scientific Assistant, Immunology, University of Munich

Natali Krekeler Postdoctoral Research Assistant, Biomedical Sciences, Cornell University

Richard Luce EIS Program, Center for Disease Control, Atlanta, GA

Silke Meerman PhD Student, Genetics, Veterinary School, Hannover

Fiona Norris PhD Student, Microbiology, Monash University

Knut Stieger PhD Student, Genetics, University of Nantes

Joost Uilenreef Resident, Anesthesiology, University of Utrecht

Kevin Woolard Resident, Pathology, North Carolina State University

Danielle Cain Intern, VCA Emergency Animal Hospital

Julie Chevrette Clinical Veterinarian, Charles River Laboratory

2001

Robert Klopffleisch Veterinary Doctoral Student, Freidrich-Loeffler Institute, Riems

Katherine Hughes Resident, Pathology, Cambridge University

Karin Holzer PhD Student, Microbiology, Cornell University

Charles Johnson Resident, Pathology, Iowa State University

Rebecca Lin Intern, Surgery, Gulf Coast Veterinary Specialists, Houston, TX

David Loch PhD Student, Physiology, University of Queensland

Maeva Louis Intern, Equine Studies, Lexington, Kentucky

Timothy Myshrall PhD Student, Toxicology, University of Washington

Simon Starkey PhD Student, Epidemiology, Cornell University

Amy Warren-Yates Resident, Pathology, Cornell University

Rachel Windsor Intern, Equine Medicine, Newmarket, United Kingdom

Robin Yates Fulbright Scholar, PhD Student, Microbiology, Cornell University

Bevin Zimmerman Resident, Pathology, The Ohio State University

Nicolas Berryessa Resident, Internal Medicine, University of California, Davis

Karin Darpel PhD Student, Parasitology, Pirbright, United Kingdom

2002

Karyn Havas U.S. Army Veterinarian

Patrick Kenny Resident, Neurology, University of California, Davis

Susannah Lillis Intern, Medicine and Surgery, Melbourne University

Michael Mienaltowski PhD Student, Cell Biology, University of Kentucky
Simon Priestnall PhD Student, Pathology, Royal Veterinary College, London
Lisa Rose Intern, Small Animal Medicine, University of Pennsylvania
Scott Rizzo Intern, University of Tennessee
Kelly Still U.S. Army Veterinarian
Barbara Taennler PhD Student, Biochemistry, U. Zurich
Ryan Taggart U.S. Army Veterinarian
Christine Trezise Intern, Pathology, Gribbles Co., Melbourne
Justin Wimpole Resident, Ryde Veterinary Hospital, Sydney
Vivian Yau Resident, Internal Medicine, Los Angeles

2003

Rosie Allister PhD Student, Parasitology, University of Edinburgh
Mieke Baan Intern, Small Animal Medicine, Cornell University
Christopher Elder Intern, Small Animal Medicine, Atlantic University
Fernando Fukuzato Intern, Small Animal Medicine, Los Angeles Animal Hospital
Lindsay Hamilton PhD Student, Neurophysiology, Cambridge University
Michael Krahn PhD Student, Pharmacology, Hannover University
Siobhan Mor PhD Student, Parasitology, Tufts University
Kate Paterson PhD Student, Garvan Institute, University of New South Wales
Carolyn Prince Intern, Small Animal Medicine, Tufts University

2004

Carolin Block Doctor Veterinary Medicine Student, University of Munich
Matthew Breed Intern, Production Animal Medicine, University of Florida
Andrew Broadbent Masters Student, Epidemiology, University of Bristol
Baukje Schotanus Intern, Small Animal Medicine, University of Utrecht
Katy Townsend Intern, Animal Health Trust, Newmarket, UK



Reunion 2005

Participants in previous Leadership Programs gathered at Zeta Psi to renew friendships and meet this year's participants. Many of the alumni are still in training and all are on career tracks envisioned by the program.

What Did They Say?

"The Leadership Program was one of the best experiences of my life."

Mathew Gerard '92

"The program enabled me to appreciate options veterinarians have with regard to postgraduate pursuits."

Rachael Gray '95

"The chance to mix with like minded people from many backgrounds was incredibly rewarding."

Wendy Harrison '95

"Cornell is one of the leading veterinary schools in the world and its Leadership Program reflects the reasons why it has achieved this status."

Michelle Dries-Kelloway '96

"The Leadership Program has profoundly influenced my life and the direction my career has taken."

Rebecca Wilcox '97

"..... an unforgettable experience."

Alex Doernath '97

"The real value of the program was reflecting on the experiences afterwards and interpreting the knowledge and perspectives I received."

Zoe Lenard '98

"The program was a major factor in my deciding to do a PhD."

Rachael Tarlinton '99

"I have fond memories of my summer at Cornell. The program broadened my horizons and genuinely inspired me. "

Kate Hughes '01

"..... an amazing program....."

Katy Townsend '04

In the Limelight

Emma J. O'Neill

My childhood ambition was always to become a veterinarian and in 1988 I was awarded a place to study Veterinary Science at the University of Bristol in England. I elected to defer my veterinary training temporarily in 1991 as I was offered the chance to join the final year of the Bachelor of Science course in Physiology in order to gain a BSc. This so-called intercalated year afforded me my first opportunity to undertake a research project; an experience that I thoroughly enjoyed and which triggered questions about my future career path. With my new found interest in research and thoughts of a career in academia, I was extremely interested, as a fourth year student, to hear of the Leadership Program. Having had enthusiastic reports from Ian Davis and Stephen Davies, previous attendees of the Leadership Program, I was compelled to apply and was delighted to be offered a place in the program.

I was not to be disappointed on joining the program at Cornell. I undertook a project in the laboratory of Professor Robert Oswald, investigating a neurotransmitter-gated ion channel, the nicotinic acetylcholine receptor. The research involved my learning the patch clamp technique, an electrophysiological technique that had gained Neher and Sakmann The Nobel Prize in 1991. Needless to say my learning curve was steep! This research project was very rewarding and served to confirm my plans to undertake a PhD. Beyond this, however, the program was immensely satisfying. The chance to experience student life in a different country whilst getting to know like-minded students from different schools worldwide, combined with the opportunity to benefit from the many mentors participating in the Leadership program, was invaluable.

I graduated as a veterinarian in 1994 and took a job in a ten vet small animal practice before returning to the University of Bristol in 1995 to undertake a three-year residency training in small animal medicine. Having thoroughly enjoyed both the teaching and clinical elements of the post while maintaining a desire to develop my research interests, I set my sights on becoming an academic clinician. I was fortunate to gain a Wellcome Veterinary PhD Studentship in 1998 allowing me to study the role of regulatory T cells in immunotherapy for Experimental Autoimmune Encephalomyelitis, a model of Multiple Sclerosis and T cell-mediated autoimmune disease. I undertook this research under the supervision of Professors Wraith and Day within the Medical Faculty, University of Bristol.

In 2002, having completed the practical work for my PhD, I was appointed as a lecturer in small animal medicine at University College Dublin in Ireland. Since then I completed my PhD and gained my Royal College and European College Diplomas in Small Animal Medicine last summer. This post provides me with the opportunity to combine work in the specialist referral clinic with research and teaching. My future career goals include the development of research encompassing the immunology skills developed during my PhD whilst continuing to further my clinical and teaching interests. I am extremely grateful to both Cornell University and the Wellcome Trust for the opportunities I have been afforded; the Wellcome Trust sponsored my intercalated year, my trip to Cornell and my PhD studentship.



**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 - 607-253-3544

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 can also be accessed directly by entering
“Cornell Leadership Program” into any web browser

Photography: Alexis Wenski-Roberts and LiLynn Graves
Graphics and Design: Munira



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