Examining the Future
The impact of changes in veterinary medicine on education

PLUS: INSIDE STUDENT RESEARCH • THE CLINICAL TEAM: A CLOSER LOOK
CASE SOLVED

From Bone Yard to The Boneyard

It was about a one-acre patch of land in the middle of the city park in Culver City, California. When Dr. Dean E. Gebroe, V89, and a handful of other residents checked it out in July 2001, it was a very different sort of bone yard: the city’s dumping ground for telephone poles, light signals, guard rails—in other words, “junk that any city acquires in the normal course of business,” says Gebroe.

In a previous life, the property had been an oil pumping site with 650 feet of abandoned cast iron piping running through it. Yet the group decided it was the ideal spot for an urban dog park. The challenge, of course, would be to transform a junk-inhabited Brownfields site into a safe place for canine residents, licensed but leash-free, to romp with their human companions. A month later the group established itself as the nonprofit Friends of the Culver City Dog Park. The group worked in hand with City Council to obtain use of the property. They organized countless fundraisers that ultimately raised over $100,000. And in March 2003 they were awarded a $250,000 Brownfields Grant from the U.S. Environmental Protection Agency to clean up the site. It was not until October 2004 that site testing would be complete and the clean-up could start. But it was all done a month—and 1,200 tons of hydrocarbon-impacted soils—later, only to have the schedule hit a six-month snag while the City negotiated agreements with the owners of the oil pipes and telephone poles to have them removed.

By August 2005 the pipes and debris were gone, allowing construction to begin. The Culver City Dog Park, aka the Boneyard, officially opened in April 2006. “The transformation of a contaminated site into a public park demonstrates the tremendous potential of all Brownfields properties,” noted Jeff Scott, EPA Waste Management Director, at the time. The park has separate areas for small and large dogs, benches, trees, water fountains, and a ground cover of decomposed granite.

This past April, Gebroe and Vicki Daly Redholtz, chair of Friends of the Culver City Dog Park, were invited to speak at the National Dog Conference and Symposium in Morristown, New Jersey, whose members met to lay the foundation for a national nonprofit dog park association. At the conference, Gebroe praised the dedication of the Board, the support of the City Council, and “a wonderful community that not only expressed their desire to have a dog park in the area but that actively participated in bringing the Boneyard to fruition.”

If you have a “case solved”—a clinical puzzle with a happy outcome, an “aha” moment in your research, or an animal-related civic challenge you helped meet—we invite you to share it with us. Send your ideas to veteditor@tufts.edu.
On the cover: Technician Anna Gates reads protein levels in a liver cell in Dr. Cindy Leveille-Webster’s laboratory. Tracing molecular parallels between liver disease in cats and dogs, and in humans, may yield answers that benefit all three.

Above: A llama lunches on the Cummings farm in Grafton.
FROM THE DEAN

A Flourishing Landscape

A year ago I joined the Cummings School of Veterinary Medicine at Tufts University and have been impressed ever since by the dedicated students, faculty, and staff with whom I have had the privilege to work and learn. I would like to thank all of you who have been so welcoming and helpful to me during my first year as dean.

Reflecting on the past year reminded me of the many ways in which Tufts friends and alumni can be proud of our school. Despite the highly competitive national environment for attracting clinical specialists to academic medicine, we hired new faculty members in five clinical specialties this year. In FY07, 26,529 patients were treated in the Foster Hospital for Small Animals and nearly 1,800 patients were treated in the Hospital for Large Animals. Our small animal hospital ranked in the top five nationally in number of annual small animal patient visits. Tufts’ Ambulatory Service in Woodstock, Conn., had a tremendously productive year and our Wildlife Clinic continued its tradition of excellent service.

Our faculty deserves enormous credit for maintaining teaching and research excellence while meeting the demand for animal health care in New England.

NIH-funded research programs in infectious diseases, reproductive sciences, gastrointestinal and hepatic diseases, pulmonology, and clinical research continued to flourish despite the difficult climate for federal funding of biomedical research. International research highlights included the expanding presence in Indonesia of a Tufts Cummings team tasked with management of avian influenza. We are very proud of our faculty for their successes in these challenging and competitive research environments.

Talented students continue to select Cummings School and their qualifications compare very favorably with similar cohorts at peer institutions. Our veterinary professional students ranked third in the nation in raw GRE test scores and were drawn from some of the most selective institutions in the country. We ranked second in the country in the total number of our current and former students who applied to internships or residencies and were matched with programs.

I have had the chance to meet with many of you and to begin to understand, from your perspectives, what makes Tufts strong and where new opportunities lie. I have also been gratified by the welcoming community of veterinary medical associations that I have found throughout New England.

In the coming year I will strive to preserve the strengths and unique features of Cummings School while also fostering and rewarding innovative achievements in research, clinical service, and teaching.

I thank those who so generously support our efforts and who help us to sustain the culture of collegiality and excellence that has become the hallmark of Cummings School of Veterinary Medicine. I am very proud to feel a part of this exceptional community.

Dr. Deborah Turner Kochevar
Dean

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We welcome your letters, story ideas, and suggestions. Send correspondence to:

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Mainzer is a strong advocate of integrating veterinary proficiencies with public health practices. In 1995, in honor of his fifth reunion and in memory of his mother, Mainzer and his father Stephen endowed the Sylvia G. Mainzer Public Health Achievement Award to recognize a graduating Cummings student for excellence in the use of veterinary knowledge and skill to protect and improve human and animal health. This year’s recipient was Eric Daniel Mondschein (see article on p. 16).

AMBULATORY CLINIC HONORED

The Tufts Ambulatory Clinic in Woodstock, Conn., was honored by the Dairy Science Club at the University of Connecticut (UConn) for its excellence in food animal-related education. The Ambulatory Clinic offers students hands-on experience both in preventive care and in responding to illnesses, injuries, and emergencies. Fourth-year veterinary students on rotation also learn about partnering with their clients when they are assigned as a consulting team to a commercial farm. Dr. Kirk Kerr, Dean of the College of Agriculture and Natural Resources at UConn, toured the Grafton campus in April. He also engaged in talks with Cummings faculty and administrators regarding the potential for developing more partnerships between the two institutions.

Hugh Mainzer, V90

Named chief veterinary officer of USHPS

On May 1, Captain Hugh Mainzer was named Chief Professional Officer for the veterinary category of the Commissioned Corps of the U.S. Public Health Service. As Chief Veterinary Officer, Mainzer leads and coordinates veterinary professional affairs for the Office of the Surgeon General and the Department of Health and Human Services. He also advises the Surgeon General and the Veterinary Professional Advisory Committee on human resource matters. Previously, Mainzer was Supervisory Preventive Medicine Officer and Epidemiologist in a division of the Centers for Disease Control and Prevention (CDC). Trained and certified as a human emergency medical technician/paramedic and hazardous materials technician, he commanded a team to help provide public health services to communities in emergency situations. Mainzer represents the CDC on the AVMA House of Delegates advisory panel. He is a past president of the American Association of Public Health Veterinarians, a diplomate of the American College of Veterinary Preventive Medicine, and a fellow of the American College of Epidemiology.
IN BRIEF

Robert S. Bridges, Ph.D., director of the DVM/MS Program in Biomedical Sciences, hosted a Parental Brain Conference last June in Boston. Participants in eleven symposia sought to bridge the gap between the basic and clinical sciences to advance the understanding of parental behavior. The keynote lecture delivered by David Rubinow, M.D., was entitled “Mood Disorders of Pregnancy and the Postpartum Period.” The topic of the plenary talk by Sarah Blaffer Hrdy, Ph.D., was “Mothers and Others: The Evolutionary Context of Human Development.”

Rare Albatross Released

On April 28 a rare yellow-nosed albatross, a wayfaring bird of the Southern Atlantic and Indian Oceans, was found dazed and emaciated in a field in York, Maine. Strangers rescued the bird and brought it into the Wildlife Clinic. Clinicians nursed it back to health and, ten days later, released it from a Falmouth beach on Buzzards Bay with a satellite transmitter attached. A few days later, the albatross was rescued again, this time on Cape Cod; it returned to the Wildlife Clinic. After a second rehab, it was released on June 2 off a boat at Stellwagen Banks. “The release went well,” reports Dr. Flo Tseng. “The boat tracked the bird for two hours—it spent time flying, floating, and preening on the water.” As of June 23, there has been no report of its coming to land. “So I guess no news is good news!” states Tseng.

OPEN HOUSE

Saturday, September 9 from 10 a.m. to 3 p.m., rain or shine.

Join us for the Cummings School’s 18th annual Open House, when the veterinary school will open its campus to the public. Exhibits and tours of the clinics and the farm offer visitors a glimpse into what veterinary education and veterinary medicine are all about. Annual crowd-pleasers include obedience, K-9, and assistance dog demonstrations; sheep shearing; a walk-in clinic for teddy bear owners to bring in their sick pals; and plenty of other activities for children. Food and drink are available for sale.

SR-90 PLESIO THERAPY NOW AVAILABLE

The Radiation Oncology Group’s Harrington Oncology Program now offers Strontium-90 (Sr-90) plesiotherapy to Cummings patients. Sr-90 is a small radioactive source used to treat tumors and other types of proliferative lesions. Lesions that may be suitable for Sr-90 treatment include nasal planum squamous cell carcinoma in cats, cutaneous mast cell tumor in cats, corneolimbal squamous cell carcinoma in horses, various eye tumors, and small, superficial tumors in exotic animals. Veterinarians are encouraged to consult Dr. Jeanne Poulson, jean.poulson@tufts.edu, or Dr. Chieko Azuma, chieko.azuma@tufts.edu, for other possible applications.

Preparing for takeoff

Buggy rides and more at the Open House

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CONTINUING EDUCATION

TUFTS CANINE AND FELINE BREEDING AND GENETICS CONFERENCE
(open to veterinarians, dog and cat breeders, and enthusiasts)
September 13 - 14, 2007, Sturbridge, MA

AT THE CUMMINGS SCHOOL IN NORTH GRAFTON, MA
(open to veterinary professionals only)
   Emergency and Critical Care, November 18, 2007
   Timely Topics in Internal Medicine, December 2, 2007
   Equine Health Lecture Series, Wednesday Evenings, January–March 2008
   Technician Symposium, January 27, 2008

14TH ANNUAL ORTHOPEDIC SURGERY COURSE AND LABORATORY
(open to veterinary professionals only)
March 3 – 6, 2008, Key Largo, FL

FOURTH ANNUAL FELINE MEDICINE CONFERENCE
(open to veterinary professionals only)
March 4 – 6, 2008, Key Largo, FL

ELIZABETH LAWRENCE AND HUMAN-ANIMAL BOND
(some sessions open to the public)
April 2008, Boston, MA

MANAGING THE PET FOOD RECALL

When the news of tainted pet food first broke last March, clinicians at Cummings fielded inquiries from a worried public as well as veterinarians in private practice. Between March and April, the Henry and Lois Foster Hospital for Small Animals treated about 30 to 35 pets for symptoms possibly related to eating tainted pet food. To provide the public with up-to-the-minute recall information, the veterinary school opened a special Web page (www.tufts.edu/vet/recall.html) with links to pet food manufacturers, the American Veterinary Medical Association, and the U.S. Food and Drug Administration.

Congratulations to Emi Knafo, V08, who won first prize for her poster presentation at the Morris Animal Foundation annual meeting this summer. Knafo presented her project from last summer, supported by the Foundation, on shared parasites in zebra and livestock in a national park in Kenya. She took top honors among a host of presenters nationwide who were the first recipients of Morris Foundation-funded veterinary student projects. Knafo, who “would love to one day be an endangered equine specialist,” plans on doing an equine internship after graduation and possibly a residency in equine or zoological medicine after that.

ZEBRA RESEARCH RULES

Knafo’s research on zebras and livestock took her to Kenya

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FACULTY IN THE NEWS

Dr. George Saperstein in “Breeding understanding,” Providence Journal, May 26, 2007, on the SVF Foundation, a cryogenic approach to preserving genetic diversity in livestock: “Saperstein said that almost all developed countries, including the United States, maintain livestock sperm banks as a hedge against desirable traits being bred out of farm animals, such as resistance to disease.…."

Drs. Nicholas Dodman and Scott Shaw in “A suicide bomber’s worst friend: Never let this dog see you sweat,” Maclean’s (Canada), May 28, 2007, on a British dog trained to detect suicide bombers using facial signals and body language: “Dogs can practically see you sweat,” says noted animal behaviourist Nick Dodman….Scott Shaw, of the Cummings School of Veterinary Medicine…breeds and trains hunting Labradors. He says they are particularly well-suited to police and army work.…."

Dr. Scott Shaw, quoted in “Rx for your pet,” Daily News Tribune, May 29, 2007, on common health and safety issues for pets during summer months: “A lot of the injuries we see at this time of year have to do with dogs off the leash, not under direct control of their owners.” (Also appeared in MetroWest Daily News and Milford Daily News.)
As Deborah T. Kochevar closes out her first year as Dean of the Cummings School of Veterinary Medicine, she pauses to reflect on veterinary education at Cummings—and how veterinary education as a whole has responded to changes in the profession.

A CHANGE in the LANDSCAPE
“From its beginning in 1978, the school has served as a model for progressive and innovative scholarly activity,” noted Dean Kochevar after she assumed her role as dean of the Cummings School last August. “I hope to nurture and expand those traditions to the benefit of the school and the veterinary profession.” To learn what the dean has discovered about Cummings with respect to the present and the future of the veterinary profession, Tufts Veterinary Medicine recently caught up with her—no mean feat, given her daily pace. For, aside from presiding over the administration of the Cummings School, Dean Kochevar, who is board-certified in pharmacology, is a professor of Biomedical Sciences. And she ran with Team Jumbo West in the 2007 Boston Marathon.

TVM: How do you compare the professional landscape today with the way it was 10 or 15 years ago?

DTK: A difference that has gotten a lot of media attention is the shift in our student population from predominantly men to now over 80% women in each class. There are no data to inform why the shift occurred, but everyone has a theory. I think a combination of factors have driven things. Female students are now encouraged to take science and math and they do very well. This makes them very attractive candidates for all the health sciences. Another factor may have been the effect of the booming dot-com economy over the past decade or so. Men may have been more willing to take risks in the business sector, drawing them away from the veterinary profession. Women may have been more motivated to seek a profession that they found personally, but somewhat less financially, gratifying. This is, of course, total speculation on my part! We all wish there were data to help us understand the shift so we could do a better job of adjusting the balance. Unfortunately the feminization phenomenon has discouraged middle-school or high-school boys otherwise interested in veterinary medicine. As dean, I’m interested in finding ways to bring a healthy balance, not only in terms of gender but also ethnic, cultural, and experiential diversity. We are all advantaged by working and learning with others who have different perspectives.

Another change in the profession has been in the number of specialty practices. The percentage of people who choose specialty practice as opposed to primary care or traditional practice has shifted. More students are choosing to do internships and/or residencies instead of going out and taking their first job right away. On the one hand, it’s wonderful to have the option of advanced training, and Tufts graduates are very competitive for internships and residencies. On the other hand, we don’t want students to think they must do post-DVM training. We need to tell them, “You shouldn’t feel like you’re not ready to practice. You are ready when you graduate to take a job as an entry-level veterinarian.” Honestly, I don’t think anyone ever feels ready. You just have to go out and do it.

TVM: Has the spectrum of opportunities open to a DVM—in research, the corporate world, public health, public policy, and so on—always been there?

DTK: Yes, but opportunities are increasing and we’re now doing a better job of letting students know about the options. A higher percentage of students come to us having done undergraduate research; so, while most don’t come in saying they want to make research a career, some do, and they know more about what that career means. There is a national need to encourage these students to seek post-DVM training and to consider remaining in academics. At Cummings School our research programs in infectious diseases, reproductive biology, gastrointestinal and hepatic disease, pulmonology, clinical nutrition and, in general, clinical research are resources for our students.

In corporate America, there are also a lot of veterinary opportunities including with industries such as pharmaceuticals, medical devices, pet food, and pet products. Veterinary specialists in laboratory animal medicine and pathology are in big demand and we were pleased to have graduated two members of the Class of 2007 who completed both DVM and Masters in Laboratory Animal Medicine degrees.

Careers in public health are not new, but we’re still working to educate students and others about the critical roles that veterinarians play. Based on their understanding of the interfaces between animals, humans and the environment, veterinarians should increasingly function as leaders of domestic and international health professional teams that include physicians and others. Our graduates have a strong track record of combining international medicine and public health. For example, Tufts currently leads an international team in Indonesia that’s using participatory epidemiology techniques to grapple with avian influenza. In conjunction with the School of Medicine at Tufts, we have offered a combined DVM and Masters of Public Health degree since 1994. Graduates of this program have enormous potential in public health administration, policy and research. The work of our Center for
Conservation Medicine provides other examples of how veterinarians contribute, not just to the health of animals, but to the health of entire ecosystems.

It’s the same with public policy, and regulatory roles in agencies like the FDA or the CDC. Although veterinarians have been involved in regulatory medicine and public policy for years, we don’t have a large presence, so many people are unaware of our role. But students are becoming more interested in learning about regulatory medicine, and have opportunities for practical experience through programs like the American Veterinary Medical Association (AVMA) Government Relations Division externship in Washington DC. We have even begun discussion of starting an externship program at the legislative level in Massachusetts that would engage Tufts veterinary students in state public health and policy initiatives.

**TVM:** Is the veterinary curriculum changing—not just at Tufts but across the board—to reflect some of these areas of interest?

**DTK:** I don’t see the core changing radically, because to be able to learn medicine, students have to have so much basic knowledge: anatomy, physiology, pharmacology, microbiology, immunology, and so on. That training serves you no matter what, even if you don’t practice a day. But at Cummings we do a good job of adding to that baseline with international medicine, wildlife medicine, and principles of ethics and evidence-based medicine. There’s also flexibility to do electives; so, for example, a student with a special interest in dairy medicine could choose to spend time in an exclusively dairy practice.

Translational medicine is the way to advance the care of both animal and human patients.

A theme discussed over the past decade within the Association of American Veterinary Medical Colleges (AAVMC) is “centers of excellence” consistent with regional resources. So Iowa, for example, might have a center of excellence in swine medicine that students can take advantage of through rotations or distance education. Cummings School is often sought after as a center of excellence for small animal emergency medicine/critical care and other specialties. We have many Tufts students who travel for specialized externships, and we host many student externs on our campus. A few Web-based courses also exist that cover specific areas you can’t get everywhere.

Another change in veterinary clinical education is a distributive education model as compared to the traditional centralized one. At least one veterinary school—not yet fully accredited—has no central teaching hospital. This new model has come about, in part, because of the availability of many more clinical specialty training venues. They often have a large number of board-certified veterinarians, just as in a teaching hospital. One caveat that may limit this distributive model is the tension between the time it takes to teach students and the need for private practices to meet their production goals. Another is the relative absence of the unique intellectual environment that research creates in an academic teaching center. Students need to understand the relationship and importance of research to excellence in clinical veterinary medicine.

**TVM:** Why is that research environment important? What does it do for the culture at Cummings?

**DTK:** It’s interesting here because we are very much an animal welfare-oriented campus, one that minimizes the use of animals in teaching as much as possible unless there is benefit to the animal. Students get their surgical experience through spaying and neutering shelter animals that will be adopted. What’s critical for people to understand is that we are also a school with excellent research programs that serve animals and humans. We take animal use in research very seriously and have clear safeguards for as-
suring animal welfare. These include the Institutional Animal Care and Use Committee (IACUC), the Clinical Studies Review Committee, and the Animal Welfare Committee. Animal use for research or teaching must be approved by the IACUC according to standards set by the United States Department of Agriculture (USDA) and the National Institutes of Health.

It is essential to understand that you can use animals appropriately in research and make an enormous impact on the advancement of animal and human health. Veterinarians are the original comparative biomedical scientists. They have much to offer in all stages of research—whether that is at the bench or in translating basic science findings in cells and laboratory animals into new therapeutics or diagnostics for ill patients. NIH has recognized the importance of translational medicine, and we hope that veterinarians will increasingly be called upon for their expertise. For us as veterinarians, the translational role is critical, because it’s where we advance our patients’ care. The majority of our students understand, appreciate, and are even involved in that major mission.

**TVM:** A lot of students applied for and got the summer research grants this year.

**DTK:** Yes, and there was a lot of good funding for our programs. We had support from the NIH, the Army, Morris Animal Foundation, and Merck-Merial [a major pharmaceutical manufacturer]. That reflects, I think, the perceived need nationally to have veterinary students consider research as a career. It also shows that there are corporate sponsors saying it is important to fund research because veterinary students need to be trained. It’s very exciting, because our students increasingly appreciate that the role of veterinarian as research scientist complements our roles as healers and caregivers. A number of schools have active student research programs, and I am pleased that we bring such a talented cadre of students to this group.

**TVM:** Aside from student research, what would you consider to be some of the school’s other points of pride?

**DTK:** Our biggest strength is the people: students, faculty, and staff. Our students are an academically well qualified, talented bunch. I think they pick Tufts in part because they appreciate the collegial and tightly knit aspect of our campus, which welcomes students as partners in learning and clinical care. We attract engaged and mature students prepared to take advantage of what we offer. The same is true of our faculty. They have a lot of expertise and talent, but also there’s something about the Tufts system that matches their collegiality and professional aspirations. Achievements of our dedicated staff in service and teaching are critical, and are highlighted in this issue.

Our clinical operation is also a big source of pride. The teaching hospitals see over 25,000 small animal cases and over 1,500 large animal cases a year. These services are exceptional for patients and clients and provide an excellent teaching caseload. Another thing—and people don’t always think of it right away, because it’s located in Woodstock, Connecticut—is our ambulatory food animal practice. Between Woodstock and our on-campus farm in Grafton, we have as effective a food animal program as many schools with a much more significant agricultural base than New England’s, and I’m proud of that. Over 80% of our students say they’re going to go into small animal medicine, but every single one of them spends a month in Woodstock. The fact that they enjoy this month and count it as a great learning experience is a huge testament to our food animal faculty.

I’m also proud of the fact that we have taken our proximity to what may be the greatest concentration of academic and intellectual talent in the country, and parlayed that into an entrepreneurial biotechnology component of our school. On the strength of our Division of Infectious Diseases, headed by Dr. Saul Tzipori, and our expertise in collaborative research programming, we’re probably the smallest school in
The laboratory and the local partnership are both sources of pride, and make the school an important player in the sophisticated Massachusetts life sciences community.

**TVM:** And evidence-based veterinary medicine?

**DTK:** Another area that I’m very proud of! It’s not unique to Tufts, but it’s more developed here than in a lot of places. Our ACE (Accelerated Clinical Excellence) program introduces principles of evidence-based veterinary medicine and applies them to model cases. Students learn that the best way to practice is to be evidence-driven; you don’t just do a treatment because you are told to, but you examine studies that show, compared to placebo, whether or not a particular treatment works. Students develop decision-making and communication skills, learn early on about specialty practice opportunities, and start to gain experience in clinical research.

**TVM:** In veterinary education, how do you assess outcomes?

**DTK:** We are early on the curve in learning how to do a good job of that. In my field, clinical pharmacology, assessing an outcome might include asking the clinicians my students work with in the fourth year, “Did they have a grasp of entry-level therapeutics? Were they able to calculate safe and appropriate drug dosages?” Along those lines, we’ve implemented a clinical reasoning pretest/post-test for fourth-year students. We’ll ask them clinical reasoning questions prior to their entry into clinics, and permutations of those questions at the end, to see how their clinical competency and clinical reasoning improved. All veterinary schools are working to improve their outcomes assessments, especially in terms of clinical competencies. This is such a hot topic that the Association of American Veterinary Medical Colleges has planned a 2008 symposium on assessing veterinary clinical competencies.

**TVM:** When you came in ten months ago, did you have specific goals, expectations, or a vision for the school?

**DTK:** I’ve been careful not to come in with a set vision before I learned more about the school. But at 10 months, I have definite priorities that I am interested in moving forward. With the areas I think we’re doing exceedingly well in, my challenge is to sustain and help provide needed resources. At the same time we need to think boldly about areas of new opportunity in clinical service, research, and teaching. For example, on the clinical side, we hope that will include establishment of a shelter medicine program and innovative ways to approach the interface between academic medicine and private specialty practice. I am also dedicated to enhancing the stature of our equine medicine program.

**TVM:** Given some of the changes we’ve talked about here, is there any advice you’d give to today’s graduates that you might not have thought of giving 10 or 15 years ago?

**DTK:** I would encourage students to explore the diverse opportunities that veterinary medicine offers and to keep an open mind about their careers. Otherwise, the basic advice hasn’t changed much. Develop a good work ethic, maintain a passion for learning, and apply the golden rule. Your chances for success go way up if you treat others well and can work intelligently and hard to help solve their problems. **TVM**
To SERVE...

and To TEACH
In surgery, a fourth-year student is learning to assess a foal’s condition and administer a safe, practical anesthesia protocol. In the intensive care unit, a new resident is shown advanced monitoring techniques to care for a seriously injured cat. Meanwhile, in a treatment room, a new intern observes as an expert examines a Doberman.

The teacher in each of these instances might very well be a veterinary technician: a veterinary nurse, in other words. Nearly all veterinary technicians in the Henry and Lois Foster Hospital for Small Animals and the Hospital for Large Animals teach not just newer technicians, but also fourth-year students in their clinical rotations, new interns, and new residents. The more sophisticated the technicians’ level of specialized education and skill, the higher their level of clinical responsibility and the more advanced the concepts and techniques they teach. Which is a good thing at the Cummings School, where the clinical environment is a constant teaching endeavor on all fronts. Students rotating through anesthesia, for example, will spend time with a faculty member, but they will also learn intubation technique, catheter placement, epidural administration, and case management skills from veterinary technicians.

A MATTER OF EXPERIENCE

“Most new interns and residents haven’t seen cases we’ve seen many times before, so it’s a matter of experience to be able to know what to do next in a given situation,” explains technician supervisor Michelle Damon, VTS (which stands for “veterinary technician specialist”; see related story). Damon, who in 1999 became a VTS in Emergency & Critical Care (ECC), is one of five other Cummings veterinary technicians board certified in a specialty area. They are Kim Wilson, VTS (ECC); and Susan Bryant, Jennifer Stowell, and Connie Warren, all VTS (Anesthesia). Several others are in the process of pursuing specialty certification.

Specialty-certified technicians draw on their expertise to teach medical knowledge and disease processes as well as clinical techniques to new interns and residents. Barbara Brewer, a senior technician in cardiology now helping to build a new specialty academy for internal medicine technicians, teaches the basics of echocardiographic anatomy, how disease processes show up on echo and ultrasound, and other advanced knowledge. Assessing a patient’s condition and formulating an appropriate anesthesia plan to present to the anesthesiologist for review are among the things taught by technician supervisor Susan Bryant, VTS, who was board certified five years ago.

Bryant has also instituted “tech rounds” for technicians in the Department of Anesthesia, in which each presents a case report or topic to colleagues. This provides an incentive to do research and gain experience in public speaking—an important skill for technicians seeking opportunities to further their careers and their profession by lecturing and presenting at conferences. Being a VTS, say Bryant and Damon, results in being tapped to speak at conventions more often. Bryant has also been asked to

At the Cummings School, both clinical care and teaching are team endeavors.

By Leslie Limon | Photographs by Jodi Hilton
contribute professional publications, having edited peer-reviewed articles for a veterinary technician journal.

Brewer, too, is professionally active; she has published articles and occasionally guest-teaches in the veterinary technician program at Becker College. Her greatest professional role outside of her work at Cummings in the past four years, however, has been working with colleagues nationwide to create the Academy of Internal Medicine for Veterinary Technicians, or AIMVT. As AIMVT board secretary and co-chair of the cardiology committee, Brewer is among those who have contributed test items for a test bank of over 1,000 questions and who will decide which ones to include in the first exam, planned for June 2008. Cummings veterinary technicians Tracey Elmes and Melissa Supernor are also AIMVT charter board members working to establish the academy. All three will be automatically certified (Brewer in cardiology, Elmes and Supernor in small animal internal medicine) with the first group of inductees.

**THE ULTIMATE CHALLENGE**

Board certification in a VTS academy is “the ultimate challenge for someone in our career,” states Bryant. It’s also a mark of prestige commensurate with the qualifications required just to sit for the exam. To earn her specialty certification she submitted a portfolio demonstrating a level of expertise, responsibility, and authority akin to that of a nurse practitioner in human medicine. Fortunately, the Cummings hospitals’ teaching environment and varied caseload offer plenty of opportunities to build a case log and master the skills in which candidates need to demonstrate proficiency. Plus, there are now enough VTS’s on the Cummings staff to help current aspirants navigate the process.

It took Bryant the better part of a year, and Damon about a year and a half, to pull together their portfolios and qualify to sit for their respective exams, a process not unlike that which a veterinarian undergoes to become specialty boarded. Both agree it has been well worth the effort, earning them not just prestige but also a level of trust among veterinarians that translates into more authority, higher-level decision-making responsibility, and greater professional fulfillment. That level of confidence makes all the difference for Cummings veterinarians and their patients.

“Our diagnostic modalities and monitoring technologies allow us to work on large animal cases that 10 or 20 years ago we might have said there’s no hope for, but those tools are only worth as much as the person using them,” states Dr. Melissa Mazan, V93, director of the Issam M. Faris Equine Sports Medicine Program. “So to have a technician with advanced training, both in how to use these tools and how to understand and analyze them, is just fantastic. Especially when you have very critical animals that need absolutely the best of what you can offer. It gives us the peace of mind to do the work we need to be doing, and it allows us to work as a team.”

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**A New Breed of Veterinary Technician**

Just over a decade ago, veterinary technicians had no career ladder once they became certified veterinary technicians (VTs), no matter how sophisticated their skills and knowledge. But all that is changing as technician specialization grows in tandem with the trend to specialize in veterinary medicine.

The National Association of Veterinary Technicians in America (NAVTA) currently recognizes four academies that offer specialty certification. The Academy of Veterinary Emergency & Critical Care Technicians (AVECCT), instituted in 1996, is the oldest. The Academy of Veterinary Technician Anesthetists (AVTA) came three years later. In 2002 the Academy of Veterinary Dental Technicians (AVDT) was provisionally recognized. And just last year, the Academy of Internal Medicine for Veterinary Technicians (AIMVT) was granted provisional recognition. Modeled on the American College of Veterinary Internal Medicine’s five subspecialties, the AIMVT currently includes small animal and large animal internal medicine, cardiology, and oncology. The fifth, neurology, awaits a critical mass of technicians who can meet NAVTA’s stringent requirements to form the organizing committee.

Qualifications to sit for the certification exam vary from one academy to another. The starting point, however, is about 6,000 hours of working as a certified veterinary technician (equivalent to three years post graduation), either predominantly or fully spent in the specialty area. Applications must include a case log summarizing 50-75 cases the technician has worked on, four of which are to be written up in detailed case reports. Additional requirements include a minimum number of continuing education credits (also required to maintain VTS certification), a completed checklist of “mastered” skills, and letters of recommendation.

Private-practice veterinarians have yet to embrace this new model of veterinary technician, according to a market survey conducted within the Department of Clinical Sciences at the Cummings School. Dr. Armelle De Laforcade, V97, assistant professor of Clinical Sciences and lead author of a 2005 report on the survey in the *Journal of the American Veterinary Medical Association*, explains that many veterinarians in small or solo practices are used to performing all clinical functions themselves. Many practitioners continue to rely on what she calls “home grown” technicians: people who have remained with the same practice for years and have received all or most of their training on the job.

De Laforcade hopes, however, that as the number of VTS’s grows, and the more available they become as a result, the greater will be their acceptance among private-practice veterinarians. For technicians with a VTS will not just free them up to do their jobs, but could also enable them to attract a new clientele with new, more specialized services. Gaining a critical mass of specialized technicians will also be necessary for the profession to continue advancing in terms of career opportunities and salary. As of this writing, AVECCT has 200 members nationwide; AVTA, 60 (three more from Cummings are applying this year); and AVDT, five.

With the rise in veterinary specialization, “people expect a different level of care from their vets than they did ten years ago,” states de Laforcade. “And with that comes more advanced nursing care. So as we continue to evolve, it may be that technicians with more specialized experience are going to be more marketable than the traditional ‘home grown’ model.”
EIGHTY-ONE DVM DEGREES WERE AWARDED AT THE 25TH COMMENCEMENT OF THE CUMMINGS SCHOOL OF VETERINARY MEDICINE last May 20. Nine students earned dual degrees: five combined the DVM with a Masters in Science degree (three in Comparative Biomedical Sciences and two in Laboratory Animal Medicine), and four combined the DVM with a Masters in Public Health from Tufts Medical School. In addition, nine graduates received a Master of Science in Animals and Public Policy. The graduates came from all different backgrounds, discovered their own special passions, and have now scattered in all directions. What brought them together was their gift of commitment to a dynamic and very special profession. They are the Class of 2007, and on these pages are just a few examples of the graduates whose futures are as bright and varied as the profession itself.

BY LESLIE LIMON | PHOTOGRAPHS BY ANDREW CUNNINGHAM
Delivering on Cue
Sarah Courchesne, V07

Sarah Courchesne, elected as student commencement speaker by her classmates, suspected they did so because they hoped her offbeat humor would spic up the occasion. Not one to disappoint, she opened her speech wondering if her classmates, knowing her due date was a mere two days after graduation, may have wished for an “obstetric melodrama [to] unfold on this stage.” The last laugh, however, was Courchesne’s: after delivering a healthy baby boy, Malcolm Warren, four days earlier, she bounded up to the podium at commencement to deliver her prepared speech. Her very presence, not to mention the speech’s lighthearted tone, were emblematic of her reputation as someone who tends to take things in stride.

To the background shrieks of a cherry-headed conure and other avian companions, Courchesne revealed that, as a youngster, she was the neighborhood go-to girl for fixing up injured birds; yet she was never “one of those ‘lifelong dreamers’ who always knew this was what I wanted.” She was a college English major who decided during her prepared speech. Her very presence, not to mention the speech’s lighthearted tone, were emblematic of her reputation as someone who tends to take things in stride.

Sarah Courchesne, V07, MPH07

Whether she pursues a clinical or research career, her immediate job is caring for her first-born. She plans to take time to map out her veterinary future, which she clearly takes seriously, if the conclusion to her commencement remarks is any indication: “There is one thing I suspect may be true of all of us today: the word ‘doctor’ [is] rattling self-consciously around in our heads. After a while, it’s expected that we will all...come to take it for granted. Since I will be at home experiencing the practice of veterinary medicine only vicariously, I urge you not to become complacent, but to work hard not only to make me look good by association, but to prove yourselves deserving of this new title and this remarkable new profession.”

LEAVING SOMETHING BEHIND
Eric Mondschein, V07, MPH07

What might you expect of a kid who grows up surrounded by aunts and uncles who are doctors, not to mention a grandfather who was a heart surgeon and one of the architects of the human heart-lung machine? This one—Eric Mondschein, that is—earned a DVM, with a Master’s in Public Health (MPH) for good measure.

Mondschein’s penchant for animal medicine was not all that unpredictable, given that he grew up surrounded by animals of all kinds: birds galore, as well as fish, turtles, ferrets, mudskippers, and a succession of dogs. At Cummings he concentrated in small animal medicine, and has decided to enter the specialized field of emergency and critical care (ECC) beginning with a one-year internship in his home state of Florida. He explains his passion for clinical medicine, and ECC in particular: “I enjoy the ‘organized chaos’ of emergency work. I’m fascinated with the conditions that animals present, as well as the technical procedures that are performed.”

Mondschein’s second passion—emergency preparedness for animals—arose from an eight-week summer project after his first year as part of his MPH program. The project: establish a volunteer team in Newton, Mass., to respond to pets’ needs during emergencies. He connected with a local veterinarian, Newton Health and Human Services, and the Newton Police Department to create the Newton, Mass., Animal Response Team, or NMART. They put him in touch with the veterinarians who were in the process of creating SMART, a similar team for the State of Massachusetts.

It didn’t take Mondschein long to decide to combine this summer project with his fourth-year, four-week project. And it didn’t take him long to figure out that the combined 12 weeks would fall far short of what was needed to do the job right. So for the better part of the past three years he stayed involved at both the local and state levels, modeling NMART after SMART. This year he conducted an active outreach campaign to recruit volunteers from the Newton community to work on the team, culminating in a successful recruitment meeting this spring. Volunteers will be trained to help capture and rescue animals, care for the injured, and issue and enforce quarantines.

Aside from developing a training program and operating procedures for temporary animal shelters, Mondschein helped with website development. He also organized, researched, and helped write a 200-page procedures manual. All the work, he says, was worth it. “I wanted to do something more, ” he explains. “I wanted to leave something behind.”
When Pancotto first started hearing about laboratory animal medicine as a Cummings student, she realized that, while she had mixed feelings about animal research, she didn’t have enough knowledge about it to discuss it intelligently. Her response? To join the dual-degree DVM/MS in Laboratory Animal Medicine program to “gain an insider’s perspective on what’s involved in laboratory research,” she says. She was reluctant to form opinions based on media accounts, which, she learned, “can be really negative, overexaggerate, and fail to tell the whole story.”

The dual-degree program, she feels, has given her that “whole story,” empowering her to educate others about the care involved in undertaking animal research. This program also taught her the skills involved in laboratory animal medicine, which involves veterinary oversight and care of research animals, organizing disease control programs for biomedical research facilities, and guiding the management of those facilities. “The average person may not realize that research decisions are not made willy-nilly, and that there is rigorous critique of research,” notes Pancotto. “Many people are also not aware that there is veterinary oversight of laboratory animals. I was unaware of that, and it’s something I’ve come to learn through the program.”

Though she values the knowledge and insights she gained from the program, Pancotto (shown above assisting with the CT of an alpaca) has decided on a career in clinical medicine, for she realized that her most rewarding moments were those that involved connecting with patients’ owners during her clinical rotations. One of those moments came around Christmastime, when she’d spent the better part of a weekend working with a dog with a chronic gastrointestinal illness. When the owners came to pick up their dog that Monday, they expressed their gratitude with “a whole box of chocolates!” she exclaims. “It was just a really rewarding experience.”

As a result, while Pancotto has not yet made up her mind between entering general practice or starting a specialty residency, she is leaning towards the former because, she explains, “there’s more client communication in general practice. You also develop more long-term relationships with people; you get to know them and their pets. That’s something I really like about the practice of veterinary medicine. You don’t typically have that with a specialty practice, where you do the work-up, send the animal home, and maybe hear from them just a few more times after that.”

Though Pellegrini grew up around animals and has loved them all her life, she ended up entering the field of criminal law, becoming an assistant U.S. attorney. Her supervisor, knowing of her animal affinity, “thought it would be funny to assign me as the liaison to U.S. Fish & Wildlife,” she laughs. Little did she know it would turn out to be “one of the great things in my career, working with people I now count as friends as well as colleagues.” Her wildlife cases, such as indicting a commercial fishery owner for shooting and killing blue herons, ospreys, and bald eagles, eventually led her to the Master’s in Animals and Public Policy (MAPP) program at the Cummings School.

Pellegrini discovered the program during job-related trips to Cummings’ Wildlife Clinic. With her boss’s blessing, she took an unpaid leave of absence from her job to pursue the one-year MAPP degree. The program, she says, has given her a broader view of wildlife issues and a keener sense of the complexity of human-wildlife interaction. “Professors all recognize the merit of opposing views,” she states. “There are issues you just have to grapple with; you can’t just say, ‘this is the answer.’ It doesn’t work that way.”

She also feels she’s sharpened her listening skills. “As a lawyer, I always thought I listened well,” she comments, “but until I took this program, I don’t think I ever really thought carefully about the underlying discourse—how people use words that often mean something else.” These insights and skills served her well in her summer master’s project on the role of local animal control officers in dealing with coyotes. She learned that officers in Framingham, who came under fire for killing several coyotes when one killed a dog, can feel pressured by residents who call to complain and demand lethal measures.

Pellegrini enjoys her job in the U.S. Attorney’s office, and is proud to be representing the United States in court, but wants greater involvement in wildlife issues. After completing her project in August, she returned to her job just in time to handle the sentencing of the fishery owner. Formulating what she was going to say in court, she said she would “approach it slightly differently than I would have, had I not gone through the program.”
**Student Summer Research 2007: A Sampling**

The canine genome, Zimbabwean caprines, and everything in between: all fascinating company for the recipients of the 2007 Summer Research Training Program awards. The research projects of these 25 veterinary students, supported by training grants from the National Institutes of Health (NIH), the U.S. Army Medical Command, Morris Animal Foundation, and Merck-Merial Scholars Program, sent them all over the globe. *Tufts Veterinary Medicine* chose four of the students—a daunting task in a field of worthy projects—and asked them to share their experiences via e-mail as they settled in during the first few weeks.

### “Will the dog genome reveal answers about mast cell tumors?”

**Colleen McCarthy, V09**

Colleen McCarthy received an NIH award to work toward the answer to this question at the Broad Institute, a multi-institutional collaboration in Cambridge, Mass., whose mapping of the canine genome made headlines. McCarthy focused on identifying broad regions of the golden retriever genome likely to harbor genes linked to mast cell tumors, which are common in golden retrievers. Seeking a genetic basis for the disease carries implications for identifying and monitoring dogs of many breeds that are at risk and instituting better breeding practices.

“My hope for this summer is to identify large regions of the genome carried with a high frequency in dogs with mast cell tumors, but not in dogs that don’t have tumors,” said McCarthy. Those regions would be targeted for finer mapping to pinpoint the culprit genes. An unfortunate coincidence rendered her work particularly meaningful: “My dog has lymphoma and is going through chemotherapy right now, so it’s hitting close to home,” she said. “I’ve seen lots of people devastated by what diseases do to their best friends; now it’s really personal for me.”

### COLLEEN MCCARTHY’S DIARY

**Weeks One and Two**

Well, the summer started off with a bang—talk about jumping out of the frying pan into the fire! I started work on my project right after the end of classes. The first step was to search both a Tufts blood bank collection and a separate collection kept at the Broad Institute to identify all the golden retrievers diagnosed with mast cell tumors, comb through the frozen samples, and pull the ones I want. After the first pass [of all sources] we discovered only 43 goldens that were mast cell positive—less than half of our ideal of 100. The suggestion was made to also survey Labrador retrievers.

By Friday of my first week, I was expected to give my first presentation. One thing that stressed me out was that the exploration of Labradors was suggested the day before the meeting. Thursdays end up being wacky days for me anyway (because my dog goes for her chemo treatments), so I ended up having to take a lot of work home with me. I presented to five members of the “Dog Mapping” group plus one collaborator from the Ohio State University veterinary school, Dr. Cheryl London [V90]. [At the meeting, the group weighed and rejected adding Labradors to the study, expecting more samples would come in.]

Sure enough, as the next week progressed and I began to extract DNA from the frozen blood samples already in-house, new samples began arriving. Additionally, more were identified that were missed in the first database search and a few new cases presented to the Tufts oncology department. As it stands right now, we have 65 samples, which is great.
Week Three
More samples are slowly trickling in.
We’ve decided to go ahead and genotype the samples we have, rather than waiting for more. Most of the samples are frozen, and it takes awhile for them to thaw! I never expected to pull samples out in the morning and not be able to use them until after lunch. Once the DNA is extracted, we need to quantify it because genotyping requires a specific DNA concentration. Quantification is a little more exciting than extraction because the reagent we use is light-sensitive (gotta work quicker!) and because a machine actually does the quantification. Because the extraction protocol is so standardized, I’d expect the extraction amounts to be similar, but they are not, even on two preps done at the same time on the same day. In the first set of samples, I had concentrations ranging from 0 to 415 ng/µL (nanograms per microliter)!

Once the samples are quantified they are put into a “stock plate,” a 96-well plate that holds my samples at a set concentration of 50 ng/µL. This step requires calculating dilutions (eek, math) and moving small volumes of colorless liquid from a small tube to a small well. From this plate, we move more small volumes of colorless liquid into another 96-well plate which we hand off to Affymetrix for genotyping. Because we use a standardized set of SNPs [single nucleotide polymorphisms, DNA sequence variations] for whole genome amplification, this phase of the project isn’t very labor intensive on our end. I hope to have the plates submitted by the end of next week and then after two weeks, I’ll get my results back….A lot of data analysis and statistics are required, which is interesting, but not something I have experience with. But there are great computational biologists here who will walk me through those steps and (perfect timing!) one will be holding a tutorial for data analysis at the end of next week.

I’d like to end up researching cancer genetics and practicing oncology. I think having an in-depth knowledge of the diseases in vivo is very important when trying to understand the molecular mechanisms behind them, so my career path will hopefully be able to marry those two aspects.

“Does a human host cell invite interaction with E. coli?”

Kathleen Riley, V10

Riley’s question took her back to the laboratory of Dr. Ira Herman, Director of the Center for Innovations in Wound Healing Research at the Sackler School of Graduate Biomedical Sciences at Tufts University. She worked there for six years before beginning her veterinary studies last fall. Her task: to study how a healthy host cell interacts with the E. coli bacterium that causes bloody diarrhea, which can be fatal when it strikes infants, children, and those with compromised immune systems. Riley focused on a protein in a cell’s cytoskeleton called actin: fibers that act like tent poles inside the cell, she explains, adding, “It just so happens that actin is on the surface of the intestinal epithelial cells, where E. coli causes problems.”

Riley’s work, supported by an NIH research grant, focused on testing the hypothesis that actin-specific signaling proteins in the host cell orchestrate the interactions that lead to infection. Using immunofluorescence microscopy and live cell imaging techniques, she studied the dynamics of E. coli infection on cultured cells from a human tumor cell line. Specifically, her summer work involved “looking at how the actin cytoskeleton changes when disease-causing E. coli attach to the surface of intestinal cells,” she states. Identifying and understanding these mechanisms could lead to development of, in Herman’s words, “a therapeutic molecular monkey wrench” to disrupt them. The long-term goal: development of a molecular alternative to antibiotic treatment of E. coli infection.

Kate Riley’s Diary

Week One
A few days before I came back, the whole lab moved from our old space in the Medical and Veterinary complex (on the Boston campus) to the newer Jaharis Family Center for Biomedical and Nutrition Research. We went from a separate room to one big lab space, with sets of benches assigned to different labs, so it feels very different. I don’t know where anything is anymore, but at least everyone else is having the same problem.

I’ve been growing cells for my experiments, but they won’t be ready until late next week. They’ve been stored in tubes under liquid nitrogen since last summer, so I had to thaw them out and put them in plastic flasks with fresh cell media. It takes a few days for them to multiply and cover the whole flat bottom surface, then another week or so to develop the tight cell connections and apical microvilli [fingerlike structures] that are features of the intestinal epithelium. In the meantime, I have been catching up on my labmates’ progress over the last year. It’s amazing how much happens in just nine months. One of the graduate students gave her progress presentation to the department. Her results seem even more dramatic when you’re not here for the week-by-week struggle of getting the experiments going, ironing out the problems, and trying to interpret the data.

Weeks Two to Three
Intestinal cells normally have a “brush border”—a surface covered with small, bristle-like projections of membrane with bundles of actin fibers at the center of each one. When the bacteria attach, they inject their own proteins into the intestinal cells, and this brush border goes away. I’m working...
on the specific changes that happen inside the host cell at the very beginning of infection, when the brush border is destroyed, which is called “effacement.” Not much is known about effacement. We know that the brush border is mostly made up of beta-actin, for which the Herman lab discovered a specific capping [actin binding] protein, beta-cap73.

I can see that beta-cap73 is present in the brush border of normal cells, and disappears, along with the actin, during effacement. But that doesn’t really say why it is happening. I will have to do more Western blots [a protein detection method] to see if there are any changes in the amount of the protein, or if it is broken down into smaller fragments following bacterial infection. I am doing this by taking samples of cultures at different time points after infection, from one hour to 24 hours, to see what changes might happen. In my first attempt, I added too many E. coli, and all the cells died and broke apart before 24 hours were up. However, if I add too few, only a few cells will be infected, and it would be unlikely to see changes in proteins from the whole culture. I have many more cultures ready now, and I will try a wide range of bacterial numbers to see what looks best after 24 hours.

“Do Zimbabwean goats carry the Brucella bacterium?”

Shannabeth Minior, V09

With a U.S. Army Research Grant, Shanna Minior sought the answer to this question at the Africa Centre for Holistic Management (ACHM), a ranch in southwest Zimbabwe. The bacterium causes brucellosis, a disease causing contagious abortions in livestock, lowering production efficiency and milk output. Since goats roam and breed freely, contagious abortions can easily escape notice. In an earlier Cummings student summer research project, 40% of the ranch’s cattle herd tested positive for Brucella exposure, but the seroprevalence rate was undetermined among goats until Minior began testing this past summer. Brucellosis spreads to humans as ungulent fever, often mistakenly diagnosed and treated as malaria. Goatherd boys would be at greatest risk. The U.S. eradicated the disease by slaughtering animals that test positive, but slaughter is not feasible when a family’s livelihood depends on the few goats they own. “Goats are people’s ‘piggy bank,’” explains project mentor Dr. Louise Maranda, assistant professor of Environmental and Population Health. So cost-effective preventive management is key.

“I’ll want to investigate the feasibility of quarantine for animals that test positive,” stated Minior, “and make sure that the milk from those animals is pasteurized to decrease zoonotic risk.” She tested a sample of the more than 650 goats on the ranch, some from community herds, by mixing their blood with an antigen in a test called the rose bengal test, or RBT.

Shanna Minior’s Diary

Week One

General first impressions: The Centre is much nicer than I was prepared for [but] the area seems isolated….The nearest town is about an hour away.

Personal challenges: Adjusting my diet! Since food is in a shortage here in Zimbabwe, I make it a point to eat whatever is served. In the last few days I have eaten kudu heart, zebra meat, and warthog intestine. [Also] adjusting my schedule! If a meeting is scheduled to start at 8 a.m., it may start anywhere between 8 a.m. or noon. I had planned on starting my project within a day or two after arrival; realistically it will be more like seven or eight days after my arrival.

My favorite Zimbabwean experiences (so far): Despite 82% unemployment, ~2500% inflation, food shortage, extreme poverty, and political instability, Zimbabweans [tease each other and laugh hard]—their laughter is quite contagious! They are also very quick to invite you for dinner or a walk when you meet them….Went for my first jog today. Ran towards the elephant pools and tried to avoid lion country. I found an elephant skull; now this I would like to bring to anatomy class! Its sooo huge and so human-like. [I’ve] seen lots of great animals: cape buffalo, elephants, civets, jackals, warthogs, impala, kudu, steerbucks, and a variety of birds.

Week Two

Adrian, the assistant ranch manager, came to bring me down to the goat corral. [While treating a sick goat, Adrian tells someone Shanna’s a “doctor.”] It distresses me that people here think I am a doctor, even though I introduce myself as a student. The truth is I have little idea of what I am doing and the
herders know a lot more than I do....I feel unprepared and helpless. It’s like I packed entirely useless things for this trip. I wish I’d brought things that the animals actually needed, like penicillin, vaccines, anti-parasite treatments—basic care items.

Project Begins: Woohoo! Today I began my work, only six days post arrival! We started at 7:47 a.m. taking blood. We used about 50 goats and took about 35 samples. Again some frustration occurred because I had trouble taking blood from the goats successfully. The herders seemed confused with the spiffy vacutainer and needle set I brought. They are accustomed to the traditional syringe and needle. This vacutainer needle doesn’t show a flashback so it was really hard to see if I was in the jugular vein. So I wasted at least 15 [sets]. The herders just re-used an old syringe and needle, using water to wash it in between goats....It’s times like this when I get so frustrated and angry [feeling so] useless in...practical knowledge. As I was struggling with one of the goats, one of the sweet goat herders said to me, “Don’t give up hope, you must keep hope and keep try.” How she can be so nice to me when she has so little, just made me feel awful and selfish. It seems like the less you have, the more spirit you have here.

I’ve found about 19% seroprevalence rate for brucellosis so far.

Week Three
I expected the seroprevalence rate to be around 40%. [But after taking 72 more samples] I suspect that about 30% is a more reasonable estimate. All my community samples were negative, whereas all the positive results were in the ACHM samples. I’m not sure if [the negative results are due to] the delay in running the tests, or if the communities around ACHM do not have Brucella.

Farmers here cannot isolate or cull any of their animals, so knowing that their animals have Brucella is not really useful. I will recommend separation but it’s unlikely to occur. The best I can offer is to boil or pasteurize [milk from goats that test positive] so people don’t get sick themselves.

I made it to Botswana yesterday and got groceries. We were gone nearly 12 hours, but spent only 45 minutes in the grocery store!
The images, and so far we have identified one potential stem cell in the samples from allergen-sensitized mice. Staining tissue sections for immunofluorescence is a two-day process requiring several steps to make sure the antibodies will only bind to the correct proteins. The antibody solution needs to sit on the tissue sections overnight to work. The antibody concentration and time that it is left on the tissues are sensitive, so not only do we have to find these very rare cells, we have to perfect our methods for finding them. I’m also training to anesthetize, intubate, and perform pneumonectomies (removal of one side of the lung) on mice, which is extremely valuable experience for my veterinary career.

The lung laboratory has also recently received some new equipment, including a magnetic cell sorter! This machine works by using cells labeled with a marker that identifies a protein of interest. The cells go through tubing and those with the marker will stick to a magnet. Once all the cells that don’t stick are deposited into a vial, the machine releases the positive (stuck to the magnet) cells into another vial. You can select which group of cells to keep, and either run them through the machine again to select for other proteins or culture them for further experiments. This is very exciting because it saves the cells (and scientists!) a trip to the Boston campus to use their cell sorter, allowing us to do more with the sorted cells in the lab. We also just got a cytocentrifuge, a machine that spins cells in solution onto slides. Because I have experience from my job in the Tufts Clinical Pathology Lab in using the machine for fluid analysis, I have been assisting to get the speed and time settings right for our samples. These are delicate stem cells, and it is a lot of stress on them to go through being stained and sorted. We want to be able to identify cells based on staining and morphology; therefore, we’ve got to get them onto slides without damaging them.

Drs. Mazan and Hoffman have ‘generously’ given me maybe hundreds of references to read to get more background on lung function testing, stem cells, asthma, emphysema, and BASC, among other topics. It’s a lot of work, but it is worthwhile, not only as a summer research project, but to help answer some important questions in lung stem cell research.

Among the factors influencing Cummings’ success in winning this subcontract was a technique developed by Dr. Udi Zukerman, research assistant professor of Biomedical Sciences, and Dr. Saul Tzipori, director of Infectious Diseases, to concentrate suspended solids in drinking and wastewater samples. This technique, called continuous flow centrifugation, eschews traditional filtration techniques in which filters tend to clog. Instead, samples are spun inside a rotor, where centrifugal force separates suspended solids from the water.

Another factor is the laboratory’s ability to propagate live oocysts of the parasite Cryptosporidium hominis (highly difficult in a laboratory setting), as well as those of C. parvum. “The fact that we can produce oocysts from both species and spike them into wastewater matrices to test different techniques, together with continuous flow centrifugation, probably gave us an edge over other laboratories,” states Widmer. Work on the project was slated to begin this summer.

Green Lights for Biosafety Laboratory

The project plan for the Cummings School’s Regional Biosafety Laboratory was approved in April by a unanimous vote of the Grafton town planning board. And approval for laboratory construction was granted by the Tufts University Board of Trustees in June. Construction was set to start in the summer, with opening projected for spring 2009. The laboratory is being built with grants totaling $19.35 million from the National Institute of Allergy and Infectious Diseases, a division of the National Institutes of Health.

Phyllis Mann, Ph.D., assistant professor of Biomedical Sciences, received a four-year NIH/NICHD grant to study the involvement of the ventromedial nucleus of the hypothalamus (VMH) in maternal behavior in rats. The VMH is part of a neural circuit in the brain that inhibits maternal behavior in virgin and first-time pregnant females. Mann’s research will use behavioral and neurochemical approaches to identify the mechanisms by which VMH inhibits maternal behavior in adult rats. She also aims to clarify the role of progesterone in the onset of maternal behavior and the role of anxiety in preventing the female from acting maternally. The goal of the study is to contribute to an understanding of natural behavioral responses in other mammals, including humans.

Research News

CUMMINGS WINS WASTEWATER CONTRACT

The Infectious Diseases Group at the Cummings School has been awarded a two-year subcontract by American Water to assist in developing techniques for testing wastewater samples for the occurrence, infectiousness, and genotype of the Cryptosporidium parasite. American Water, the largest water services provider in North America, is under contract to the WaterReuse Foundation to test the effects of both traditional and innovative wastewater treatments on this microscopic, chlorine-resistant parasite. Found in drinking and recreational water throughout the world, it causes cryptosporidiosis, a diarrheal infection, now one of the most common water-borne diseases in humans in the U.S. The laboratory, under the direction of principal investigator Giovanni Widmer, Ph.D., will evaluate the effect of various wastewater treatments as well as detection and genotyping techniques. One of his goals is to determine the usefulness, reliability, and simplicity of different testing techniques as used on an array of wastewater types.

MATERNAL BEHAVIOR GRANT RECEIVED

Phyllis Mann, Ph.D., assistant professor of Biomedical Sciences, received a four-year NIH/NICHD grant to study the involvement of the ventromedial nucleus of the hypothalamus (VMH) in maternal behavior in rats. The VMH is part of a neural circuit in the brain that inhibits maternal behavior in virgin and first-time pregnant females. Mann’s research will use behavioral and neurochemical approaches to identify the mechanisms by which VMH inhibits maternal behavior in adult rats. She also aims to clarify the role of progesterone in the onset of maternal behavior and the role of anxiety in preventing the female from acting maternally. The goal of the study is to contribute to an understanding of natural behavioral responses in other mammals, including humans.
PHOTO: ANDREW CUNNINGHAM

Philanthropic Resonance

Leveen Family Fund commits $400K to new MRI suite

Diagnosis using magnetic resonance imaging (MRI) has now expanded to include horses and other large animals—even a 350-pound pig. It was the addition of the 2,100-square-foot Leveen Family Fund MRI Wing that made this expansion possible. Open since last December, it is the most sophisticated in New England for diagnosing large and small animals. The facility, annexed to the Cummings hospitals, bears the name of the charitable foundation that committed $400,000 to help fund it. Its founder, the late Brookline philanthropist and dog-fancier Hilda Leveen (inset), owned a succession of black-and-white Boston terriers, all named Peter after her father.

“This gift helps us keep costs down for clients and for our faculty involved in MRI research,” said hospital director Dr. Steven Rowell. “Technology like MRI requires huge investments in the building, equipment, and personnel. Since each patient must be anesthetized, we cannot perform as many MRI scans a day as are done in human MRI facilities. We want to move our technology forward without driving costs beyond the capabilities of clients and researchers.”

In the MRI room, the patient is moved through the center of a doughnut-shaped magnet on a sliding table that acts as a conveyor. A special table for large animals enables a horse to undergo a leg scan. Three-dimensional scan images of a spine, a brain, or any organ are captured on computer by a technician in the adjoining control room. “We average two or three cases a day, five days a week,” says MRI technician Brenda Tilley. “Mainly we do dogs and cats. One of my favorite cases was a dog that walked over with his favorite stuffed animal in his mouth.” Patients have included rabbits, a bear cub, and even a porcupine, which Tilley describes as “very interesting! We wore big gloves to avoid the needles.” Wrestling a 350-pound pet boar through a 23-inch hole has been her most challenging patient so far. “Wow,” muses the technician. “I don’t know how we fit that pig in there.”

That people’s pets are being so well cared for would have meant a lot to the benefactor whose family’s name is above the door. Hilda Leveen was the eighth of nine children in her family, none of whom had children; instead, dogs dominate the family album. Hilda, born in 1906, never married, and worked as a secretary in the financial industry. Her sister Caroline, a judge, was just the second woman appointed to the bench in Massachusetts. Her brother Percy was a violinist with the Boston Symphony.

Hilda Leveen was the last of the line when she passed away. She lived very frugally, invested wisely, and when she died in 2000 at age 93 her $3.5 million estate went to establish the Leveen Family Fund, intended to benefit, among other causes, the welfare of animals. “She wanted to make sure people took care of their dogs,” said Miss Leveen’s attorney, Stephanie Meilman of Newton. At the Leveen Family Fund MRI Wing, her wish will come true.

—MARK SULLIVAN
Underwriting Pathology

When a black bear had to be put down at the wildlife clinic after being found wandering disoriented along a road, Tufts veterinarians suspected some sort of neurological disease. Dr. Sureshkumar Muthupalani and Dr. Chris Gibson, veterinary residents in pathology (the study of disease and its processes), were called in on the case. With the guidance of supervising pathologist Dr. John Keating, they confirmed the diagnosis: lysosomal storage disease, a metabolic disorder affecting neurons in the brain. “This is a case where pathology gives a good answer,” Muthupalani said.

The work done by pathologists like Gibson and Muthupalani is important not only to veterinarians in clinical practice, but also to pharmaceutical companies, which rely on pathologists to test safety of drugs in development. Of the four residents now training in anatomic pathology at Cummings, two—Muthupalani and Gibson—have their three-year residencies underwritten by corporate partners, biotech company Biogen Idec and pharmaceutical company Boehringer Ingelheim, respectively. Biogen Idec has provided support annually since 2004 and Boehringer Ingleheim since 2005.

“The generous support from Biogen Idec and Boehringer Ingelheim is invaluable,” said Dr. Nicola Parry, assistant professor of Pathology at Cummings and director of the Veterinary Anatomic Pathology residency program. “We couldn’t run this program without their support.” Biotechnology and pharmaceutical companies are major employers of veterinary pathologists, who are in short supply. This critical deficit has prompted the American College of Veterinary Pathologists and the Society of Toxicologic Pathologists to form the ACVP/STP Coalition for Veterinary Pathology Fellows to increase their numbers. Many companies lend financial support to the coalition. Others, such as Biogen Idec and Boehringer Ingelheim, directly support veterinary schools’ pathology training programs.

Dr. David Hutto, a veterinarian and former assistant professor of pathology at the Cummings School, is senior director of comparative pathology at Biogen Idec in Cambridge. “Investing in training programs that form the pipeline of veterinary pathologists is a critical need for our discipline,” he said. “The need is outpacing the supply, and the disparity is growing all the time. Tufts has a very good pathology training program, and the trainees that come out of the program have done very well. It’s an opportunity for us to make a direct contribution to the pathology pipeline in a nearby institution that we have confidence in.”

Dr. James Stoltz, a veterinarian, is associate director in the Department of Toxicology and Safety Assessment at Boehringer Ingelheim Pharmaceuticals in Ridgefield, Conn. “I think the value of the partnership with Tufts is in raising awareness of employment opportunities for residents at pharmaceutical companies,” Stoltz said. “We sponsor a four-week externship at the company that allows the resident to gain first-hand experience of what the job would entail for an entry-level toxicologic pathologist.”

Gibson, 31, a native of Doylestown, Pa., earned his DVM in 2002 from the University of Pennsylvania, and practiced at veterinary clinics in Scranton and Doylestown. After his residency he looks to a career in academia or industry. “The amount I have learned has been amazing,” he said of his experience as a pathology resident. “You can learn about this in textbooks, but actually seeing the effects that diseases have on animals puts things in perspective for me.”

Muthupalani, 36, originally from Chennai (Madras), India, received his DVM in 1995 from Madras Veterinary College and his Ph.D. in Veterinary Microbiology in 2005 from the University of Kentucky. “Training in pathology gives you a broad base—you can go into industry, into academia, into research,” Muthupalani said. “The program at Tufts is very good. Since I received my degree in veterinary medicine 10 years ago, so many clinical advances have been made: I have been exposed to these, in addition to learning pathology.”

—Mark Sullivan
How do honeybees travel from Grafton to Medford?

They get transported—very, very carefully—answers Philip Starks, Ph.D., an assistant professor of biology at Tufts University. Starks and his researchers, who include graduate and undergraduate students, are researching honeybees’ response to disease. The work involves collecting bees from hives in Starks’s apiary, located on the Cummings campus, and taking them back to his Medford campus laboratory for analysis. Researchers use smoke, which interferes with the bees’ chemical signaling system, to keep agitated bees off guard while they’re being collected for transport.

Why are studies like these important? Because disease—together with parasites, pesticides, and habitat loss—is contributing to the dramatic decline in the bee population. Part of the problem lies with the size and homogeneity of modern agriculture; too much is being asked of the bees that service it. Yet without bees’ pollination, agriculture can’t survive on any scale.
ON THE TEAM

They serve those who come to heal, and help teach those who are here to learn. Many are at the forefront of growing specialization in the field. Who are these crucial members of the Cummings team? Read our feature story to find out.