



2009

The Microscope (2009-2010)

Department of Microbiology

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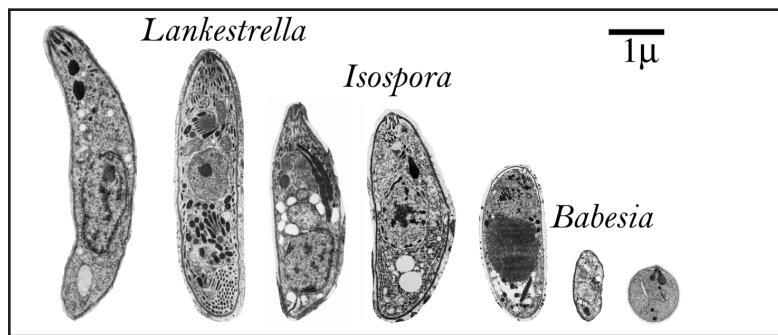
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The MicroScope

The 2009-2010 Department of Microbiology Newsletter



Dr. Chunlei Su and the Fight Against Toxoplasma

It invades your body through food and water, and has been found nearly everywhere human and mammal populations exist. A mother can unknowingly pass it to her unborn child, but may not get sick herself. One of the most common and beloved house pets in cultures around the world is the parasite's most prolific spreader, passing it on to adoring owners.

It may sound like something out of a horror movie, but Toxoplasma is very real and infects nearly one third of the world's population. The parasite has been found almost everywhere, but Dr. Chunlei Su and his lab team are trying to map out and study Toxoplasma (toxoplasma for short) in order to learn how to make it more manageable and less problematic on a global scale.

"[Toxo is] a single cell pathogen that must infect human or animal cells," explains Dr. Su. "Then they reside inside the cell and replicate, and in that process they cause disease. This parasite can infect mammals and birds in general. They hide in the cells and then you cannot remove them."

For people infected, it is believed that they will carry the parasite for life, but in most cases, because the immune system is strong, they can repress this parasite so they won't replicate as much, and therefore stays as a chronic infection.

Sometimes, it can cause eye lesions in healthy people. Infection acquired during pregnancy in a healthy mother may spread and

-Continued Page 2-

Words from the Department Head

Professor Jeffrey M. Becker



Welcome to the Annual Newsletter of the Department of Microbiology! Our Department is one of a handful of departments in the U.S. that has strong faculty representing both microbial pathogenesis and microbial ecology. We are fully engaged in providing our undergraduate students with a deep appreciation of modern microbiology and with opportunities to carry out research in the laboratories of our faculty members. We are dedicated to providing our graduate students with a great experience in teaching and in performing research at the frontier of modern science. The unique wide scope and strength of our Department has resulted in many significant contributions to science with projects funded by institutions including the National Institutes of Health, National Science Foundation, American Heart Association, and Department of Energy.

This past year we welcomed three new members of our Department: Vitaly Ganusov, Frank Loeffler, and Elizabeth Fozo. Each comes to our Department with impressive training and promises to add greatly to the strength and vigor of our research and teaching.

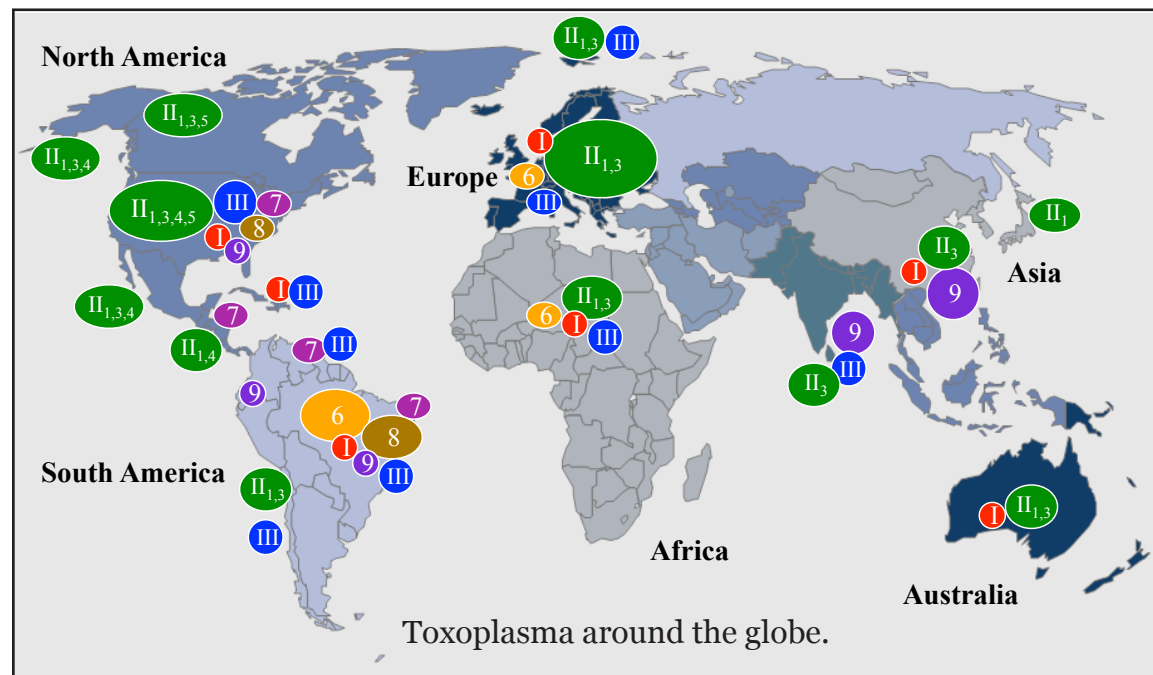
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cause severe damage to the fetus. In immunocompromised persons such as those infected with AIDS or recipients of organ transplant, infections of toxo can cause life-threatening swelling of the brain.

One of the most interesting aspects of this parasite is the fact that it has no host specificity. Toxo can infect almost any mammal, including humans. According to Dr. Su, in other parasites, like malaria, a given species of the parasite can only infect certain hosts.

This ability to infect a wide range of hosts presents a particularly difficult challenge for those trying to study and treat toxo. Because the parasite can live in just about every mammal, it is able to be extremely prolific on nearly every continent, and because the common house cat- or really any feline- is the main propagator of toxo, human populations are particularly affected by the disease.

Dr. Su explains that toxo probably began its spread around the world when humans moved away from



being hunter-gatherers constantly on the move, to more sedentary beings using agriculture as their main source of food.

When early modern humans started setting up shop in permanent housing, mice moved in as well. This caused the always resourceful modern man to adopt cats as pets to keep the mice out of their food. Sadly, this resourcefulness also facilitated a cycle of toxo transmission between cat and mouse. A single infected cat can shed hundreds of millions of parasites in their feces in several days, which may contaminate food and water, causing infection in animals (such as mice, pigs, goats, sheep, cattle, chickens, etc.,) and humans if the parasite is ingested. As this agriculture based form of society grew, cat and mouse, and therefore toxo, populations expanded with it.

Dr. Su and his lab are trying to track the spread of toxo throughout the world by genotyping the different strains found on different continents and inside various mammals. Eventually, he hopes to put together a global map and list trailing the different strains of toxo around the globe. This new research has already yielded some very compelling results.

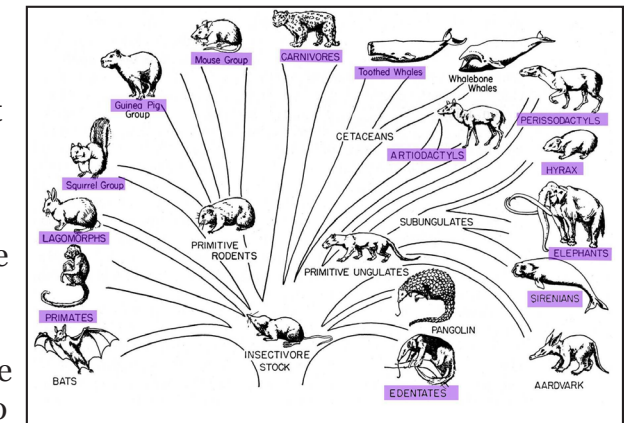
“So now we see a very interesting pattern at the global level,” says Dr. Su. “For example, when you look at Europe, Africa, Asia and North America there is one particular genotype, type II, which is dominant. You see it 80 percent of the time. The question is, why do you see this particular strain? Why is it dominant at the global level?”

One reason Dr. Su thinks this strain might be so prolific is because of its age. He hypothesizes that this type of toxo was around when humans first began domesticating cats and therefore the parasite quickly spread to the rest of the world.

Another reason Dr. Su thinks type II might be dominant is because it has a biological advantage that sets it above the other strains of toxo. Part of Dr. Su’s work is understanding which of these reasons is the major factor contributing to the success of this kind of toxo.

“On the other hand,” says Dr. Su, “when you look at toxo strains from South America, they’re very different. You don’t see type II strains there very often.”

One possible explanation for this variation is the fact that many forms of feline, aside from the common house cat, take up residence in the jungles of South America. The only time toxo can go through sexual recombination, is when it is inside a feline host. Therefore, if more feline hosts are available and eating a wide range of animals with various types of toxo infecting them, then toxo naturally becomes more diverse through recombination.



“A different ecosystem may facilitate a different way of transmission, and generate a different population structure,” says Dr. Su. “By studying this, we try to understand different transmission patterns and eventually have some idea of how we should control the spread of this parasite.”

The ultimate goal of Dr. Su’s research is to find a way to manage and even manipulate toxo to keep it from infecting such a large portion of the world. Through understanding the basic biology of the parasite, they might find a way to turn off the particularly virulent aspects of the parasite and maybe eventually develop a way to cure the disease entirely.

“If you reduce the possibility of toxo infecting livestock, then you can reduce the possibility of it infecting humans. Understanding the mechanism of virulence will help us identify a target to treat the disease,” explains Dr. Su. “It’s a long way to get there, but for now we need to understand the basic biology so that toxo can be better controlled.”

-Miriam Kramer

Message from the Department Head (continued)

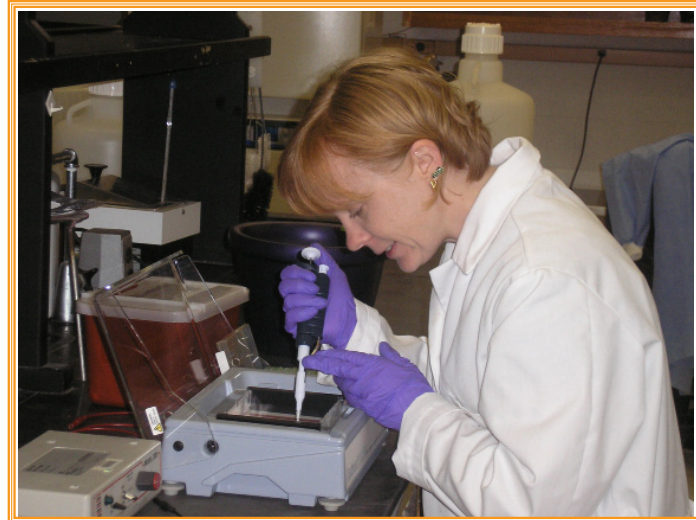
Microbiology is a leading force in science and will continue as a major scientific discipline throughout the 21st century. Microbiology has a long-standing, strong identity as a distinct scientific discipline supported by extremely robust national and international organizations. Microbiologists have historically played important roles in major advances in the biological sciences contributing to humanity’s health and welfare and winning a majority of the Nobel Prizes for Medicine and Physiology. The continuing threat of epidemics, the rise of drug resistant microbes, and the recognition of the huge number of uncultured microbes that play important roles in the environment all point to the continued importance of the discipline of microbiology. Embrace “The Golden Age” of Microbiology!

It is indeed a great honor to serve as Head of the Department, and I thank all of the faculty, students, and staff for their great contributions, and I thank our alumni and supporters for their generous gifts that allow our students to participate in research and attend scientific meetings

After four years working for the National Institutes of Health, **Dr. Elizabeth Fozo** was ready for a change. While she enjoyed working at the NIH, Dr. Fozo knew she wanted to go back into the classroom and into a university lab of her own.

“I always wanted to go back to academia, back to a college setting where I could have my own research lab and graduate students,” explained Dr. Fozo, “but also I really want to have undergraduates in my lab. I really enjoyed that aspect when I was a grad student.”

For Dr. Fozo, the Department of Microbiology at UT fits all her needs. From the first time she came to the university, she knew that this department was the place for her.



“It was really nice to see the diversity in research [in the department],” she explained. “It [the microbiology department] has immunology, virology. It has environmental microbiology and pathogenesis, and I really liked that aspect. I just loved it from my interview. I liked the students that I met. I really liked the faculty. Everyone really got along.”

Once Dr. Fozo starts work in her lab in the fall, her research will focus on novel ways to investigate and manipulate a very interesting aspect of *E. coli*. At the NIH and now continuing at UT, Dr. Fozo works with a relatively mysterious form of RNA. Small RNA, or sRNA, has recently been found to control certain gene expressions.

Before this discovery, according to Dr. Fozo, no one thought that sRNA could control gene expression at all. These sRNAs are found in almost every species on Earth, but within bacteria, much of the time they are implemented to help with regulation in a stressful environment. Dr. Fozo is particularly interested in looking at one set of these regulating sRNAs.

“There are many different types of these RNAs that can do it [regulate gene expression],” said Dr. Fozo. “So, I was interested in this one family that are 5 of these RNAs, and I call them sibs [for siblings].”

The sibs are actually coded to make a toxic protein which, when enough of the protein is produced, can kill the *E. coli* that creates it. Dr. Fozo is attempting to understand the possible advantage(s) the bacteria could gain by making this poisonous protein.

“If it makes too much of it then it will kill itself,” explained Dr. Fozo. “So the big question is why would it make this protein that could kill itself? Why would any organism have this type of system? What’s the possible benefit?”

Dr. Fozo’s theory revolves around the idea that these bacteria use this toxin as a way to regulate themselves while in stressful environments.

“When something stressful happens in the environment, bacteria are driven to divide and replicate, replicate, replicate,” explained Dr. Fozo. “There are going to be times when you experience stress where you don’t want to divide because you could have DNA damage, damage to your membrane and to your proteins.”

Dr. Fozo theorizes that when bacteria are exposed to stressful environments, they use this protein to regulate their internal activities so they won’t replicate under stressful conditions. If the bacteria only produce a small amount of the toxic protein, it shuts down everything within the cell, making replication impossible but keeping the bacteria’s DNA intact.

Ultimately, Dr. Fozo hopes that her work with these sRNAs will yield not only a deeper understanding of *E. coli*, but also therapeutic treatments for patients suffering at the hands of pathogenic bacteria.

“Once we know what they target then we have a target for drug therapy,” said Dr. Fozo. “Once we know how they work, once we know that biological information, we can then use it to develop a directed antibiotic.”

A Fresh Start: New Faculty joining Microbiology

The newest UT-ORNL Governor's Chair, **Professor Frank Loeffler**, is also one of the newest faculty members to join the microbiology department.

As a governor’s chair, Professor Loeffler will be splitting time between his labs at UT and Oak Ridge, while simultaneously trying to bring the two organizations closer together.

“One of the main goals [of this program] is to bring these two institutions, Oak Ridge and UT closer together so that they are not really separate units,” said Loeffler, “but from the outside perceived [appear as] as one big research family.”

Prof Loeffler also hopes that he can help facilitate the sharing of information, research and students more freely between these two closely knit groups.

While working at both UT and ORNL, Prof Loeffler’s research will focus on removing man-made contaminants from various ecosystems with the use of naturally occurring microbes in the environment. Prof Loeffler is particularly interested in understanding how these different microbes actually breakdown the contaminants. Using that information, he can help create new ideas that can ultimately be applied to problems within a given environment.

“We are generating fundamental scientific understanding of how these processes work and what is required in order to develop an application,” explained Prof Loeffler. “So we look for microbes that can do certain things that are of interest for cleaning up the environment, but we have been trying to understand how these microbes operate, how they function, what they need in order to be active.”

Recently Prof Loeffler has been working with some new microbes that are able to clean up chlorinated solvents within aquatic environments. These toxic compounds are very abundant within ecosystems and cause large problems for humans as well.

Prof Loeffler said, “We’re looking into microbes that contribute to detoxification of chlorinated solvents, so dry cleaning fluids and things like this are very abundant in the environment and a big problem in drinking water.”

Although Prof Loeffler’s work is mostly lab based, his research gives those that are out in the field a better understanding of the science behind the process of removing these toxic materials from the ecosystem.

“If you don’t have this basic scientific understanding you will fail later on in the application,” said Prof Loeffler.

Prof Loeffler is also very interested in understanding how these microbes developed the ability to breakdown these compounds in the first place. He explained that many of these contaminants have been in the environment less than 100 years, so the fact that so many different organisms are able to use these compounds is rather extraordinary.

“Where’s this capability [to breakdown these compounds] coming from, how did these genes evolve,” said Prof Loeffler. “That’s another question we’re trying to answer. It may sound purely academic, but it isn’t because if we could know how much time it would take for those microbes to evolve to respond to contamination, then we could make much better predictions about the fate of these contaminants over periods of time.”

Prof Loeffler’s work will help to contribute to the cleaning up of land and water ecosystems across the globe. By having a more fundamental understanding of the science behind these microbes’s abilities, it will give practitioners and scientists alike new ideas about how to clean up damage done to the Earth throughout the years.

-Miriam Kramer



Out of the Office

This year's departmental retreat facilitated inter-lab bonding and put new research from each lab on display.



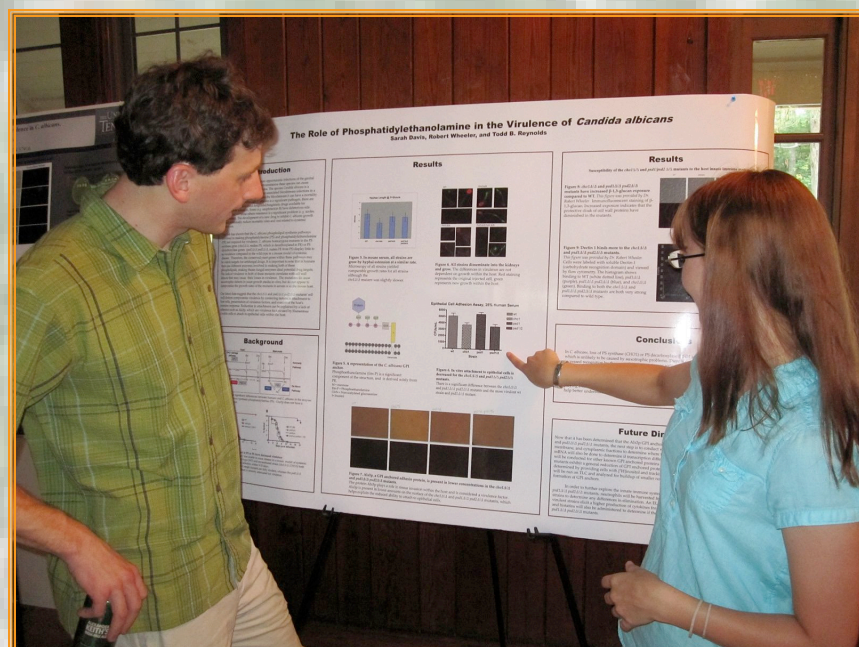
Professor Becker discussing one of the many research posters with Dr. Tom Masi, another member of the faculty.



Many of the faculty members made research presentations through the course of the weekend.



The department eating dinner in the mess hall.



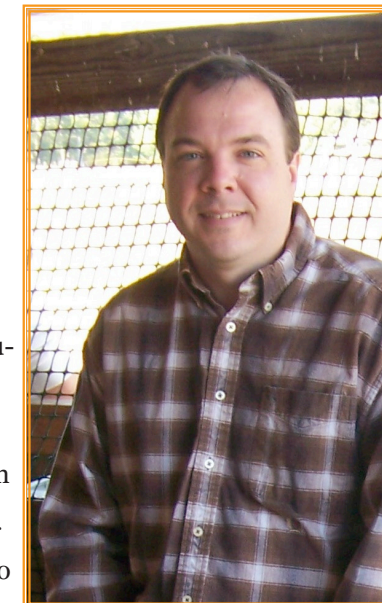
Jeremy Chandler listens as fellow graduate student, Sarah Davis, explains poster.



Graduate students talk about some interesting new research presented at the retreat.



Wisdom from a Former Student: Chris Elkins



How did you end up in Microbiology at UTK?

This is a long story that involved a road trip during spring break from Case Western Reserve University in Cleveland, OH where I completed my undergraduate studies. At the time, I had already graduated with my Bachelor's degree in Biology and History but continued taking a few graduate-level classes for an additional year in the Department of Biology that ranged from enzymology and genetic engineering to advanced microbiology. I became engaged quite heavily by the subject matter covered in the latter class which was offered during the Spring semester and so I immediately (and hurriedly) prepared my applications for graduate school. As I tend towards unconventional approaches, I decided to make uninvited visits to a few of my "selections" during the ensuing break: University of Tennessee, University of Virginia, and Penn State University. My first stop was the University of Tennessee which also coincided with a visit to a long-time friend who was a graduate student in the Department of Chemistry and who also was able to put me up for the night. I strolled in unannounced the next day to find Dr. Jeff Becker in his office and introduced myself. We struck up a good conversation and it was that initial interaction that attracted me to the department. I used the same tactic with the other two schools but walked away largely unimpressed. My decision was clear; I only submitted one application.

What was the focus of your PhD at UTK and how has UTK affected your career?

My Ph.D. training was under the direction of Dr. Dwayne C. Savage, an eminent intestinal microbiologist who dedicated his career to physiological- and molecular-based systematic studies of the commensal microbiota – interests that he had initiated in conjunction with his postdoctoral mentor, another eminent microbiologist by the name of René Dubos, many years earlier. Although I was Dr. Savage's last student (he had just stepped down as Chair of the Department), his interests in microbial encoded factors important in persistent microbial colonization within the lower gastrointestinal tract (GI) were still active and afforded me an opportunity to work with a prominent and instrumental expert in this field. I was given wide latitude on issues to pursue under his tutelage and became intrigued by bile acid-associated genetic determinants in *Lactobacillus*. These steroid molecules are natural detergents found exclusively at high concentrations in this environment and undoubtedly influence the qualitative and quantitative measure of microbes in the ecosystem due to their intrinsic noxious properties. Scott Lundeen, a protein biochemist and previous graduate student of Dwayne's, identified and characterized several purified isoforms of enzymes able to deconjugate bile acids. In my thesis, I approached the issue from a molecular genetic basis to explore the coding capacity for this activity. During the course of this work, we discovered a set of bile acid transport genes associated with a gene responsible for deconjugation which peaked my interest in issues associated with bacterial bile acid resistance and transport biology. This tangent propelled my career in a natural progression to a postdoctoral fellowship in the laboratory of Dr. Hiroshi Nikaido dealing with drug efflux pumps. Dr. Nikaido was actively investigating issues related to bile acid efflux in gram-negatives. This experience would enhance my understanding of GI commensalisms by providing the perspective of intrinsic resistance to natural molecules, but also broaden my scope to include antibiotic resistance which has implications in an open and, obviously, dynamic ecosystem subject to ingested drug therapy. These issues continue to be active interests of mine to this day.

In addition to the world-class training I received as a graduate student, UTK has maintained a presence in my interactions both past and present. It has been said many times before that the scientific community is a wonderfully small world. I remember bumping into a fellow graduate student, Dr. Brad Day, from Professor Gary Stacey's old lab during my days as a postdoctoral fellow in Nikaido's lab at UC Berkeley. I had lost touch with Brad but was happy to find a fellow UTK and Department Microbiology graduate so far away from Tennessee. More recently a good friend and fellow graduate student from the BCMB Department, Dr. Brad Strader (a staff fellow at NIH in Bethesda), and I have become re-acquainted since my move to the DC area last year with the FDA. It is interesting how scientific interests overlap and we have since initiated some collaborative efforts with at least one publication in submission and work continuing on a second. I keep in regular contact with other fellow graduate students such as Dr. Michael Allen, an assistant professor at the University of North Texas and others at annual scientific meetings. It is this network of people with varied interests that positively impacts one's career in a continuous process both directly and indirectly. Dr. Becker once said (in regards to attendance at weekly departmental seminars) that everyone is required but, more importantly, should want to attend seminars even when they seemingly fall outside one's area of expertise. It is the same with the network of people that you build over time and how you use apparent differences in expertise to your advantage. After all, modern science increasingly embraces large-scale processes with enormous amounts of data generation that require analytical synthesis of vastly different disciplines within our "small" world of (as van Leeuwenhoek coined) "animalicules".

In general, what's your position with the FDA?

I currently serve as Chief of the Molecular Genetics Branch in the Division of Molecular Biology of the Office of Applied Research and Safety Assessment in the Center for Food Safety and Applied Nutrition (CFSAN) in the metro Washington, D.C. area. CFSAN is FDA's premier regulatory and research center dedicated to all aspects of food safety and security and, in my position, I am responsible for leading and managing research efforts to this end in the realm of molecular biology. Traditionally, the research in the Branch has focused heavily on the development of rapid, molecular approaches for the detection and identification of enteric bacterial pathogens in foods and on technologies involving eukaryotic-based assays to identify, for instance, developmental toxicants. We have the added objective of refining any newly designed methods with the forward vision of transferring this technology to FDA's field laboratories.

From a more fundamental perspective, much of our work involves interrogating genomes of foodborne pathogens such as *E. coli* pathotypes, *Shigella*, *Salmonella*, and *Vibrio* in a high throughput fashion. These efforts allow us to ask questions regarding pathogen evolution and relatedness especially with clonal outbreaks where we can focus deeply into the genomic landscape to derive unique genetic features characteristic of the particular outbreak scenario (i.e. gene acquisitions, peculiar insertions/deletions, informative panels of single nucleotide polymorphisms). In an effort to achieve these goals, we have invested heavily in custom microarray platforms for genotyping and SNP-typing pathogens and in high resolution optical restriction fragment maps to assist in generating spatial scaffolds of genomes that can assist next-generation sequencing efforts. These methodologies are not amenable to the field deployment per se but, when used in concert, can generate a wealth of new targets and genetic characteristics that can be screened with current field-ready standard technologies involving, for instance, qPCR. We are now moving into a new area involving genotyping communities of organisms from ecological reservoirs pertinent to specific food production environments or that may impact pathogen colonization and/or detection. Thus, this metagenomic field will enable us to study the genetic complement of microbial communities in a culture-independent fashion. This is important especially since the vast majority of microbes in ecological habitats (such as the GI tract) are most likely uncultivable due to the inability to define growth requirements that can be reproduced in the laboratory. With regards to the GI tract, development in this area may also bolster knowledge in areas such as applied nutrition for CFSAN.

Anything else you would like to add?

A few fellow UTK graduates, Dr. (Michael) Allen (University of North Texas) and Dr. Bruce Applegate (associate professor at Purdue University), were just remarking over a beer at the last General Meeting of the American Society for Microbiology hosted in San Diego in May that our group interactions as graduate students in microbiology were the best we've seen while migrating through other institutions. UTK is a wonderful collegiate environment and Knoxville has an excellent quality of life.

Thank you for your support!

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Graduate Students completing their studies in Fall 2010



Going from rock singer to microbiology graduate student might seem like a strange career choice to most, but for **Jeff Morris** that's his reality. He started off as an undergraduate rocker in a band with an affinity for science and is now graduating with his doctorate after years of hard work in the field and lab.

Morris initially took notice of the microbiology department at UT while working towards his bachelor's degree at Kennesaw State University. A paper by Dr. Steven Wilhelm and Curtis Suttle caught his eye while he was enrolled in a summer course on oceanography.

"I was looking for a place to do my graduate work," says Morris, "and I thought this idea of a previously unknown 'viral shunt' helping to keep nutrients flowing in the surface layers of the ocean, rather than sinking to the bottom, was an example of the sort of 'gee-whiz' science I wanted to do. So I sent Steve an email, and we set up an interview, and the rest is history."

Morris joined the Zinser lab and since then his research has been focused on investigating microbial evolution and ecology, and he hopes to continue that during a postdoctoral fellowship.

"I'll probably [continue to] pursue the co-culture research I've done as a graduate student from a different perspective," says Morris, "leaning either toward field populations or else theoretical questions about the evolution of mutualism."

Although Morris was initially torn between microbiology and music, he no longer questions any decision he's made that led him to this point in his career.

"Pretty much without question it [his best moment at UT] was seeing the sea cliffs of Moloka'i's north shore from on board the R/V Kilo Moana," explains Morris. "Unlike most of my time at sea, the water that day was almost perfectly smooth and the weather was calm and pleasant. If I had had any misgivings about my choice of careers, that sight set them to rest."



So, **Audrey Matteson**, What brought you to UT?

I am graduating with my Ph. D. While I was working on my Master's Degree at Bowling Green State University in Ohio, I was able to do field research on Lake Erie with Dr. Wilhelm for several weeks. I was studying the bacterial community structure prior to and during seasonal hypoxic waters in Lake Erie. Since I was finishing up soon and needed to decide my future plans, I discussed with Dr. Wilhelm his research and possibly working on a Ph. D at the University of Tennessee. After visiting the University and faculty, I decided that it was a perfect fit to continue my education.

What is your best memory of life as a graduate student?

My best memories are from research expeditions I spent in the Pacific Oceans where I got to experience life on the sea and meet other famous scientists. Most people think we spend our days playing shuffleboard on the starboard side of the boat, but in fact it is a lot of hard work and long hours. In the end you get lots of samples that will help you finish up that dissertation that is always looming in the back of your mind. There is nothing like being out in the middle of nowhere surrounded by some of the most beautiful waters in the world.

What are your plans for after graduation?

Find a job, of course! Unfortunately it's a bad economy to be looking for a job, but once I get closer to graduation, hopefully I will have a job lined up in North Carolina where my husband has a lecturer position at the University of North Carolina. Since there are so many universities in North Carolina, I hope to find a post doc position to continue my research on aquatic microbial communities.



Budinoff knew exactly what he wanted in a PhD advisor, and to him Dr. Buchan and her lab at UT was a perfect fit.

"If I'm going to get my PhD somewhere I want an advisor that's 1) young and ambitious and 2) is going to make sure I get out of here in 4 years, and that was [Dr. Buchan]," explains Budinoff. "I actually came to the University of Tennessee to get my PhD with [Dr. Buchan]."

While working in Dr. Buchan's lab for the past 4 years, his research focused on understanding the abundance and diversity of a bacteria, roseobacter, in coastal marine ecosystems. He also looked into the different varieties of viruses that infect the various forms of roseobacter found in those environments.

Although he has enjoyed working with viruses and bacteria, Budinoff is looking to change direction for his postdoctoral study.

"Really my goal is to not work with bacteria or viruses, which is what I'm doing now, but to look at microzooplankton," says Budinoff. "I'm interested in looking at those because I haven't had any experience with them during my career."



Matt Saxton didn't originally think he would end up staying at UT as long as he did. He came to the microbiology department to work as a lab technician, but at the end of his year, as Saxton was looking for graduate school options, Professor Steven Wilhelm offered him a place as a PhD student in his lab.

In the end, Saxton couldn't be happier to have been offered a position in Prof Wilhelm's lab and the opportunities it presented.

"I was excited about staying at UT because of the Lake Erie projects we have," said Saxton. "That was a big part of it. I really like working for Dr. Wilhelm. I felt that I could be successful here."

Since Saxton decided to stay as a graduate student at UT, most of his research has focused on field work based in Lake Erie. He has mostly been looking into filling in gaps in current research with phosphorous in *Microcystis*.

According to Saxton, the prevailing theory is that the more phosphorous in a given population of *Microcystis*, the larger the algal bloom. Saxton has been looking into getting a more complete data set about phosphorous quotas in the Lake Erie blooms.

Overall, Saxton believes that the extensive field work he gained through his work at UT will help him find a good placement for his postdoctoral research. Ultimately he'd like to go into academics but he's open to anything.

"I'd like to go into academics. I'd like to teach or go that whole route," explained Saxton. "I try not to be too attached to any one idea."

-Miriam Kramer

2009-2010 Departmental Awards

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Non- Departmental Awards

Steven Brown (Small Lab) and Suneeta Acharya (Onami Lab) received the D. Frank Holtman Microbiology Undergraduate Academic Achievement Award for their outstanding work as undergraduate microbiology students.



Dr. Alison Buchan was awarded the Undergraduate Faculty Teaching Award for excellence in undergraduate instruction.

Jonathan Lockhart received the Lisa Kahn Undergraduate Research Award for his superior work as an undergraduate researcher in the Becker lab.

From the Reynolds lab, **Marissa Rodrigues** has been presented the Graduate Teaching Award for excellence in undergraduate instruction.



Judy Whitaker has been awarded the Microbiology Staff Award for excellence in administrative work.

Charles Budinoff (Buchan), Jeremy Chandler (Zinser), Bo-Jhih Guan (Brian), John Harp (Onami), Audrey Matteson (Wilhelm), Anthony Montedonico (Reynolds), Marissa Rodrigues (Reynolds), Matthew Saxton (Wilhelm), Aarthi Sundararajan (Sangster), Junwei Zeng (Onami), Suneeta Acharya (Onami) all received David White Travel Awards to continue their research in the future.



CONGRATULATIONS!

Congratulations to Drs. Reynolds, Sparer and Su for being promoted to Associate Professor with tenure this year.



George Umanah, from the Becker lab, received a \$1,000 scholarship and was chosen to present a talk on his work at the Keystone Meeting in Colorado in April.

From the Reynolds lab, **Anthony Montedonico's** abstract was chosen for a talk at the American Society of Microbiology Candida and Candidiasis Conference this year, and he received a \$500 ASM Travel Award.

Chris Gulvik, from the Buchan lab, won the award for the Best Student Oral Presentation at the Regional American Society of Microbiology meeting held here in Knoxville in October 2009.

Lydia Siebert, from the Zinser lab, won the Office of Research EURECA Award for her project titled "Identification of *S. lacuscaerulensis* Genes Responsible for Helping Phenotype Towards *Prochlorococcus*."

Jeff Morris won a Biology Division Science Alliance Award in the amount of \$3,000 to aid in his research.



Mark Mowbray, Helena Pound, Cara Turski and Elizabeth Morrow all received an Undergraduate Summer Research positions for 2010. The chancellor's office funds these internships to stimulate undergraduate participation in research.

We Want to Hear from You!

Your full name: _____

Address: _____

Graduation year(s): _____

Degree(s): _____

Place of employment: _____

Job title and description: _____

How did your time at UT prepare you for this position? _____

You may also send your comments to microbiology@utk.edu. Please include "The MicroScope '09-'10" in the subject line.

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