

Leadership Program for Veterinary Students 2012 Annual Report



Cornell University
College of Veterinary Medicine



Contents

7	Agenda
9	Participants
10	Activities
20	Cornell's Partnership with the NIH
22	Walter Reed Army Institute of Research & Navy Medical Research Center
24	Presentations and Prizes
25	Program Scholars and Their Research
40	Counselors and Facilitators
42	Housing
43	Time Out
44	Program Dinner
46	Program Alumni
47	Where Are They Now?
56	What Did They Say?
Inside back cover	In the Limelight

A Commitment to Excellence

The mission of the annual Cornell Leadership Program for Veterinary Students is to provide students with learning experiences that clarify and reinforce their commitment to careers in science. The Program is distinguished by a tradition of excellence that spans 23 years. During this time, 540 alumni have participated. These individuals came from 62 veterinary colleges in all parts of the world and many, as we had hoped, have become scientific leaders within the veterinary profession. We are happy to report that 27 outstanding scholars participated in this year's Program. Already some of these scholars have committed to a career that will involve research. It is too early to know where

they will take their careers; however, based on the outstanding achievements of past participants we expect great things from them.

Research is the major focus of the Leadership Program. Program scholars pursue individual research projects under the guidance of Cornell faculty members who are all highly successful scientists and experienced mentors. The University's world-class research facilities and unsurpassed intellectual environment support the scholars' research investigations. In addition to laboratory-based research projects, program scholars participate in modules and workshops that are designed to highlight employment and leadership opportunities for veterinary graduates in academia, government, and industry.

One of the pleasures of organizing this program is hearing about the career achievements of our alumni. Their experiences provide valuable insight into problems facing veterinarians in research careers. Issues such as student debt and shrinking budgets for research are important factors that influence career choices. As new challenges arise, we expect to provide practical guidance to scholars as they choose their careers. This year's publication of a study undertaken by The National Academies of Science entitled "Workforce Needs in Veterinary Medicine" once again reinforces the continuing, and urgent need for veterinarians to become engaged in biomedical research and discovery.

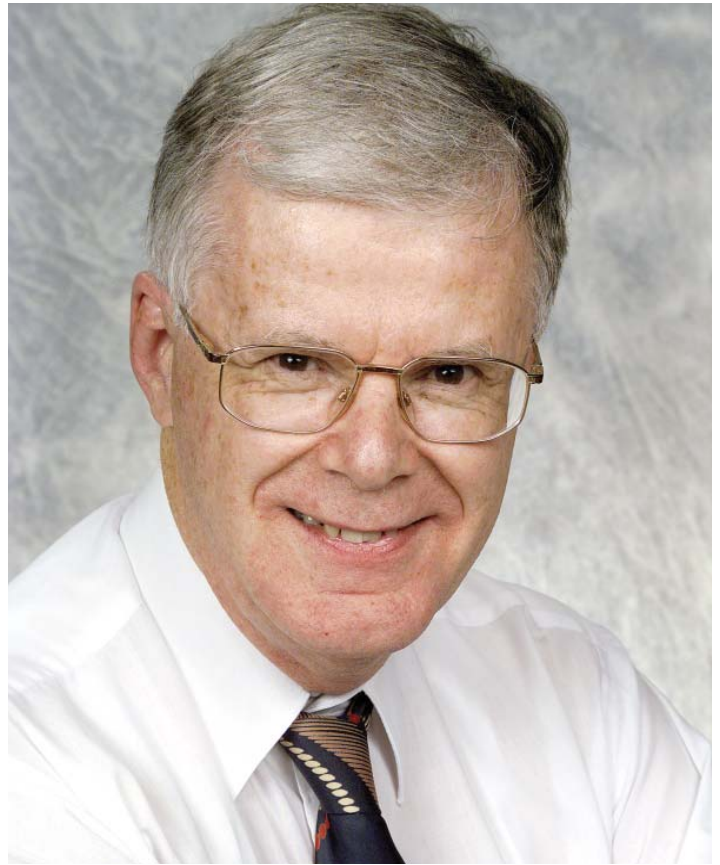
Our continued success depends on finding ways to improve the program and to set new goals. Each year we evaluate all program components and ask if they meet the desired goals. This year we re-evaluated



John Parker BVMS, PhD
Program Director

our discussion of creativity in science and as a result organized a symposium entitled “Creativity examined”. The facilitators of this symposium included two Nobel laureates, a Fellow of the Royal Society, the President of a major charitable foundation, and the Dean of the College of Veterinary Medicine at Cornell. The discussion was enthralling and our scholars had the opportunity to meet individually with each of the facilitators at dinner or during a luncheon that followed the symposium to ask questions and discuss their career goals.

Additionally, we launched a pilot of a new alumni website this year, which we hope will provide a convenient way for alumni to remain in contact and to share advice, experience, and opportunities. We expect that this resource will further enrich the careers of our alumni and provide a link that will last long beyond the Summer Program.



David R. Fraser, BVSc, PhD
Co-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:

National Institutes of Health
Deutscher Akademischer Austauschdienst
The Albert C. Bostwick Foundation
Pfizer Inc.
Boeringer-Ingelheim Co.
The Wellcome Trust

The program organizers also thank the facilitators, counselors, and mentors who took part in the 2012 program. Thanks also to Ms. Kaylie Ackerley, the Program Coordinator, and to Ms. Jennifer Best, Ms. Alexis Wenski-Roberts, and Mr. David Frank for their assistance. Finally, the organizers congratulate the participating scholars. Their academic achievements, coupled with their dedication to discovery and service, mark these individuals as future leaders of the veterinary profession.

Publications

From time-to-time, the program organizers and their associates have described elements of the program, strategies for their implementation, and outcomes of this initiative. Recent publications include:

- Promoting Science-Based Careers Through Student-Directed Learning. McGregor, D.D. and Fraser, D.R. J. Vet. Med. Educ. 33; 294, 2006.
- Counseling Veterinary Students Who Aspire to Careers in Science. McGregor, D.D. and Fraser, D.R. JAVMA 229:668, 2006.
- Acquainting Veterinary Students With Careers in the Pharmaceutical Industry. McGregor, D.D., Fraser, D.R., Haven, M.L. and Hickey, Gerard. J Vet. Med. Educ. 34:139, 2007.
- Career Paths of Alumni of the Cornell Leadership Program for Veterinary Students. Fraser, D.R., McGregor, D.D. and Gröhn, Y.T. Vet. Record 163:750, 2008.

Interested parties also are invited to visit the program website at www.vet.cornell.edu/OGE/Leadership



2012 Leadership Program Agenda

Monday, June 4	Opening Meeting and Ethics Discussion Biological & Chemical Safety Training Welcome BBQ
Tuesday, June 5	Library Orientation Laboratory Orientation
Wednesday, June 6	Radiation Safety Training
Sunday, June 10	Career Discussion
Monday, June 11	Leadership Module Reception & Dinner
Thursday, June 14	National Institutes of Health
Friday, June 15	Walter Reed Army Institute of Research & Naval Medical Research Center
Monday, June 25	Infectious Diseases Workshop
Tuesday, June 26	Research Project Previews
Thursday, July 5	Drug Design Workshop
Friday, July 6	Reunion Dinner
Monday, July 9	Careers in Industry Workshop
Wednesday, July 11	Leadership in Action
Thursday, July 12	Residency Training
Friday, July 13	Translational Science
Monday, July 16	Research Training
Thursday, July 19	Wine and Cheese Event
Tuesday, July 24	Hypothetical Research Workshop
Monday, July 30	Creativity in Science
Wednesday, August 8	Research Presentations
Thursday, August 9	Research Presentations Exit Meeting







2012 Leadership Program Scholars

Name	University	Mentor(s)	Department	Sponsor
Molly Benner	Louisiana State University	Cynthia Leifer	Microbiology/Immunology	NIH & Pfizer
Luca Bertzbach	Freie Universität Berlin	John Parker	Baker Institute	DAAD & Bostwick Foundation
Deborah Burnett	University of Sydney	Tracy Stokol	Population Medicine/ Diagnostic Sciences	Pfizer
Iris Chan	University of Cambridge	Nate Sutter	Clinical Sciences	Wellcome Trust
Emily Cornwell	Cornell University	Paul Bowser	Microbiology/Immunology	NIH & Pfizer
Rosemary Cullander	University of Glasgow	Kenneth Simpson	Clinical Sciences	Wellcome Trust
Kristofer Dewberry	Cornell University	Yrjö Gröhn	VM Administration	NIH & Pfizer
Josep Duato-Botam	Universidad de Zaragoza	Matt DeLisa	Chemical Biology	Pfizer
Andrew Durden	University of Georgia	Joel Baines	Microbiology/Immunology	NIH & Pfizer
Anna Maria Gartner	TiHo Hannover	David Russell	Microbiology/Immunology	DAAD, Bostwick Foundation & Boehringer-Ingelheim
Anja Gemmer	TiHo Hannover	Toshi Kawate	Molecular Medicine	DAAD, Bostwick Foundation & Boehringer-Ingelheim
Anna Goodroe	Texas A&M	Claudia Fischbach	Biomedical Engineering	NIH & Pfizer
Lauren Griggs	Cornell University	Craig Altier	Population Medicine/ Diagnostic Sciences	NIH & Pfizer
Lauren Hamstead	Royal Veterinary College	Scott Coonrod	Baker Institute	Wellcome Trust
Robert Holly	University of Georgia	Marjory Brooks	Population Medicine/ Diagnostic Sciences	NIH & Pfizer
Hilary Hu	University of Sydney	Robert Weiss	Biomedical Sciences	Pfizer
Mee-La Lee	University of Wisconsin	Ted Clark	Microbiology/Immunology	NIH & Pfizer
Elizabeth McCalley	Texas A&M	Alex Travis	Baker Institute	NIH & Pfizer
Andrea Nies	TiHo Hannover	Maurine Linder	Molecular Medicine	DAAD, Bostwick Foundation & Boehringer-Ingelheim
Jane Park	Cornell University	Scott Coonrod	Baker Institute	NIH & Pfizer
Laura Schmettmann	University of Sydney	Avery August	Microbiology/Immunology	NIH & Pfizer
Peter Silke	University of Cambridge	Colin Parrish	Baker Institute	Wellcome Trust
Luc Smolders	Utrecht University	Chris Schaffer	Biomedical Engineering	Pfizer
Hanna Telama	University of Helsinki	Natasza Kurpios	Molecular Medicine	Pfizer
Noortje van der Helm	Utrecht University	David Lin	Biomedical Sciences	Pfizer
Adam Werts	NC State University	Rick Cerione/ Marc Antonyak	Molecular Medicine	NIH & Pfizer
Helena Wittgenstein	Freie Universität Berlin	Gregory Acland/ Anna Kukekova	Baker Institute	DAAD & Bostwick Foundation

Activities 2012

The Leadership Program combines faculty-guided research with student-directed learning through participation in modules, workshops, and group discussions. The activities encourage responsible leadership, critical thinking, and the development of teamwork skills. The program also highlights graduate training opportunities calculated to promote the professional development of program alumni as independent scientists and public health professionals.

Research

Each Leadership Program scholar is assigned a project and a faculty mentor to guide his or her research. The projects enable the students to gain practical experience by exploring problems of interest to them. Simultaneously, students hone their communication skills through engagement in group discussions and by presenting their research findings in a public forum at the conclusion of the program.



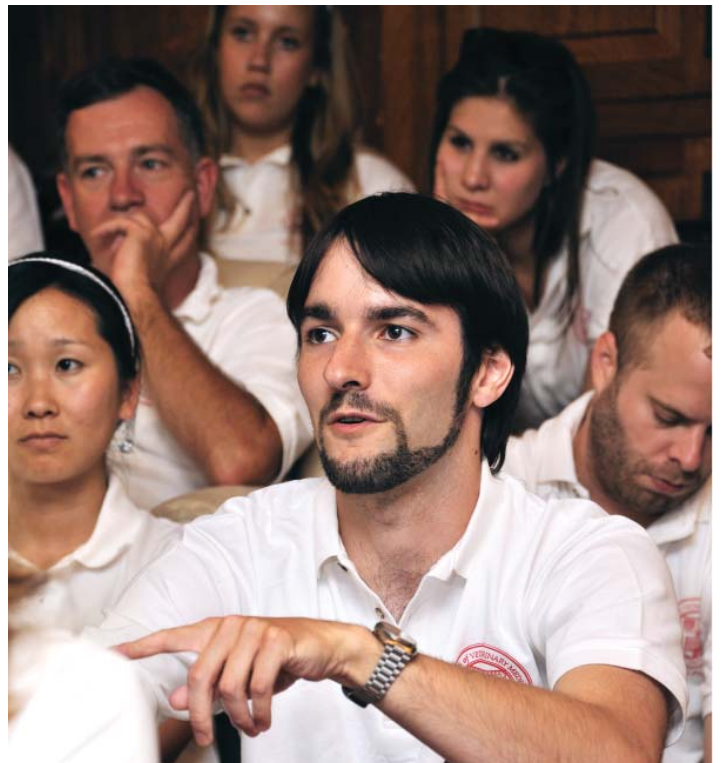
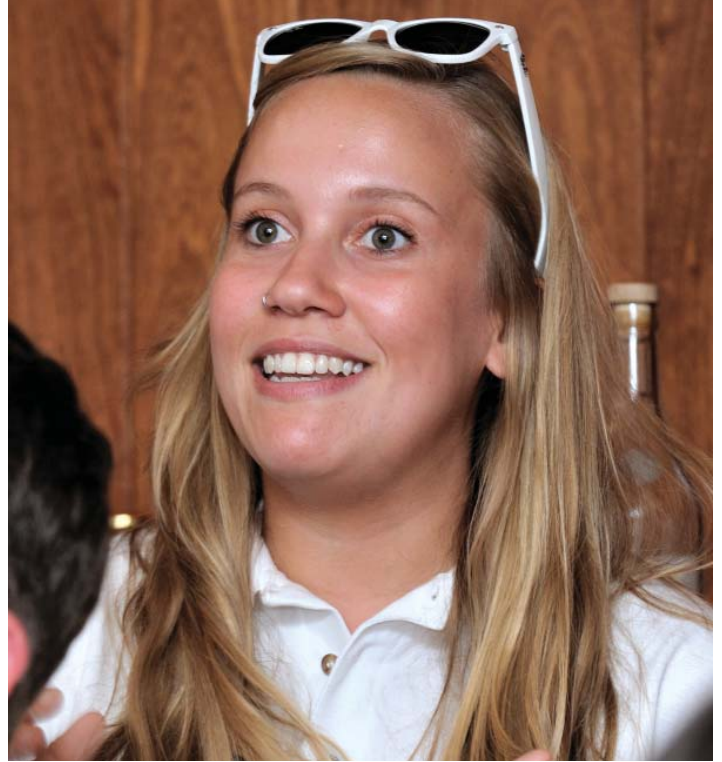
Leadership

Leadership and its attendant responsibilities are central considerations in the Leadership Program. Critical thinking and decision-making are featured in a scenario-based module that explores public health, economic, political, and social issues. Students and facilitators are assigned roles that oblige them to articulate, defend, or modify their views as the scenario unfolds. At the conclusion of the module, the facilitators comment on the exercise and discuss leadership principles they have adopted in their own careers. This year, Professor David Fraser moderated the discussion with assistance from Professor Klaus Beyenbach, Professor Douglas McGregor, and Dean Deborah Kochevar.



Leadership in Action

The film entitled “A Few Good Men” illustrates strengths and deficiencies of individuals cast in the role of leaders. The students discussed leadership characteristics illustrated by the film. Professors David Fraser, Douglas McGregor, Drew Noden and John Parker offered points to consider as well as feedback for the students to ponder.



Infectious Diseases

A workshop moderated by Professors Terence Dermody, Alfonso Torres, Colin Parrish, John Parker, and Philip Carter featured discussions of antibiotic resistance and diseases which are emerging or re-emerging in nature or which pose a bioterrorist threat to people or the Nation's agricultural assets. Program scholars selected the diseases on which they focused. Having done so, they conducted library research on the topics, and employed Socratic methods to engage their peers and facilitators in lively and informative discussions. Later in the day, the facilitators commented on related issues and the need for veterinary scientists who contemplate careers in infectious disease research or veterinary public health.





Drug Design

Dr. Michelle Haven, a senior executive of Pfizer Animal Health, designed and moderated a competition between mock companies formed by the students. The competition encouraged creativity and the development of teamwork skills through activities connected with the discovery, development and marketing of veterinary pharmaceuticals. Dr. Joy Huffman assisted Dr. Haven in this module. Later the same evening, the two facilitators answered questions regarding the range of employment opportunities for veterinarians at Pfizer and the advanced training required to be competitive for such positions.



Industry Workshop

Drs. Gerard Hickey, Emily Hickey, and Peggy McCann conducted mock interviews for three positions in the pharmaceutical industry and at Merck Co. in particular. The students prepared for the interviews by reviewing the resumes of prospective applicants and by submitting application letters for the positions. On the day of the meeting, the facilitators commented on the letters and posed questions to the students that explored their personal interests and qualifications for employment.



Hypothetical Research

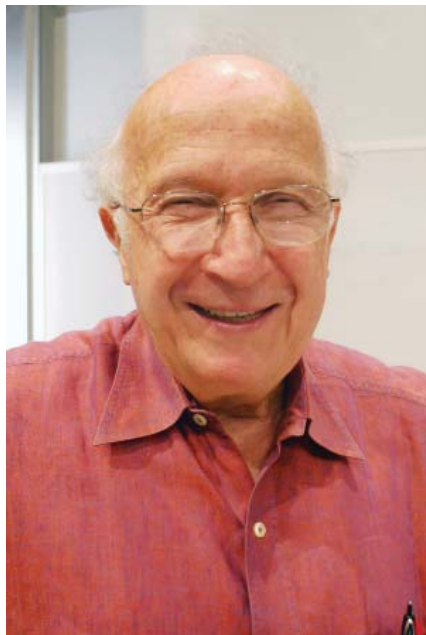
Veterinary students have a strong desire to work on problems of importance to animal disease. To encourage students to actively think about how hypothesis-driven research might benefit animals, the students prepared 'blue-sky' hypothesis-driven research proposals focused on the problem of equine laminitis. Facilitators Drs. John Parker, Chris Schaffer, and Robert Weiss then reviewed the proposals and made suggestions before the students presented their ideas to Dr. Tom Divers, an expert on equine laminitis.



Creativity Examined

Leadership Program scholars explored the basis of creativity in the humanities and science. They were guided in this regard by Professors Roald Hoffman and Oliver Smithies, Drs. Don Randel and Elizabeth Simpson, and Dean Michael Kotlikoff. Aspects of creativity were considered in a panel discussion moderated by Professor

Richard Cerione. Prominence was given to aspects of innovation that can be learned and how creativity can be encouraged in individuals who aspire to discovery-based careers. The discussion was followed by a luncheon and small group meetings in which the students raised questions of their own and commented on points made by the panel.





Career Explorations

Career planning is featured prominently in the Leadership Program. Four meetings were convened to consider opportunities for veterinary graduates to broadly influence the veterinary profession through careers in the academy, government or industry.

Professor David Fraser, and Drs. Jenny Sones and Robert Ossiboff reviewed career options available to veterinary graduates who aspire to careers in science. The four counselors emphasized the importance of selecting a superior environment for graduate research training and a mentor who has a successful training record.

Professors Julia Felipe, Sean McDonough and Kirk Maurer commented on residency programs in the clinical sciences, pathology and laboratory animal medicine,

respectively. The three counselors emphasized factors one should consider in seeking a residency; the expectations of those responsible for training and the satisfactions of pursuing a clinical or veterinary service career.

A companion meeting addressed issues related to graduate research training. Professors Maurine Linder, Natasza Kurpios and Douglas McGregor identified aspects of training one should weigh in selecting an institution for graduate study; the subject of one's thesis research and an individual to guide one's graduate studies.

In a separate meeting, a case study illustrated "translational science." The ensuing discussion led by Professor Kenneth Simpson revealed how an individual trained to a high level of proficiency as both a clinical specialist and research scientist can extend the frontiers



of knowledge through his or her capacity to define disease mechanisms at the cell or molecular level.



Cornell's Partnership with the National Institutes of Health

The National Institutes of Health and the Cornell University College of Veterinary Medicine have forged a partnership that offers program scholars an opportunity to learn about research conducted at the nation's premier biomedical research institution. This year's participants 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.





Agenda

Welcome and Introduction

Dr. Richard G. Wyatt

Executive Director, Office of Intramural Research

NIH Research Training Opportunities

Dr. Pat Sokolove

Deputy Director, OITE, NIH

The Cornell-NIH Partnership

Dr. John S. L. Parker

Director, Cornell Leadership Program

“Imaging the nanometer scale architecture of exocytosis and endocytosis”

Justin Taraska, PhD

Investigator, Laboratory of Molecular and Cellular Imaging, National Heart, Lung, and Blood Institute, NIH

“Regulation of chronic inflammation and fibrosis in chronic helminth infection”

Tom Wynn, PhD

Chief, Immunopathogenesis Section, Laboratory of Parasitic Diseases, National Institute of Allergy and Infectious Diseases, NIH

“Non-human primate models for gene therapy and stem cell research”

Cynthia Dunbar, MD

Head, Laboratory of Molecular Hematopoiesis, National Heart, Lung, and Blood Institute, NIH

“Adventures in viral immunology: Translating DRIPs”

Jonathan Yewdell, M.D., PhD

Head, Cellular Biology and Viral Immunology Section, Laboratory of Viral Diseases, National Institute of Allergy and Infectious Diseases, NIH

“Norovirus Replication: A cat and mouse game”

Kim Green, PhD

Chief Caliciviruses section, Laboratory of Infectious Diseases, National Institute of Allergy and Infectious Diseases, NIH

Closing Remarks

Dr. John S. L. Parker



Walter Reed

Army Institute of Research/Naval Medical Research Center

Armed Services & Infectious Disease

Leadership Program scholars had the privilege this year of visiting the combined facilities of the Walter Reed Army Institute of Research (WRAIR) and the Naval Medical Research Center (NMRC). Senior members of the combined center staff described the remarkable progress being made at WRAIR/NMRC in addressing still unresolved problems of infectious diseases, which are of special concern to the uniformed services. The scientific program was followed by a short tour of the superb research facilities at WRAIR/NMRC.

Agenda

Welcome and Overview

COL Ralph Erickson

Commander, WRAIR

CAPT Richard Haberberger

Commander, NMRC

“Development of a Malaria Vaccine: Challenges and Opportunities”

CAPT Thomas Ritchie, Director, Military Malaria Vaccine Program

“Undersea Medicine Research at NMRC”

CDR David Regis, Department Head, Undersea Medicine

Tour of WRAIR/NMRC





Presentations & Prizes

Leadership Program scholars discussed their research in a series of presentations over two days at the conclusion of the program. A book prize was awarded to Adam Werts for the best overall research achievement as judged by his underlying hypothesis, investigative protocol, results, and presentation. Additional prizes were awarded to Molly Benner, Luca Bertzbach, and Luc Smolders, for exceptional achievements in integrative biology, cell biology, and molecular biology, respectively. Deborah Burnett was awarded a prize for the highest-ranking presentation by a scholar from Australia or the United Kingdom. The Selection Committee for the 2012 Leadership Program salutes these individuals and congratulates the entire group for their commitment to research and the excellence of their presentations.



Integrative Biology Prize

Luc Smolders

In vivo imaging of cerebral microglia responses to cortical microhemorrhages



Molecular Biology Prize

Molly Benner

Mutagenesis of specific TLR9 tyrosine motifs alters pro-inflammatory cytokine production



Program Prize

Adam Werts

Microvesicles: Potential mediators of intercellular communication between stem cells



UK & Australia Prize

Deborah Burnett

Interactions of platelets with equine herpesvirus-1 (EHV-1)



Cell Biology Prize

Luca Bertzbach

The role of endosomal acidification in the cellular entry of feline calicivirus

Program Scholars

& their Research



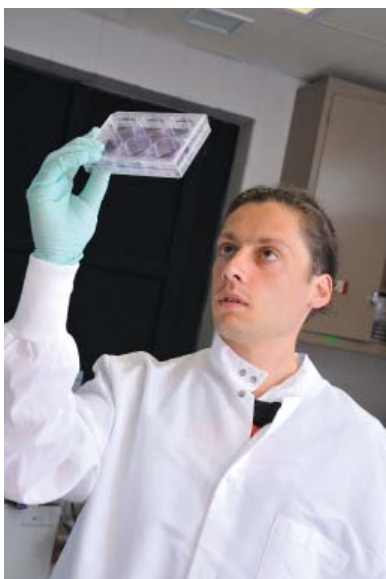
Molly Benner, Louisiana State University, Immunology

Mutagenesis of specific TLR9 tyrosine motifs alters pro-inflammatory cytokine production.

Two years into a veterinary degree and still uncertain of how I might make the most of my DVM, I arrived in Ithaca with the hopes of making some informed career decisions by the time I headed back to Baton Rouge. The Cornell Leadership Program has not only afforded the opportunity to gain further research experience, but also provided invaluable resources for examining veterinary careers beyond the clinic. The ten weeks spent here will undoubtedly shape the remaining two years of my curriculum and help me make my way through the muddle of post-DVM prospects.

With guidance and inspiration from Dr. Cindy Leifer, I spent the summer examining the effects of Toll-like receptor 9 (TLR9) mutations on cytokine production. TLR9 is a trans-membrane endosomal protein that responds to unmethylated CpG oligonucleotide sequences frequently found in bacterial DNA. The lab had found that a particular tyrosine motif in the cytoplasmic tail of TLR9 was important for signaling and is suspected to be involved in receptor trafficking through the stages of endosomal breakdown of phagocytosed bacteria within macrophages. I confirmed their results with regard to the first tyrosine mutants (Y888 → A, F) and then tested the other two single mutants (Y870 and Y980 → A, F) for tumor necrosis factor (TNF) and Type1 interferon (IFN) production in murine TLR9 knockout macrophages stimulated with CpG via ELISA and luciferase assay, respectively. I also created TLR9 tyrosine double and triple mutants by transforming *E. coli* with retrovirus containing combinations of the single tyrosine mutant genes and then tested them for TNF production as well.

I would like to thank Dr. Cindy Leifer, Jody, Fern, Sid and Clarice for hosting me in their lab this summer, teaching me loads about transfection, transduction, transformation and trivia, and laughing at my jokes. Finally, I thank the NIH and Pfizer for providing financial support.



Luca Bertzbach, Freie Universität Berlin, Virology

The role of endosomal acidification in the cellular entry of feline calicivirus.

As a fourth year vet student in Berlin, I applied to the Leadership Program to learn more about nontraditional career opportunities in veterinary science. For me, this program has been a great chance to experience excellent research, to meet extraordinary people and to study at a top university abroad. Since I am very interested in emerging infectious diseases and zoonoses, I plan to pursue PhD training and to find a place in a governmental institution or in academia. This summer I worked in the Parker Lab on feline calicivirus (FCV) and its entry into cells. FCV, a positive stranded small RNA virus, is a major pathogen of upper respiratory tract diseases in cats and one of a few caliciviruses that replicates in cell culture. Over the past 10 years, FCV has been associated with virulent systemic disease (VSD) outbreaks, causing high mortality. Cellular entry of the FCV strain F9 is dependent on acidification in endosomes after endocytosis. My research focused on whether or not wildtype VSD-FCV strains also require an exposure to low endosomal pH during infectious entry into feline cells in order to gain a better understanding of FCV's pathogenesis. In a side project I worked on the

development of a real-time-qPCR assay for the detection and quantification of positive and negative stranded FCV RNA.

I'd like to thank my mentor Dr. Parker and all researchers in the Parker Lab for their tremendous support. Thanks also go to Drs. Fraser and McGregor and my fellow residents of Zeta Psi. It was an awesome summer! Finally, I thank the DAAD and the Bostwick Foundation for financial support.



Deborah Burnett, University of Sydney, Virology

Interactions of platelets with equine herpesvirus-1 (EHV-1)

Participating in the Cornell Leadership Program has been a fantastic experience which has broadened my understanding of research and helped me clarify my career goal of combining an academic career with both research and clinical veterinary practice.

Inappropriate blood coagulation is postulated as a mechanism underlying the pathogenesis of the abortion storms and neurological disease occurring in EHV-1 infections. This coagulopathy could result from direct activation of platelets by EHV-1 or by indirect activation of platelets via endothelial cells or monocytes. My research in Dr. Stokol's lab investigated the possibility of EHV-1 causing direct platelet activation. We found that infection of platelets with purified EHV-1 resulted in direct platelet activation, which we measured using flow cytometric markers of platelet activation, including the exposure of platelet glycoprotein P-selectin, phosphatidylserine and platelet shape change. Concurrently we performed qPCR for viral DNA on infected platelets. This revealed increased genetic material in virus-

infected platelets; suggesting that EHV-1 is able to directly bind to or invade platelets. These results suggest that EHV-1 is able to activate platelets and may reveal a novel mechanism for EHV-1 transport systemically. By investigating the role of platelets in EHV-1 we hope to understand the pathogenesis of this important horse disease, which may lead to alterations in current prevention and treatment practice.

I would like to thank Dr. Stokol and all members of the laboratory, in particular Dr. Yeo, for their help and support completing this summer project. I also would like to thank Drs Parker, McGregor and Fraser, for their efforts and enthusiasm running this amazing program. I am grateful for the financial support I got from Pfizer Inc.



Iris Chan, University of Cambridge, Genetics

The effects of SINE elements on gene expression

I began my veterinary education with the goal of becoming a clinician. However, during my studies and an intercalated year I became more interested in research. The Leadership Program was an invaluable opportunity for me to explore the many career options beyond veterinary practice. It was an enriching experience, providing me with a fantastic introduction to research in genetics besides learning the various aspects of the role that veterinarians play in society.

This summer I investigated the effects that short interspersed elements (SINEs) might have on the dog genome. SINEs are retrotransposons that are found in many mammalian species in high copy numbers. Previous research found that SINE insertions in certain genes can cause disease. These diseases are caused both by changes in gene expression levels, as well as by variations in protein coding sequences. I examined if SINE insertions in the genes PTPRK and FANCD2 influence the sequences of their mRNA transcripts; and if SINE insertion in OXSM changed gene expression level. I sequenced PTPRK and found that the SINE

element was present in intronic DNA and was spliced out of the mRNA and did not cause splicing defects. Using quantitative PCR I found that the SINE insertion in OXSM reduced gene expression levels.

I would like to thank Dr. Nate Sutter and Dr. Sara Kalla for their superb mentorship and support. My gratitude also goes to Dr. Parker, Dr. McGregor and Dr. Fraser for organizing this fantastic program, and for their enthusiasm in encouraging young scientists. I would also like to thank the fellow students in the program for making this summer so incredible. Finally, I thank the Wellcome Trust for financial support.



Emily Cornwell, Cornell University, Disease Ecology

The role of Round Gobies in the spread of viral hemorrhagic septicemia virus

I decided to become a veterinarian in 5th grade, but fell in love with research as an undergraduate. When I learned about dual DVM/PhD programs, I immediately knew it would be a perfect combination. My experience in the Cornell Leadership Program has been an excellent opportunity to test out a new field of research, learn about career opportunities, and spend time with a fantastic group of aspiring veterinary scientists.

My research this summer focused on the infection dynamics of viral hemorrhagic septicemia virus (VHSV), a virus that was first found in the Great Lakes in 2003 and causes disease in over 80 fish species. Through my research, I found that a single species, the Round Goby, seems to play a key role in the maintenance of VHSV in the Great Lakes. Round Gobies migrate offshore to overwinter, but little is known about the site fidelity of these fish when they return to shallow water in the spring. I used microsatellite markers to look at the genetic structure of Round Goby populations collected in offshore and nearshore areas of Lake Ontario. Preliminary

results suggest that while genetic similarity exists in nearshore populations, there is significant mixing when fish move offshore. This may be a way for VHSV to spread across Lake Ontario.

I would like to thank Dr. Bowser and everyone in the Bowser lab for their mentorship and support this summer. I also thank our facilitators, program directors, program coordinators, and my fellow students for a fantastic summer experience. I received financial support from the NIH and Pfizer – thanks!



Rosemary Cullander, University of Glasgow, Gastroenterology

Evaluation of the Role of Neuraminidase in the Pathogenesis of Adherent and Invasive Escherichia Coli (AIEC)

As a third year veterinary student I was interested to gain more research experience and explore the range of professional opportunities that are available for a veterinary graduate. The Leadership program has given me insight into the importance of an advanced research degree, as well as the myriad career paths that are available to a veterinary researcher. Following the completion of my veterinary training I hope to pursue a PhD and Residency training, so that I can continue to contribute to the creative process of scientific discovery.

The Simpson lab investigates adherent and invasive E. coli that invade intracellularly in GI disorders such as ulcerative colitis and Crohn's disease. My work involved assessing the role that neuraminidase, an enzyme that cleaves sialic acid residues from host cells, has in the pathogenesis of these bacteria. Using a vast library of E. coli isolates from both human and canine patients we studied the conditions that facilitate adhesion of these bacteria to Caco-2

intestinal epithelial cells. Neuraminidase pretreatment of intestinal epithelium facilitates adhesion by the AIEC pathotype. Understanding the complex interactions of bacteria within the gut environment could suggest enzyme inhibitors as a viable therapeutic strategy.

I would like to thank Dr Kenny Simpson and Dr Mark Rishniw for their mentorship and guidance; science is certainly improved by the company you keep. I would also like to thank the members of the Simpson lab, without whom none of my time-points would have had any hope of being reached. Thanks to the Wellcome Trust for providing the funds.



Kristofer Dewberry, Cornell University, Epidemiology

A system dynamics approach to modeling the movement of antimicrobial resistance gene-carrying bacteria from Feedlot to consumer

I am interested in wildlife and emerging infectious diseases and their implications for public health. I applied to the Leadership Program to gain hands on experience in epidemiology and to develop my skills as a leader among my peers. Additionally, I was excited about the possibilities to meet experts across the veterinary profession.

This summer I investigated the movement of commensal E. coli O157:H7 bacterial populations in a cattle herd through processing to consumer using a system dynamics approach. The first objective of my project was to evaluate and demonstrate that system dynamics could be applied to the issue of antimicrobial gene exposure to humans. My second objective was to evaluate how the use of in-feed antibiotics affected downstream consumer exposure to commensal bacteria that contained resistance genes. Understanding how decisions such as banning in-feed antimicrobials affects consumer exposure, allows decision makers to understand the true impact of their decisions and serve to guide policy decisions.

Furthermore, the development of a model allows for the identification of weak spots in the available knowledge, and thus identify areas for further research.

Through interactions with facilitators, mentors, and peers, I gained a deeper understanding of various veterinary career opportunities, many of which rely on the investigative skills gained through a PhD. I would like to thank all the facilitators, mentors, and participants who made this program a success, and Drs. Fraser, Gröhn, McGregor, and Parker for their encouragement. The Leadership program has been an invaluable experience in developing my leadership skills and preparing me to contribute to my field and the world as a whole. I am grateful to the NIH and Pfizer Inc. for providing funding.



Josep Duato Botam, University of Zaragoza, Biomedical Engineering

Characterization of Outer Membrane Vesicle production in different bacteria strains and gene knock-outs

Through studies of biochemistry and genetics I have developed a profound interest in research, inspiring me to undertake projects in molecular and structural biology. The Leadership Program has given me a very good research experience in a renowned laboratory. In addition, the program has improved my communication skills through participation in the many interactive, amazingly well prepared, thought-provoking modules, which are a most remarkable feature of the program. Now that I am aware of the different career paths that I can follow with my veterinary degree I am sure I want to do a PhD in a field related to cancer.

My research project related to Gram-negative bacteria outer membrane vesicles (OMVs), which are secreted into culture media. Bacteria can be transformed with a plasmid that allows specific antigen expression in the OMVs which can then reach distant targets in a concentrated, protected form. Once a specific protein antigen is expressed in OMVs, they can be purified from the media and injected as a highly immunogenic vaccine. We have examined which combination of bacteria strains and specific gene knock-outs (involved in hypervesiculation) cause the greatest expression of OMVs.

My gratitude and thanks to Professor Matthew DeLisa, for allowing me to participate in his laboratory and to Taylor Stevenson for his exquisite and detailed teaching. The program couldn't be better. Finally, thanks to Pfizer for supporting me.



Andrew Durden, University of Georgia, Virology

The role of UL31 in Herpes Simplex Virus-1 (HSV-1) capsid assembly

As a veterinary student, I feel that it is my responsibility to get the best scientific education possible; not just because it will make me a better clinician, but also because I will be better prepared to face real world challenges. The Cornell Leadership Program appealed to me because it is the only program of its kind, providing both cutting edge research training and lessons on how to become an effective leader in both a veterinary practice and the community. The program has enlightened me on all of the various career paths veterinary medicine has to offer and the sacrifices that each path may entail.

My research focused on the role of the genes UL31, in the capsid assembly of herpes simplex virus-1. It is well known that expression of the UL31 gene is required for the egress of the herpesvirus nucleocapsid into the cytoplasm, but there is still much that is not understood about the formation of the capsid and how it becomes associated with the inner nuclear membrane. I found that UL31 is not needed for the localization of pUL17 and pUL25 to the capsid, two of the six proteins used in DNA packaging. My time in the Baines lab has given me newfound confidence in my ability to think critically and to both create and test hypotheses. These new skills should serve me well in my future career at an academic institution.

I would like to thank the Baines lab for all of their help and support. I also thank the NIH and Pfizer for funding me.



Anna Maria Gartner, Tierärztliche Hochschule Hannover, Microbiology

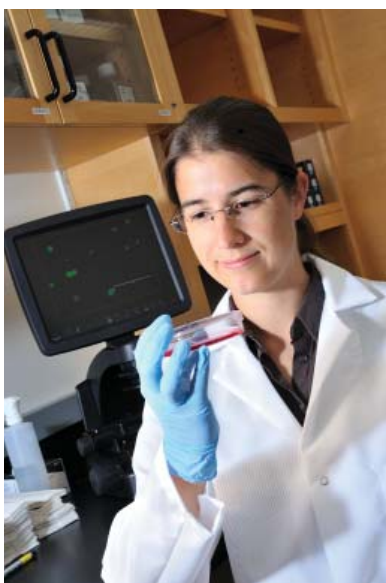
The effect on growth of Toxoplasma gondii in macrophages and fibroblasts of down-regulating signaling pathways of the host cells with siRNA

I had no laboratory experience prior to enrolling in the Leadership program. Therefore, I was eager to learn laboratory techniques and to get a sense of what it was like to work on a research project.

My project involved transfecting fibroblasts and macrophages with a library of 80 different types of siRNA that target cellular signaling pathways to see if any of the siRNAs had an effect on the growth of *Toxoplasma gondii*. After transfection, I infected the cells with *Toxoplasma gondii* that express green fluorescent protein (GFP) and measured for increases in fluorescence with a plate reader. During the ten-week summer program I optimized the experimental conditions and performed many assays under different conditions; however, I found that both cell lines were unaffected by the siRNA treatments. I also measured parasite growth in the two cell-lines by assessing the numbers of infected cells at different times after

infection, using flow cytometry and by imaging with confocal microscopy. I found that the parasite infection was more efficient in macrophages than in fibroblasts, presumably because of differences in the efficiency of phagocytosis.

I want to thank Prof. David Russell and Dr. Barbara Butcher for their help and patience as well as the members of the Russell lab, who took time to explain everything to me. Also I would like to thank Boehringer-Ingelheim, the Bostwick Foundation and DAAD for their financial support.



Anja Gemmer, Tierärztliche Hochschule Hannover, Molecular Medicine

Uncovering the spatial structure of frog extracellular nucleotidases, NTPDases 1 and 2

I applied for the Leadership Program because I wanted to find out if a science-based career was suitable for me. Thanks to this extraordinary program I am now absolutely determined to follow this path.

In Prof. Toshi Kawate's lab I worked on a project to elucidate the spatial structure of two enzymes, NTPDase1 and 2. These enzymes hydrolyze extracellular nucleotides and thus play an important role in purinergic cell signaling. I used green fluorescent protein fusions of these enzymes combined with fluorescence size exclusion chromatography to attempt to obtain proteins expressed from both insect and mammalian cells that did not aggregate and were of sufficient purity (as assessed by SDS-PAGE) to set up trials to produce enzyme crystals. I found that the native protein construct did not crystallize. I therefore used site-directed mutagenesis to replace two or three glycosylated asparagines with serine, glutamic acid or arginine

in NTPDase2. I found that the asparagine at position 129 of NTPDase2 is essential for its proper folding, membrane targeting and activity. However, I found that three of the mutants of NTPDase2 purified as protein monomers rather oligomers. These findings will be useful in future attempts to obtain protein crystals.

I would like to thank all members of the Kawate Lab for their support and help, all my fellow students for a great summer, as well as Drs. Parker, McGregor and Fraser for organizing this highly enriching program. Moreover, I want to thank the DAAD, the Bostwick Foundation and Boehringer Ingelheim for their financial support.



Anna Goodroe, Texas A & M University, Biomedical Engineering
Effects of Mechanical Loading on Osteoclast Maturation In Vitro

I came to Cornell hoping to gain insight into less publicized careers in veterinary medicine. The Leadership Program was helpful in this regard but it also afforded many opportunities to network with individuals who have successfully established themselves in unique ways within the veterinary profession. I am pleased to leave the program with new ideas about how I can pursue my interests in laboratory animal medicine and research.

My project this summer focused on the development of an in vitro model that can be used to study breast cancer that has metastasized to bone. I used scaffolds, which my lab developed as an in vitro method to study the microenvironmental conditions surrounding cells within cancellous bone and to characterize the behavior of osteoclasts exposed to mechanical loading. Osteoclasts resorb bone and their activity is up regulated in the presence of metastatic breast cancer in bone.

Members of the Fischbach lab have shown that mechanical loading of the tibia in mice reduces bone resorption. The results of my own research demonstrated that mechanical loading of RAW stem cells decreases the maturation of osteoclasts. The idea that mechanical loading decreases osteoclast maturation and bone resorption can be used as an adjunct therapy, through exercise, to decrease bone loss.

I'd like to thank Dr. Maureen Lynch for her guidance and mentorship that resulted in a new appreciation for biomedical engineering. I am grateful to Dr. Claudia Fischbach for allowing me to join her team for the summer. I'm also indebted to Min Joon Lee and Praveen Polamraju for their countless hours of assistance. Thanks also to the NIH and Pfizer for supporting me financially.



Lauren Griggs, Cornell University, Population Medicine and Diagnostic Science
Improved Detection of Canine Brucellosis

My interest in research began early in my undergraduate studies. Obtaining a residency in laboratory animal medicine and a PhD will allow me to simultaneously pursue all three of my passions: veterinary medicine, research and teaching. I applied to the Leadership Program to understand the roles of veterinarians in non-academic research settings as well as how veterinarians balance multidisciplinary careers. This program has sparked my interest in industry as a possible career path.

Promiscuous breeding practices to meet the demand of hypoallergenic designer breeds have caused the emergence of the sexually transmitted and zoonotic pathogen *Brucella canis*, which causes abortions and sterility in dogs. The current "gold standard" diagnostic test (Agar Gel Immunodiffusion) is expensive, slow, subjective, unable to be automated, and only offered at one of a few laboratories in the world: Cornell's Animal Health Diagnostic Laboratory (AHDC). A positive

result is a line of precipitation that forms when *Brucella* lysate and positive dog serum diffuse together on an agar plate. My project goal in the Altier lab was to identify the candidate proteins responsible for this precipitation. Using immunoblotting, I was able to isolate six potential candidate proteins, two of which were sent for identification by mass spectrometry. The final goal of my project is to replace the requirement for *Brucella* lysate, which is difficult and hazardous to produce, with a recombinant immuno-dominant protein and automated diagnostic testing using a Luminex test.

I would like to thank Drs. Altier and Wagner for their patience and guidance in the western blotting process. Mrs. Heather Freer and Dr. Chien-Che Hung were also integral in the brainstorming and methodology. I received funding from the NIH and Pfizer for which I am grateful.



Lauren Hamstead, Royal Veterinary College, Molecular Biology

Role of the maternal effect genes FILIA, MATER and PADI6 in early embryonic development

After applying to veterinary school with the aim of becoming an equine specialist, I was given the opportunity to undertake research projects and decided to pursue a career in research instead. The Leadership Program has inspired me to think about combining biomedical research, human and veterinary medicine to solve important clinical problems in both humans and animals. It has given me a clearer understanding of the training that will best help me realize my ambitions.

This summer I worked in the Coonrod lab at the Baker Institute, investigating the expression of maternally derived proteins essential for zygotes to progress beyond the two-cell stage. Three of these proteins, Maternal Antigen (MATER) and Peptidyl Arginine Deiminase 6 (PADI6) and FILIA were the subjects of my research. Given that the critical role played by these proteins in early embryo development is not understood, my first aim was to investigate their expression and confirm their co-localization. I also investigated how MATER and PADI6 expression affect the localization of endoplasmic reticulum because polarization of cell organelles is important for cleavage stage development. After transfecting the genes of interest into somatic cells we were able to show their co-localization by immunofluorescence.

I would like to express my gratitude to everyone in the Coonrod lab, particularly Boram Kim for giving me such a fantastic experience this summer. I would also like to thank Drs Parker, McGregor and Fraser and all the Leadership students for making this summer such a valuable learning experience and such great fun. I am also grateful to the Wellcome Trust for providing me with funding.



Robert Holly, University of Georgia, Hematology

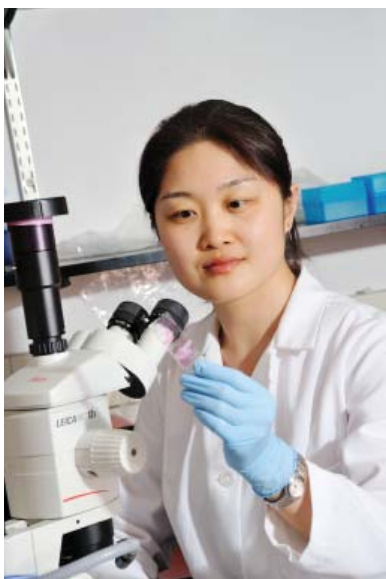
Purification of the platelet protein TMEM16F

I became interested in science when I was in grade school. Given my interest, I applied for admission to the Cornell Leadership Program upon entering my second year in veterinary college. The program offered the prospect of gaining experience in research while simultaneously providing insight into alternative paths in veterinary medicine. The experience has been invaluable.

My research focused on validating a method of purifying and enriching plasma membrane fractions in platelets, first in humans and then in dogs. My objective was to purify a plasma membrane protein called TMEM16F. TMEM16F (also known as ANO6) is a transmembrane platelet protein that is abnormal in Scott syndrome, a disorder of blood coagulation. Using a two-phase partitioning method, I obtained a platelet membrane fraction suitable for analysis. Proteomic methods were then used to identify and characterize TMEM16F. The latter was identified in enriched human platelet membranes. TMEM16F expression in purified canine platelet

membranes differed in control and CSS (Canine Scott Syndrome). Following western blotting analysis using the extracellular domain antibody, a marked reduction in expression was observed in the CSS dogs. Proteomic analysis is pending to determine the identity of putative TMEM bands.

I would like to thank Dr. Marjory Brooks and Dr. James Catalfamo for this amazing experience. I have learned much about research and will look back favorably on my summer at Cornell for many years. I would also like to thank the NIH and Pfizer Inc. for providing funding support.



Hilary Hu, University of Sydney, Cancer biology

Investigation of metastases in the Pten/Kras/Stra8-Cre mouse model of testicular germ cell tumors

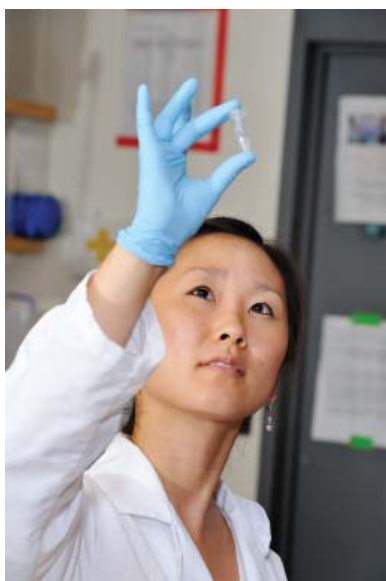
Testicular tumors account for more than 60% of malignancies in young men between the age of 15 and 35. Testicular cancer has serious physical and psychological effects. Fortunately, testicular tumors are often curable, and this unique property may provide insights into our understanding and treatment of other cancers. Currently, there are no suitable animal models for the investigation of testicular germ cell tumors.

My task this summer was to contribute to the development of a mouse model of testicular germ cell cancer under the supervision of Prof. Bob Weiss and Dr. Amy Lyndaker. Through simultaneous activation of an oncogene (Kras) and suppression of a tumor suppressor gene (Pten), the Weiss Lab has successfully created a robust mouse model of human testicular tumors that develops aggressive testicular tumors early in life. My project focused on identifying and characterizing

testicular tumor metastases in these mice because one striking feature of human testicular tumors is their tendency to metastasize. This is significant because metastases are associated with relapses, increased resistance to chemotherapy and poorer prognosis.

I collected organs from the sacrificed mice and potential metastases were first identified with Haematoxylin and Eosin stain. I then used immunohistochemistry and an antibody against Octmar-4, which specifically binds to germ cells that are responsible for the development testicular tumors, to confirm tumor metastases.

My experience this summer was memorable, and I would like to thank my fellow students for their friendship and support; my supervisors for their excellent mentorship and inspiration; as well as the program facilitators for this wonderful opportunity. I am grateful for the funding support I received from Pfizer Inc.



Mee-La Lee, University of Wisconsin, Immunology and Molecular Biology

Cloning stage specific Ichthyophthirius multifiliis proteases for expression in Tetrahymena thermophila

The Cornell Leadership Program attracted me because I have an interest in leadership development and am seeking ways to fine-tune my leadership skills. My hope was that the program would also help me identify a career path that was best suited to my interests. While still I cannot say what that pathway will be, I have gained some clarity from my experience in the program.

I had the wonderful opportunity to work in Dr. Ted Clark's lab. There, I studied Ichthyophthirius multifiliis, a parasitic protozoan that causes "white spot" disease in fresh-water fish. I. multifiliis is an obligate parasite My task was to explore how I. multifiliis proteases are involved in infection and release of the parasite from fish. Specifically, I created Ichthyophthirius protease constructs that subsequently will be transformed into Tetrahymena thermophila, a free-living protozoan, for expression. The ultimate goal of the project will be to use the expressed proteases as a vaccine for fish.

I am grateful to Dr. Ted Clark for being an excellent mentor who inspired me to think on my own. I am also thankful for Donna Cassidy-Hanley's guidance and the rest of the Clark lab who patiently taught me lab skills and created a wonderful learning environment that facilitated questions and discussion. Funding for my summer was generously supplied by the NIH and Pfizer Inc.



Elizabeth McCalley, Texas A&M University, Reproductive Biology
Characterization of PGAM2 in the principle piece of mouse spermatozoa

My interest in research began when I was an undergraduate at Cornell, working in Dr. Pat Johnson's lab, which focuses on ovarian cancer research. Up until that point I was convinced I would obtain a DVM degree and go into small animal practice. When I learned of the Leadership Program, I was delighted that there was a summer program dedicated entirely to exploring alternative careers in veterinary medicine.

This summer I had the pleasure of working in Dr. Alex Travis' lab, which focuses on sperm biology. Sperm are unique in that they use specialized glycolytic enzymes tethered to the fibrous sheath, a support structure in their principal piece, to provide localized ATP to power their flagella. The Travis lab aims to recreate this unique pathway by attaching sperm-specific glycolytic enzymes to a synthetic solid structure. In the future, this technology could be used to power nanodevices in the body, using readily available blood glucose as the energy source. Little is known

about PGAM2, one of the enzymes thought to be part of the sperm glycolytic pathway. My research confirmed that PGAM2 is the predominant isoform of phosphoglycerate mutase in sperm and suggested that the enzyme is not tightly tethered to the fibrous sheath.

I would like to thank all of the members of the Travis lab for their help and guidance. Specifically, I would like to thank Dr. Chinatsu Mukai for overseeing my project. I would also like to thank all of the program coordinators and facilitators for making this such a outstanding and enjoyable experience. Finally, I thank the NIH and Pfizer Inc. for providing my funding.



Andrea Nies, Tierärztlichen Hochschule, Hannover, Molecular Medicine
Characterization of mutations in DHHC9 palmitoyl transferase that cause X-linked mental retardation

I have been fascinated by the mechanisms of biological systems and biochemical processes since my schooldays. After finishing my PhD in chemistry I decided to study veterinary medicine to obtain deeper insight into how organisms function. I applied to the Leadership Program to combine both fields and to explore future career opportunities in research.

This summer I worked in the Linder Lab on palmitoylation, which is the reversible post-translational modification of cysteine residues within proteins. Palmitoylation reactions are mediated by a family of palmitoyl transferases, called DHHC's. Mutations in DHHC9 are associated with X-linked mental retardation. The hypothesis is that the loss of enzyme activity results in decreased palmitoylation of critical substrates leading to neural dysfunction. Currently there are no known endogenous substrates for DHHC9. The aim of my work was to find out whether the BK potassium channel is a substrate for DHHC9 in cells and to test the effects

of the two DHHC9 point mutants for reduced palmitoylation. By the end of the Program I was able to demonstrate that there is an influence of DHHC9 on palmitoylating the potassium channel in vivo.

I want to thank the organizers for selecting me and the Linder lab for making my research work so enjoyable. Special thanks go to Dr. Maurine Linder for giving me this very interesting research topic, for many fertile discussions and for excellent mentorship. I'm deeply grateful to Wendy Greentree who showed me so many new techniques and answered all my questions. I'm also grateful to those who supplied my funding: DAAD, the Bostwick Foundation, and Boehringer-Ingelheim.



Jane Y. Park, Cornell University College of Veterinary Medicine, Epigenetics and Cancer

Investigating the Role of PADI2 in Squamous Cell Carcinoma

My summer in the Leadership Program has been an invaluable experience in both research and graduate training. I entered veterinary school with the intention of starting a career that balanced elements of clinical work, research, and teaching and through the Leadership Program I have received the tools to pursue this ambition. Not only have I befriended like-minded students and future colleagues, but I have also obtained career advice from some of the most distinguished individuals in the fields of human and veterinary medicine, research, and industry.

I have also, in a short period of time, greatly expanded my knowledge of basic science and learned many fundamental techniques that will help me in my future research. I worked in the Coonrod Lab at the Baker Institute where I attempted to characterize patterns of expression of peptidylarginine deiminase 2 (PADI2) in squamous cell carcinomas. I used multiple techniques including

immunohistochemistry, immunofluorescence, immunoblotting, and modified anti-citrullination assays to assess PADI2 expression in feline squamous cell carcinoma tissue samples and cell cultures of A431 human squamous cell carcinomas. I confirmed the expression of PADI2 in squamous cell carcinomas and found varying expression patterns, which may correlate with different stages of cancer development.

I cannot thank Drs. Parker, McGregor, and Fraser enough for giving me the opportunity to participate in the program. They have not only allowed me to immerse myself in a vigorous environment of research and collaboration but have personally given me great guidance for my future endeavors. Thanks also to the NIH and Pfizer for supplying funding support.



Laura Schmertmann, University of Sydney, Immunology

Characterising the Role of Eosinophils in the Development of Allergic Asthma in C57BL/6 x BALB/c ΔdblGATA Mice

I applied to the program because of my strong interest in research, particularly wildlife, infectious diseases and pathology. The experience greatly improved my awareness of the array of opportunities available to veterinary graduates and the means by which to pursue my dreams while obtaining sound scientific training. Best of all, the program introduced me to 26 inspiring, fun and like-minded students from around the world.

My research focused on the recruitment of eosinophils and T cells to the lungs of C57BL/6 x BALB/c ΔdblGATA mice during allergic asthma (AA). The ΔdblGATA mutation, resulting in an eosinophil null state, highlighted the pivotal role of eosinophils in AA in C57BL/6 mice. However, BALB/c ΔdblGATA mice still develop AA comparable to the wildtype. This likely is related to a bias towards Th2 cell responses in this strain. Characterizing the cross will hopefully elucidate the role of eosinophils in the development of AA. Preliminary results indicate a reduced

response in the cross, comparable to that of C57BL/6 ΔdblGATA mice. However, due to inconsistencies with control and wild-type mice, this work will be ongoing in order to establish its validity.

I would like to thank Drs. Avery August and Kindra Stokes for their mentorship and the entire August lab for their support. I would also like to thank Drs. McGregor, Fraser and Parker for their dedication to providing this amazing opportunity and for inspiring me to continue pursuing a career in research. In addition, thank you to all of the participants for making this summer so memorable. Finally, thank you for my funding support from the NIH and Pfizer Inc.



Peter Silke, Cambridge University, Virology

Generating recombinant antibody fragments against canine parvovirus capsid antigens

When I entered veterinary school in 2008, my long-term career plan was to enter private practice. But after working in a virology lab investigating influenza, I became fascinated with the opportunities research could provide. My application to the Leadership Program was driven by a desire to gain more experience in research outside of my veterinary school.

During my summer at Cornell, I worked in Prof. Colin Parrish's lab investigating recombinant single-chain variable antibody fragments (ScFv). These are the smallest antigen-specific antibody fragments available, and offer a wide range of potential uses, both therapeutic and research-based. ScFvs can be generated from immunized hosts by mRNA extraction from splenocytes, followed by reverse transcriptase PCR and cloning into bacteriophage that express the ScFv on their surface coupled with a filamentous surface protein. Using phage display, the recombinant phage can be panned against a specific antigen, selecting for antigen specificity with each subsequent round of panning. The ScFvs specific for Canine

Parvovirus I was able to express from recombinant *E. coli* can be used to characterize epitopes targeted by the host antibodies, as well as how the virus circumvents this response.

After the Program, I feel confident in my decision to pursue a long-term career in research. After graduating from vet school, I hope to gain some clinical experience before embarking on a PhD in basic science, with an emphasis on the cellular mechanisms of infectious disease.

I would like to thank all the members of the Parrish lab, along with Drs. Parker, Fraser and McGregor for all their help over the course of the program. I am also grateful for the funding support I received from the Wellcome Trust.



Luc Smolders, Utrecht University, Biomedical engineering/Neurobiology

In vivo imaging of cerebral microglia responses to cortical microhemorrhages

The Cornell Leadership Program has provided me with a variety of valuable experiences, and has given me insight into the general area of potential career paths one can take.

In the course of my research I used a mouse model to study the effects of cerebral microhemorrhages, which are linked to cognitive decline in humans. Microhemorrhages drive an inflammatory response consisting of microglia (brain-resident macrophages), which may lead to neural dysfunction. However, it is unclear by what mechanism microglia become activated after a microhemorrhage. P2Y receptors are known to activate microglia when exposed to nucleotides, e.g. increased concentrations of ATP. To investigate whether the P2Y-pathway was involved in microglial activation, we evaluated the effects of a P2Y inhibitor by employing in vivo imaging of the brain through a surgically-made window in the top of the skull. Two-photon-excited fluorescent microscopy was used for this purpose. In response to microhemorrhages, microglia participated in a rapid

inflammatory response up to 200 μ m from the microhemorrhage, as well as extension of microglial processes toward the hemorrhage. Application of the P2Y-inhibitor resulted in decreased microglial activation, indicating that this is a pathway is relevant in microglia activation. This knowledge may provide new opportunities to reduce the impact of microhemorrhages on the brain.

I would like to thank my supervisors Prof. Chris Schaffer and Dr. Nozomi Nishimura, for their enthusiastic supervision; Morgan Brophy, who guided and helped me considerably throughout the entire period; the Schaffer lab, for the good times; the organizers of the Leadership program, and of course my fellow Leadership students, for making this a unforgettable experience. Finally, I must acknowledge my funding support from Pfizer Inc. – thank you.



Hanna Telama, University of Helsinki, Molecular Biology

Characterizing asymmetric gene expression in the dorsal mesentery

The leadership program provided me a unique opportunity to gain first hand research experience in a productive, high-quality laboratory. The experience also enabled me to establish a network of professional contacts, which will be of great benefit when I pursue post-graduate education in the United States.

I undertook my summer research project in the Kurpios lab, which studies organ development with particular focus on the formation of left to right asymmetry in the dorsal mesentery. My aim was to study gene expression in the developing dorsal mesentery, with the task of verifying the expression of a cluster of ten genes, suspected to be specific to the right side of the dorsal mesentery, through in situ hybridization studies. These right-specific genes were derived from microarray data of previous work in the lab. We designed RNA-probes for the ten cluster genes; *Accn5*, *Ctso*, *Gucy1a3*, *Npy2r*, *Lrat*, *Pdgfc*, *Rbm46*, *Rxfpl*, *Sfrp2* and *Trim2*. In situ hybridization studies of these RNA-probes were performed in stage 21 wild-type chicken embryos, using both transverse slices and whole mount embryos. Preliminary data showed that five out of ten cluster genes show potential expression in the dorsal mesentery. Optimization of signal and more section studies are needed for specific characterization of expression in the mesenteric compartments.

I would like to thank my mentors Nataza Kurpios and Ian Welsh for their guidance and support this summer. I would also thank Pfizer Inc. for funding support.



Noortje van der Helm, University of Utrecht, The Netherlands, Neurobiology

Combinatorial cadherin complexes in cell-cell adhesion

When I started my veterinary degree, I knew that my curiosity and enthusiasm for intellectual challenges would make a career in private practice less satisfying for me. After completing the pre-clinical phase of my studies, I participated in a one-year veterinary research program. This made me realize that it is exciting to look beyond the boundaries of current knowledge. After being introduced to the scientific world, the Leadership Program has provided me with the tools to broaden my research experience and to explore alternative possibilities for my future career.

During development, billions of neurons connect with their targets to form a functional nervous system. Cell-cell adhesion molecules are known to be critical in regulating axon guidance. Recently, it was found that neural-cadherin, a strong cell-cell adhesion molecule, forms a complex with two different members of the delta-protocadherins, a cadherin subfamily. This complex greatly enhances the weak adhesive ability of these protocadherins. This suggested a possible mechanism whereby complex formation allows for delta-protocadherins to be involved in axon guidance to a greater degree than previously suspected. My research project involved, screening the whole delta-protocadherin family for interactions with neural-cadherin using co-immunoprecipitation assays. This work will provide insight into how these proteins instruct proper wiring of olfactory sensory neurons.

Working in the Lin Lab this summer was a great experience. I would like to thank Prof. David Lin and Adam Bisogni for their motivating, inspiring and invaluable mentoring. I would also like to thank Drs. Parker, McGregor, and Fraser for the opportunity to participate in their wonderful program. I am grateful for my funding support, which came from Pfizer Inc.



Adam Werts, North Carolina State University, Molecular Biology

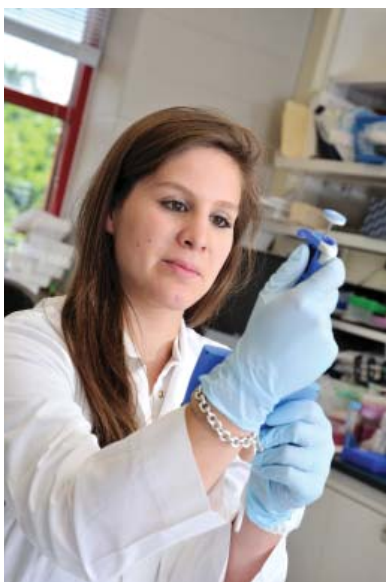
Microvesicles: Potential mediators of intercellular communication between stem cells

Before enrolling in the Cornell Leadership Program, I completed a PhD in Cell Biology at the University of North Carolina and one year of the veterinary curriculum at North Carolina State University. I feel that my experiences this summer working in the Cerione lab, as well as the lab meetings I attended with Drs. Kurpios and Leifer, have helped me better understand the different styles of running a research lab. Together they have solidified my desire to pursue a career in basic research.

In Dr. Cerione's lab, I investigated microvesicle (MV) production. MVs are small (0.1 to 2 μm) membrane-bound structures that contain host cell specific proteins that function as intercellular signaling molecules. The Cerione lab has shown that MVs generated from cancer cells mediate the transient transformation of normal cells into cells that have oncogenic properties. Whether MVs function in a similar capacity in a normal, healthy organism has not yet been established, however.

Working with graduate student Laura Desrochers, I showed that mouse embryonic stem (ES) cells produce MVs, potentially helping ES cells maintain their pluripotency. I also conducted proteomic analysis on isolated ES cell MVs. The results showed over 1500 different proteins enriched in these MVs. Of the top 19 most enriched proteins, 7 were tubulin monomers, suggesting a potential role for tubulin in the formation and/or structural maintenance of the MVs. With this large list of potentially important proteins in ES MVs, the project has raised many more questions than answers and I am eager to see where the research will head next.

My funding for this summer came from the NIH and Pfizer Inc.



Helena Wittgenstein, Freie Universität Berlin, Genetics

Mapping microsatellite markers, haplotypes and polymorphisms associated with tame and aggressive behaviors on chromosome 3 of silver foxes

When I began my DVM training in 2008 I was convinced that I would become a practicing veterinarian. But university soon taught me that there is more to a DVM than practicing medicine and I was convinced of the importance of research in veterinary medicine.

Striving to broaden my understanding of the different career paths available to veterinarians, I participated in the Leadership Program. I was captivated by the once-in-a-lifetime opportunity to work closely with the best veterinary students and scientists from around the world and build a lasting professional and personal network. I am convinced that the experience I gained during my 10 weeks at Cornell will influence and shape my career path.

My project in the Acland lab was focused on understanding the genetics underlying the behavior in tame and aggressive strains of the silver fox (*Vulpes vulpes*). I developed fox-specific microsatellite markers and built a meiotic linkage map for a part of fox chromosome 3 that had not been previously mapped, but showed signs of selection. I identified haplotypes and a deletion/insertion polymorphism, which almost perfectly differentiates animals between the two strains. To test an association between the strain specific haplotypes and behavior I used fox experimental pedigrees segregating behavioral differences between the two strains. No significant association was identified in F2 pedigrees.

My special thanks go to Drs. Greg Acland and Anna Kukekova and Ms. Jennifer Johnson and the other laboratory members for letting me spend ten wonderful weeks under their supervision and guidance. I also would like to thank Drs. Parker, Fraser and McGregor for enabling me to participate and thrive in such an extraordinary program. I am very grateful for the funding support I received from the DAAD and the Bostwick Foundation.

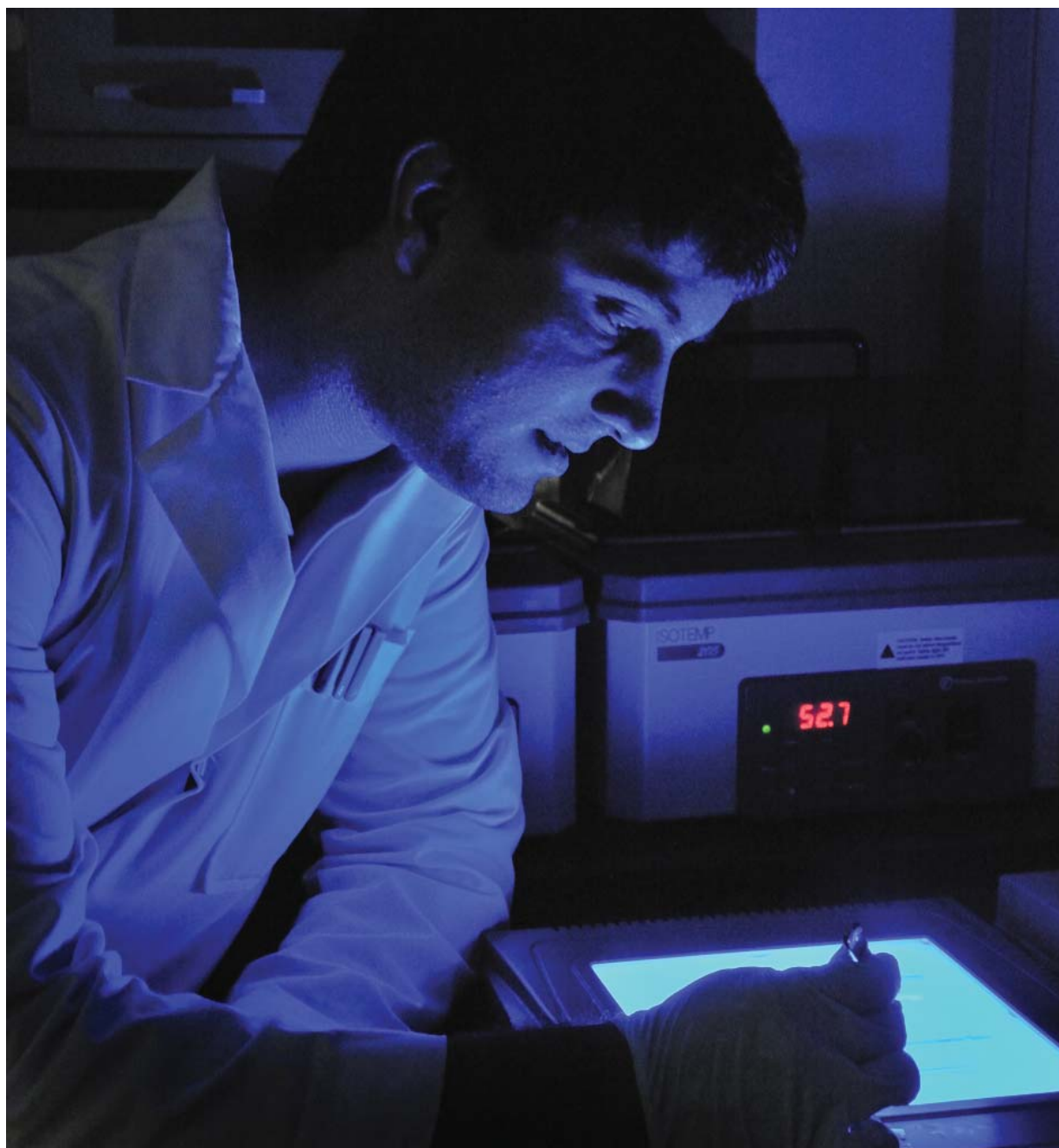


Kaylie Ackerley, Program Coordinator

As the Program Coordinator, I had the opportunity of a lifetime to share in the adventures and triumphs of this year's participants. From working at night and on weekends to ensure their presentations were complete to traveling to Washington, Toronto and everywhere in between, the students epitomized the need to balance work and the building of relationships that will last a lifetime. It was a pleasure to facilitate these activities to ensure that the students had a memorable experience.

The Leadership Program provided invaluable insight into the field of veterinary medicine; insight that I will put to great use as I pursue a career as an agricultural educator teaching animal science and pre-veterinary coursework at the high school level. I want to be the person who prepares the next generation of veterinary students for this type of rigorous program. My sincere appreciation goes to Drs. Parker, McGregor, and Fraser for providing me with such a wonderful experience. In addition many thanks go out to Jennifer Best for her infinite assistance throughout the summer program. Finally, thank you to all of the students for the birthday breakfast surprise, all of your hard work, and instilling confidence by saying, "If you

can deal with us for a whole summer, you will make a phenomenal teacher." Good luck in your future career and personal endeavors!



Facilitators & Counselors



Dr. Klaus Beyenbach,
Facilitator
Professor, Physiology
Cornell University



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



Dr. Rick Cerione, Facilitator
Professor, Pharmacology &
Chemical Biology
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Dr. Terrence Dermody,
Facilitator
Professor, Virology
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Dr. Thomas Divers, Facilitator
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Dr. Julia Felipe, Counselor
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Dr. David Fraser, Facilitator/
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Dr. Michelle Haven, Facilitator
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Dr. Gerard Hickey, Facilitator
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Molecular Medicine
Cornell University



Dr. Kirk Maurer, Counselor
Veterinarian, Center for Animal
Resources and Education
Cornell University



Dr. Peggy McCann, Facilitator
Director, Regulatory Affairs
Merck Co.



Dr. Sean McDonough,
Counselor
Associate Professor, Biomedical
Sciences
Cornell University



Dr. Douglas McGregor,
Counselor/ Facilitator
Professor Emeritus,
Immunology
Cornell University



Dr. Drew Noden, Facilitator
Professor, Biomedical
Sciences
Cornell University



Dr. Robert Ossiboff,
Counselor, Resident,
Anatomical Pathology
Cornell University



Dr. John Parker, Facilitator
Assoc. Professor, Virology
Cornell University



Dr. Colin Parrish, Facilitator
Professor, Virology
Cornell University



Dr. Don Randel, Facilitator
President
Andrew W. Mellon Foundation



Dr. Chris Schaffer, Facilitator
Assoc. Professor, Biomedical
Engineering
Cornell University



Dr. Elizabeth Simpson, FRS
Facilitator, Professor Emeritus,
Transplantation Biology
Imperial College, London



Dr. Kenneth Simpson,
Facilitator
Professor, Clinical Sciences
Cornell University



Dr. Oliver Smithies, Facilitator
Nobel Laureate & Distinguished
Professor of Pathology and
Laboratory Animal Medicine,
University of North Carolina
at Chapel Hill



Dr. Jenny Sones, Counselor
Graduate Research Assistant,
Biomedical Sciences
Cornell University



Dr. Alfonso Torres, Facilitator
Associate Dean for Public
Policy, Cornell University



Dr. Robert Weiss, Facilitator
Assoc. Professor, Biomedical
Sciences
Cornell University

Housing

Participants in the 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 scholars to socialize and relax in a convenient and pleasant campus environment.



Time Out

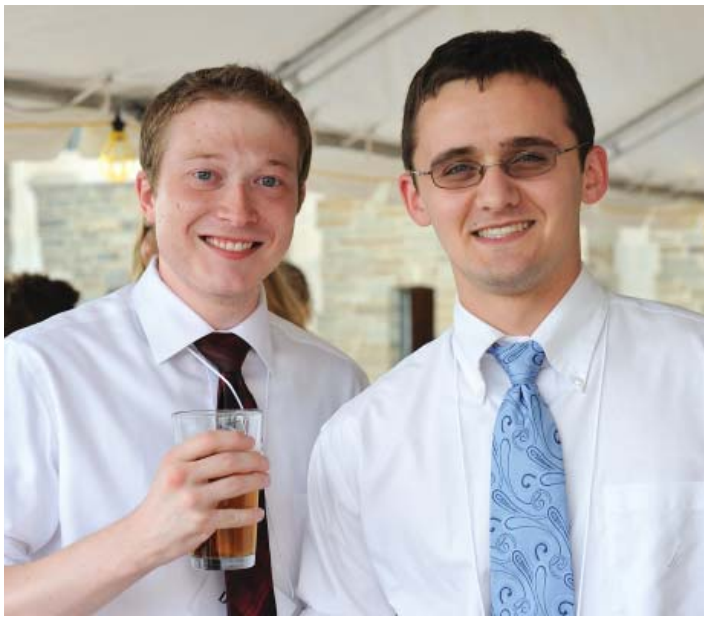
Apart from their intensive schedule, program scholars found time for many personal pleasures. They capitalized on local Ithaca amenities, participating in the Finger Lakes International Dragonboat Festival and visited natural sites of beauty and cultural centers within striking distance of Ithaca.



Program Dinner

The Leadership Program scholars hosted a dinner for their mentors, module facilitators, counselors, and other guests at Willard Straight Hall on the Cornell University campus.





Program Alumni

Contact with Leadership Program graduates is maintained in order to strengthen the professional network forged at Cornell and to uphold the program's tradition of excellence for the benefit of future scholars. Alumni are encouraged to make informed decisions about the advanced training needed to realize their professional goals. The accompanying table lists degrees awarded to program graduates and degrees they are expected to receive after completing the academic programs in which they are presently registered. Not included in the list are degrees alumni received before they began their veterinary studies.

Academic Qualifications of DVM alumni of the Leadership Program (1990-2011)

DEGREE	No.	% NORTH AMERICAN ALUMNI (N = 264)	No.	% OTHER COUNTRIES ALUMNI (N = 249)	No.	% TOTAL ALUMNI (N = 513)
PhD	46	17.4%	97	39%	149	29%
Dr. Med. Vet.	NA	NA	19	7.6%	19	3.7%
MPH	9	3.4%	4	1.6%	13	2.5%
MS	7	2.7%	14	5.6%	21	4.1%

NA = Not applicable

The following table indicates that a substantial number of program alumni obtained residency training in the course of their graduate studies. Eighty-eight residents were graduates of veterinary schools in North America while 46 were alumni of schools located elsewhere in the world. It is tempting to speculate that the difference between the two groups reflects greater opportunities for residency training in North America although other, less obvious reasons may contribute to the observed difference.

Residency Training of DVM Alumni of the Leadership Program (1990-2011)

No.	% NORTH AMERICAN ALUMNI	No.	% OTHER ALUMNI	No.	% TOTAL ALUMNI
90	34.1%	46	18.5%	134	26.1%

North American (N=264) Other Countries (N=249) Total (N=513)



Where Are They Now?

Listed below are the positions currently occupied by program alumni whom have completed their veterinary education and are pursuing careers in science or public health.

1990

John Angelos, Associate Professor, Comparative Pathology, University of California at Davis, CA

William Carr, Instructor, Ragon Institute, MGH, Harvard University, Cambridge, MA

Laura Gumprecht, Associate Director, Safety Assessment, Merck Research Laboratory, West Point, PA

Elizabeth Lyon-Hannah, Research Faculty, Boise State University, Boise, ID

Richard Haworth, Senior Pathologist, GlaxoSmithKline, Middlesex, UK

Melissa Mazan, Associate Professor and Director, Sports Medicine, Tufts University, North Grafton, MA

Rebecca Papendick, Diagnostic Pathologist/Senior Scientist, Zoological Society of San Diego, San Diego, CA

Susan Schaefer, Clinical Associate Professor, Surgery, University of Wisconsin, Madison, WI

A. W. (Dan) Tucker, Senior Lecturer, Veterinary Public Health, University of Cambridge, UK

Thomas Vahlenkamp, Head, Institute of Virology, School of Veterinary Medicine, Leipzig, Germany

1991

Prema Arasu, Vice-President International Programs, Washington State University, Pullman, WA

David Bainbridge, Clinical Veterinary Anatomist, University of Cambridge, UK

Linda Berent, Clinical Associate Professor, University of Missouri, Columbia, MO

Ian Davis, Associate Professor, Veterinary Biosciences, The Ohio State University, Columbus, OH

Dianne Hellwig, Associate Professor, Agriculture and Natural Resources, Berea College, KY

Judy Hickman-Davis, Director, Laboratory Animal Training Program/Associate Professor, Department of Veterinary Preventive Medicine, The Ohio State University, Columbus, OH

Alison Moore, Equine Medical Consultant, IDEXX, Cambridge, Ontario, CA

Alan Radford, Senior Lecturer, Small Animal Studies, University of Liverpool, UK

1992

Tomasz Betkowski, Business Manager, Quintiles, Warszawa, Poland

Stephen Davies, Associate Professor, Parasitology, Uniformed Services University, Bethesda, MD

Mathew Gerard, Clinical Associate Professor, Large Animal Surgery, North Carolina State University, Raleigh, NC

Christine Hawke, Lecturer in Professional Practice, University of Sydney, AU

Julio Montero, Brigade Veterinarian, US Army, Yongsan, South Korea

John Ober, Resident, Nutritional Science, Cornell University, Ithaca, NY

Jacqueline Phillips, Professor, Molecular Neuroscience, Macquarie University, Sydney, AU

Cristina Rodriguez-Sanchez, Senior Research Associate, Universidad Nacional Autónoma de México, Mexico

Louise Southwood, Associate Professor, Large Animal Emergency and Critical Care, University of Pennsylvania, New Bolton Center, Philadelphia, PA

Reinhard Straubinger, Professor and Section Head, Bacteriology and Mycology, Ludwig Maximilian University, Munich, Germany

1993

Virginia Fajt, Associate Professor, Pharmacology, Texas A&M University, College Station, TX

Christopher Laing, Director, Science and Technology University City Science Center, Philadelphia, PA

Emma Massey O'Neill, Lecturer, Small Animal Medicine, University College, Dublin, Ireland

Joanne Rainger, Registrar, Anesthesia, University of Sydney, AU

Ashley Reynolds, Staff Member, MSNW Inc, Washington DC

Susannah Ryan, Director Scientific Services, Chameleon Communications International, London, UK

Veiko Saluste, Chief Executive Officer, Interchemie Worken, Adelaar AS, Estonia

Melinda Stewart-Gabor, Pathologist, Elizabeth MacArthur Research Laboratory, Sydney, AU



Lynn Wachtman, Clinical Veterinarian and Instructor, New England Primate Center, Harvard Medical School, Southborough, MA

1994

Melissa Beall, Research Scientist, Medical Affairs, IDEXX Inc., Portland, ME

Larissa Bowman, Director, Mountain Veterinary Pathology, Asheville, NC

Leslie Gabor, Manager, Pre-Clinical Safety, Novartis Animal Health, Sydney, AU

Maria Lara-Tejero, Senior Research Associate, Department of Microbiology, Yale University, New Haven, CT

Christopher Mariani, Associate Professor, Neurology, North Carolina State U., Raleigh, NC

Sonia Mumford, Veterinary Medical Officer, Olympia Fish Health Center, U.S. Fish & Wildlife Service, Olympia, WA

Jeffrey Phillips, Assistant Professor, Oncology and Medical Genetics, University of Tennessee, Knoxville, TN

Julie Pomerantz, Associate Research Scientist, Wildlife Trust, Palisades, NY

Stacy Pritt, Director and General Manager, Biological Test Center, B. Braun Medical, Irvine, CA

Mary Thompson, Lecturer Small Animal Medicine, University of Queensland, AU

Oliver Turner, Senior Pathologist, Novartis Institute for Biomedical Research, East Hanover, NJ

1995

Gertraut Altreuther, Project Manager, Parasitology, Bayer Animal Health, Leverkusen, Germany

Philippa Beard, Lecturer, Virology, University of Edinburgh, UK

Kate Creevy, Assistant Professor, Small Animal Medicine, University of Georgia, Athens, GA

Rachael Gray, Senior Lecturer, Veterinary Anatomy, University of Sydney, AU

Wendy Harrison, Research Scientist, GlaxoSmithKline, Medicines Research Center, Stevenage, UK

Andrew Moorhead, Assistant Research Scientist, Veterinary Parasitology, U. of Georgia, Athens, GA

Tony Mutsaers, Professor, Clinical Studies, Ontario Veterinary College, Guelph, Ontario, CA

1996

Mark Doherty, Technical Service Manager, Ancare, Kirrawee, NSW, AU

Michelle Dries-Kellaway, Senior Regional Coordinator, Department Premier and Cabinet, New South Wales, AU

Patricia Gearhart, Adjunct Assistant Professor, Ophthalmology, Michigan State University, East Lansing, MI

Tamara Gull, Assistant Professor, Pathobiology, Oklahoma State, Stillwater, OK

Antonia Jameson-Jordan, Lecturer, Department of Biomedical Sciences, Cornell University, Ithaca, NY

Ralph Senfton Head, Information Technology, Provet AG, Berne, Switzerland

John Stein, Resident, Diagnostic Imaging and Radiology, University of Wisconsin, Madison, WI

Allison Stewart, Associate Professor, Equine Internal Medicine, Auburn University, AL

Edwin van Duijnhoven, Research Scientist, NOTOX, the Netherlands

Constantin Von der Heyden, Director, Pegasys Strategy and Development RSA, South Africa

1997

Peter Bracken, Technical Services Veterinarian, Boehringer Ingelheim, AU

Jonathan Happold, Senior Veterinary Officer, Epidemiology, AGDAFF, AU

Esther Kornalijnslijper, Faculty Member, Department of Infectious Diseases, University of Utrecht, Netherlands

Tanya LeRoith, Assistant Professor, Pathology, Virginia Tech, Blacksburg, VA

Lucy Neave, Lecturer, Creative Writing, Australian National University, Canberra, AU

Patricia Pesavento, Associate Professor, Pathology, University of California, Davis, CA

Paul Plummer, Assistant Professor, Microbiology, Iowa State University, Ames, IA

Deborah Prattley, Lecturer, Veterinary Public Health, Massey University, NZ

Jonathan Werner, Principal Pathologist, Amgen, Inc., Thousand Oaks, CA

Esther Wissink-Antonis, Research Manager/Faculty, Virology, University of Utrecht, the Netherlands

Rachel Walker, PhD candidate, Pathology, University of Sydney, AU

Rebecca Wilcox, Animal Welfare Officer, RMIT University, Melbourne, AU

1998

Max Bastian, Senior Scientist, Paul Ehrlich Institute, Langen, Germany
Stephen Fleisher, Biologist, Center for Biologics Evaluation and Research, FDA, Bethesda, MD
Karsten Huffer, Assistant Professor, Microbiology, Institute of Arctic Biology, University of Alaska, Fairbanks, AK
Mary Klinck, PhD candidate, Pharmacology, University of Montreal, Montreal, CA
Karen Liljebjelke, Assistant Professor, Microbiology, University of Calgary, Alberta, CA
Larissa Minicucci, Director, D.V.M./M.P.H. Program, University of Minnesota, Minneapolis, MN
Amanda de Mestre, Lecturer, Veterinary Basic Sciences, Royal Veterinary College, London, UK
Erin Phipps-Crotty, Public Health Specialist, New Mexico Dept. of Health, Albuquerque, NM
Anne-Marije Sparnaay, Senior Policy Advisor, Ministry of Agriculture, the Netherlands

1999

Erica Behling-Kelly, Assistant Professor, Clinical Pathology, Cornell University
Christine Broster, Veterinary Clinical Training Advisor, The Brooke, UK
Robert Dickens, Training Specialist, U.S. Department of Agriculture, Raleigh, NC
Joshua Fine, Program Manager, SAIC, Animal Disease Center, Plum Island, NY
Peter Florian, Director of Pharmacology R&D, Sanofi, Frankfurt, Germany
Carl Holmgren, Research Scientist, Université de la Méditerranée, Marseille, France
Emily Meseck, Senior Pathologist, Wyeth Research Laboratories, Chazy, NY
Rachel Peters, Assistant Professor, Biomedical Sciences, Cummings School of Veterinary Medicine, Tufts University, MA
Mary Nabity, Clinical Assistant Professor, Texas A&M University, College Station, TX
Kimberly Newkirk, Assistant Professor, Anatomical Pathology, University of Tennessee, Knoxville, TN
Christopher Premanandan, Assistant Professor, Veterinary Biosciences, The Ohio State University, Columbus, OH
Rachel Tarlinton, Lecturer, Veterinary Cellular Biology, University of Nottingham, UK
Holger Volk, Lecturer, Neurology and Neurosurgery, Royal Veterinary College, London, UK



2000

Beatrice Bohme, Assistant Professor, Surgery, School of Veterinary Medicine, University of Liège, Belgium
Stephen Daley, Postdoctoral Fellow, Immunology, Australian National University, Canberra, AU
Katharine Evans, PhD Candidate, Epidemiology, University of Nottingham, Nottingham, UK
Toby Floyd, Epidemiologist, Veterinary Laboratories Agency, Addleston, UK
Rachel Geisel-Allavena, Senior Lecturer, Pathology, University of Queensland, Brisbane, AU
Samuel Hamilton, Senior Veterinary Officer, Biosecurity Services, DAFF, Canberra, AU
Birgit Hingerl-Viertlboeck, Postdoctoral Fellow, Immunology, University of Munich, Germany
Natali Krekeler, Lecturer, Veterinary Reproduction, University of Melbourne, Melbourne, AU
Jamie Lovaglio, Clinical Veterinarian, Pacific Northwest National Laboratory, Richland, WA
Richard Luce, Epidemiologist, US Centers for Disease Control and Prevention, Atlanta, GA
Fiona Norris-Sansom, Postdoctoral Fellow, Microbiology, University of Melbourne, AU
Simon Starkey, Pet Education Veterinarian, Pet Smart Inc., Phoenix, AZ
Knut Stieger, Research Leader, Faculty of Medicine, Ophthalmology, Justus – Liebig University, Giessen, Germany
Joost Uilenreef, ECVA Residency Supervisor, University of Utrecht, the Netherlands
Kevin Woolard, Research Fellow, Neuro-Oncology, NIH, Bethesda, MD



2001

Julie Chevette, Head, Animal Environment, Montreal Heart Institute, Montreal, PQ
Karin Hoelzer, Risk Assessment Officer, US Food and Drug Administration, College Park, MD
Katherine Hughes, PhD candidate, University of Cambridge, UK
Stephanie Janeczko, Medical Director, New York City Animal Care and Control, New York, NY
Charles Johnson, Postdoctoral Fellow, Comparative Pathology, University of Minnesota, Minneapolis, MN
Robert Klopffleisch, Assistant Professor, Pathology, Freie Universität, Berlin, Germany
David Loch, Postdoctoral Fellow, Queensland University of Technology, Brisbane, AU
Maeva May, AAAS, Trainee, National Cancer Institute, NIH, Bethesda, MD
Timothy Myshrall, Assistant Director, Veterinary Services, Cleveland Clinic, Cleveland, OH
Judith Phillips, Research Associate, Neurovirology, University of Pennsylvania, Philadelphia, PA
Kis Robertson, Preventative Medicine Fellow, Dept. Health and Mental Hygiene, Laurel, MD
Jason Stayt, Resident, Clinical Pathology, Murdoch University, Perth, AU
Amy Warren-Yates, Assistant Professor, University of Calgary, Calgary, Alberta,
Rachel Windsor Ballantyne, Veterinary Technical Manager, Merial Pharmaceutical, Stevenage, UK
Robin Yates, Associate Professor, Comparative Biology, University of Calgary, Calgary, Alberta, CA
Bevin Zimmerman, Assistant Director, Pathology, WIL Research Laboratories, Ashland, OH

2002

Christine Bayley Trezises, Veterinary Pathologist, Gribbles Pathology, Melbourne, AU
Karin Darpel, Postdoctoral Scientist, Virology, Pirbright, UK
Karyn Havas, PhD candidate, Epidemiology, Colorado State University, Ft. Collins, CO
Patrick Kenny, Lecturer, Neurology and Neurosurgery, Royal Veterinary College, London, UK
Steven Laing, Resident, Pathology, University of California, Davis, CA
Susannah Lillis, Clinical Assistant, Professor, Radiology, University of Liverpool, UK
Anne Lo, Strategic Management Consultant, Bain & Co., London, UK
Michael Mienaltowski, Postdoctoral Fellow, Molecular Biology, University of South Florida, Tampa, FL
Andrew Miller, Head Diagnostic Services, New England Primate Research Center, Harvard Medical School, Southborough, MA
Simon Priestnall, Resident, Pathology, Royal Veterinary College, London, UK
Kelly Still, Brigade Veterinary Surgeon, US Army Fort Bragg, NC
Barbara Taennler Werhli, Marketing Manager, Veterinaria AT, Zurich, Switzerland

2003

Rosie Allister, Ph.D. candidate, Epidemiology, University of Edinburgh, UK
Mieke Baan, Clinical Instructor, Medicine, University of Wisconsin, Madison, WI
John Baker, Associate Consultant, Bain & Co., London, UK
Sandra Barnard, Assistant Professor, Oncology, The Ohio State University, Columbus, OH
Belinda Black, Resident, Large Animal Medicine, Ontario Veterinary College, Guelph, Ontario, CA
Patrick Carney, PhD Candidate, Epidemiology, Boston University, Boston MA
David Gardiner, Pathologist, IDEXX Laboratories, Sacramento, CA
Erica Gruber, Resident, Clinical Pathology, Cornell University, Ithaca, NY
Carol Haak, Resident Critical Care, University of Missouri/Animal Emergency Center, Milwaukee, WI
Lindsay Hamilton, Research Veterinarian, Jurox Ltd, Ruthersford, AU



Michael Krahn, Assistant Professor, Cellular & Molecular Anatomy, University of Regensburg, Germany

Heather Martin, Laboratory Animal Veterinarian, Hoffman-LaRoche, Nutley, NJ

Siobhan Mor, Lecturer, Food Safety, University of Sydney, Sydney, AU

Kate Paterson, Senior Science Writer, Garvin Institute, University of New South Wales, AU

Karla Stucker, Postdoctoral Fellow, J. Craig Venter Institute, Rockville, MD

Lyn Wancket, PhD candidate, Molecular Virology, The Ohio State University, Columbus, OH

Christiane Wrann, Research Fellow, Medicine, Beth Israel Deaconess Medical Center, Harvard University, Cambridge, MA



2004

Anton Asare, USDA Public Health Veterinarian, University of South Carolina, SC

Carolin Block, Clinical Trials Manager, Roche Pharma AG, Basel, Switzerland

Mathew Breed, PhD candidate, Immunology, Tulane University, Covington, LA

Andrew Broadbent, Postdoctoral Fellow, Virology, NIAID, NIH, Bethesda, MD

Karla Dreckmann, Research Scientist, Vaccine Development, Boehringer Ingelheim, Germany

Annika Krengel, Veterinarian, Wilhelma Zoo Stuttgart, Germany

Robert Ossiboff, Pathology Fellow, Bronx Zoo, New York, NY

Allison Rogala, Resident, Laboratory Animal Medicine, University of North Carolina, Chapel Hill, NC

Duncan Russell, Lecturer, Pathology, The Ohio State University, Columbus, OH

Baukje Schouten-Schotanus, PhD candidate, Cell Biology, University of Utrecht, the Netherlands

Katherine Scollan, Assistant Professor, Cardiology, Oregon State University, OR

Ivana Sekis Calice, Scientist, Baxter Innovations GmbH, Vienna, AT

Katy Townsend, Clinical Instructor, Surgery, The Ohio State University, Columbus, OH

Claire Underwood, Academic Clinician, University of Queensland, Brisbane, AU

2005

Krystal Allen, Resident, Laboratory Animal Medicine, University of Pennsylvania, Philadelphia, PA

Melanie Ammersbach, PhD candidate, Ontario Veterinary College, Guelph, Ontario, CA

Hannah Bender, Resident, Anatomical Pathology, Cornell University, Ithaca, NY

Derek Cavatorta, PhD candidate, Immunology, Cornell University, Ithaca, NY

Hille Fieten, Ph.D. candidate, Genetics, University of Utrecht, the Netherlands

Amanda Kreuder, PhD candidate, Iowa State University, Ames, IA

Rebecca Mitchell, Postdoctoral Fellow, Cornell University, Ithaca, NY

Marieke Opsteegh, Postdoctoral Fellow, Marie Curie Fellow, Moredun Research Institute, University of Edinburgh, UK

Emily Orchard Mills, PhD candidate, Psychology, University of Sydney, AU

Tricia Oura, Clinical Instructor, Diagnostic Imaging, North Carolina State University, Raleigh, NC

Johanna Rigas, Instructor, Clinical Pathology, Washington State University, Pullman, WA

Klara Saville, MS candidate, Center for Tropical Medicine, University of Edinburgh, UK

Catherine Trickett, PhD candidate, Animal Behavior, Bristol University, UK

Nina Weshaupt, PhD candidate, Neuroscience, University of Alberta, Edmonton, Alberta, CA



2006

Onno Burfeind, Postdoctoral Fellow, Clinic for Animal Reproduction, Freie Universität, Berlin, Germany

Bronwyn Clayton, PhD candidate, Virology, CSIRO, Geelong, AU

Alexander Corbishley, PhD candidate, Immunology, Roslin Institute, University of Edinburgh, UK

Janny DeGrauw, Postdoctoral Fellow, Faculty of Medicine, Utrecht University, the Netherlands

Louise Fitzgerald, Resident, Pathology, University of Pennsylvania, Philadelphia, PA

Anne Gordon-Schneider, PhD candidate, Cornell University, Ithaca, NY

Annika Haagsman, Resident, Small Animal Medicine, University of Utrecht, the Netherlands

Eva Marie Laabs, PhD candidate, Parasitology, Tierärztliche Hochschule, Germany

Jane Leadbetter, Medical Student, Griffith University, Brisbane, AU

Gelja Maiwald, Head, Companion Animal Products, IDT Biologika, Dessau Germany

Richard Meeson, Staff Clinician, Small Animal Surgery, Royal Veterinary College, UK

Ashley Neary Hartley, PhD Candidate, University of Georgia, Athens, GA

Joseph Neary, PhD candidate, Epidemiology, Colorado State University, Fort Collins, CO

John Parker, Senior Clinical Training Scholar, Neurology, University of Cambridge, UK

Tiffany Reed, PhD Candidate, Cancer Biology, NIH, Bethesda, MD

Laura Spoor, PhD candidate, Bacteriology, Roslin Institute, University of Edinburgh, UK

2007

Patrick Ayscue, Fellow, Science and Technology Policy, National Academy of Sciences, Washington D.C.

Sonja Broer, PhD candidate, Pharmacology, Tierärztliche Hochschule, Germany

Rosemary Brungs, Medical Student, University of Sydney, AU

Sarah Caddy, PhD candidate, Virology, Imperial College, London, UK

Elva Cha, PhD candidate, Epidemiology, Cornell University, Ithaca, NY

Boran Choi, MS candidate, Immunology, Seoul National University, Seoul, South Korea

Amy Fulton, Resident, Dentistry and Oral Surgery, University of California, Davis, CA

Ludwig Groebler, Veterinary Medical Educator, European Surgical Institute, Hamburg, Germany

Laura Grogan, PhD candidate, Conservation Biology, James Cook University, AU

Kate Johnson, PhD candidate, Clinical Science, Royal Veterinary College, London, UK

Kristen Lewis, Resident, Pathology, The Ohio State University, Columbus, OH

Ryan Traslavena, Resident, Pathology, University of California, Davis, CA

Maria Volkman, Dr. Med. Vet. candidate, Humboldt University, Berlin, Germany

Annemarie Voorbij, Resident, Medicine, University of Utrecht, the Netherlands

Shen Yang, PhD candidate, Biomedicine, University of Maryland, Baltimore, MD

2008

Rachel Acciacca, Branch Chief, Veterinary Services, Camp Lejeune, Marine Base, NC

Hannes Bergmann, PhD Candidate, Australian National University, Canberra, AU

Jennell Bigrigg, Resident, Comparative Pathology, Johns Hopkins University, Baltimore, MD

Anna Byron, M.S. candidate, University of Sydney, Sydney, AU

Lucie Chevallier, PhD candidate, Genetics, Pasteur Institute, Paris, France

Katharina Dinger, Dr. Med. Vet. candidate, Center for Experimental Medicine, Cologne, Germany

Johanna Dups, PhD candidate, Virology, CSIRO, Geelong, AU

Anna Heymer, Dr. Med. Vet. candidate, Nutrition, Tierärztliche Hochschule, Germany

Lisa Holz, PhD candidate, Cardiology, University of Tübingen, Germany

Sally Ann Iverson, ORISE Research Fellow, Plum Island Animal Disease Center, NY

Prabhpreet Kaur (nee Singh), Government Veterinarian, AVA Singapore

Joshua Leach, Resident Pathology, Beatson Institute for Cancer Research, Glasgow, UK

Ming Lui, Intern, Emergency and Critical Care, Advanced Critical Care, Los Angeles, CA

Katharine McKelvey, Resident, Theriogenology, North Carolina State University, Raleigh, NC

Johanna Mleszko, PhD candidate, Cornell University. Dallas New, MSc candidate, University of Saskatchewan, Saskatoon, SK, CA

Annalies Nijdam, Research Scientist, Hematology, University of Utrecht, the Netherlands

Jessica Privett, MPH candidate, University of Sydney, Sydney, AU

James Swann, Intern, Small Animal Medicine, Royal Veterinary College, London, UK



2009

Jennifer Bernard, Resident, Pathology, University of Tennessee, Knoxville, TN

Floryne Buishand, PhD candidate, Cell Biology, University of Utrecht, the Netherlands

Nancy Erickson, PhD candidate, Pathology, F.U. Berlin, Germany

Sonja Heinrich, Dr. Med. Vet candidate, Institute for Zoo and Wildlife, Berlin, Germany

Shuhei Ito, PhD candidate, Cellular Biochemistry, University of Tokyo, Japan

Beth Licitra, PhD candidate, Cornell University, Ithaca, NY

Meridith Sherrill, Intern, Small Animal Medicine and Surgery, Purdue University, West Lafayette, IN

Elizabeth Slack, PhD candidate, Immunology, Royal Veterinary College, London, UK

Sarah VanRijn, Intern, Resident in Small Animal Surgery, Utrecht University, The Netherlands.

Hans Winkler, PhD candidate, Immunology, University of Zurich, Switzerland

Bing Yun Zhu, Resident, Small Animal Medicine, University of California, Davis, CA

2010

Clinton Doering, Intern, South Arizona Veterinary Speciality Center, Tucson, AZ

Lise Greve, PhD candidate, Sports Medicine, Royal Veterinary College, London, UK

Brina Lopez, Intern, Equine Medical Center, Ocala, FL

Luise Steltzer-Seeker, PhD candidate, Cell Biology, Scottish Agricultural College, Edinburgh, UK

Daniel Woodburn, Resident, Zoological Pathology, University of Illinois, Urbana, IL

Sirin Yaemsiri, Intern, Small Animal Medicine, Colorado State University, Fort Collins, CO

2011

Ángel Abuelo Sebío, PhD candidate, Metabolism, University of Santiago de Compostela, Spain



What Did They Say?



"I retain very fond and vivid memories of the 10 weeks I spent participating in the Cornell Leadership Program."

Amanda de Mestra, 1998



"I remember that wonderful summer of the Leadership Program."

Mieke Baan, 2003



"The program ignited my interest in infectious diseases and opened my mind to professional aspects of veterinary medicine that I had not yet considered."

Larissa Minicucci, 1998



"The program was a great inspiration to me and I met great people."

Anton Asare, 2004



"I have very happy memories of the Leadership Program."

Christine Broster, 1999



"I had an awesome summer at Cornell."

Hanna Bender, 2005



"Little did I suspect that the Leadership Program would have such a profound impact on my career."

Richard Luce, 2000



"I often think of the great time I had in Ithaca, and I'm still in touch with many of the Cornell fellows."

Annemarie Voorbij, 2007



"I am passionate about the Leadership Program as it gave me a valuable insight to research."

Kate Hughes, 2001



"The program was one of the most important experiences in my life."

Joanna Mleczko, 2008

In the Limelight:

Peter Florian



It has been a while that I participated in the Leadership Program at Cornell University and on occasion I realize how much impact the summer in Ithaca had on my future career. During my time at the James A. Baker Institute for Animal Health at Cornell University in 1999, I had the pleasure to work in Dr. Reinhard Straubinger's lab on IL-10 expression levels in tissue from dogs infected by Lyme disease. This laboratory experience really emphasized my wish to continue a career in research as a veterinarian.

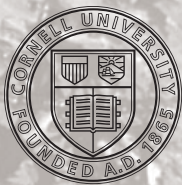
Hence, after graduation from the Veterinary Faculty at the University of Leipzig, Germany in 2000, I decided to pursue my education with a doctoral thesis. Looking

for opportunities I had the great luck to receive a scholarship from the German Research Foundation to work on my doctoral degree in a multidisciplinary graduate school at the Charité in Berlin in the laboratory of Prof. Michael Fromm. I mainly used electrophysiological methods to explore the intestinal barrier function in chronic inflammatory bowel disease and the fact that the laboratory was fully integrated in one of Berlin's University hospitals really made the time a great adventure. Almost every week, we had inspiring discussions with the physicians from the gastroenterological care unit in the same building and it was great to see how close science and patient care can work together in a hospital setting. Listening to the daily problems of patient care and the sometimes-frustrating experiences with patient outcome encouraged me to identify the best way of bringing medical solutions to patients. During my postdoctoral fellowship, I was therefore very grateful to have the chance to join Pfizer's veterinary medicine R&D pharmaceuticals discovery department in Sandwich, United Kingdom as an in vivo pharmacologist. Moving across to the UK and working in the industry R&D environment was a real eye-opener to me and I realized that this type of work is exactly what I would like to do in order to translate science into medicine for patients.

In 2006, I got the chance to move back to Germany and become a laboratory head at Sanofi in Frankfurt working in the field of cardiovascular-thrombosis. Based on the experience I gained throughout my work, I successfully completed two board certifications, one in physiology and later in pharmacology and toxicology. I continued to work as an in vivo pharmacologist and was recently appointed director of pharmacology within R&D at Sanofi in Frankfurt. We currently work on various indications such as cardiovascular (stroke) or degenerative joint disease (osteoarthritis), which really makes my work life interesting and challenging. I very much appreciate the multi-disciplinary approach in industry to tackle disease and to come up with medications for them. Interestingly enough, the loop that started in the Leadership Program seems to be closing. I initially worked on joint disease (Lyme-arthritis) at Cornell University and am now continuing with running disease models on degenerative joint disease here at Sanofi to find better medications for patients suffering from osteoarthritis. I am therefore very grateful that I had the chance to spend a summer at Cornell University and that I got inspired to work in research as a veterinarian in the pharmaceutical industry.

Peter is the Director of Pharmacology R & D at Sanofi-Aventis, GmbH.

To prepare tomorrow's scientists and public health professionals



Cornell University
College of Veterinary Medicine

For more information about the Leadership Program, contact

John S. L. Parker
Leadership Program for Veterinary Students
Baker Institute for Animal Health
College of Veterinary Medicine
Cornell University
Ithaca, NY 14853
Phone: 607 256-5626
Fax: 607 256-5608
E-mail: jsp7@cornell.edu

www.vet.cornell.edu/OGE/Leadership

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