



2014

The Microscope (2013-2014)

Department of Microbiology

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MicroScope Annual Newsletter 2013-14

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Words from the Department Head: Professor Jeffrey Becker

I was asked recently by Assistant Professors Liz Fofo and Jill Mikucki to give a talk on my research career at the Faculty-Student Retreat they organized in August, 2014. Having been at UT for my entire post-postdoc career --- over 42 years, I had a lot of sorting and thinking to do in preparing a twenty-minute talk. Below is the 3-minute version of this retrospective.

The life of a University Professor is one of satisfaction (most of the time). It is a “privileged life” to be able to work at something one loves with unlimited potential to contribute to humankind’s betterment. All of this takes a complex infrastructure of students, faculty, staff, administrators, and alumni working together, each making significant contributions in his/her own manner. Indeed, we are our own “systems biology” network. Lesson Learned One- Build a Team.

It has been my extraordinary privilege to have had a perfect collaborator, Prof. Fred Naider, of the City University of New York, for all these years. Freddy and I have a beautiful synergy involving chemistry (Freddy) and biology (me). We have been very fortunate to have received

funding from outside agencies like NSF, the American Cancer Society, and NIH that allowed us to pursue really interesting and challenging research on small peptides, membrane transport systems, pathogenic yeast, and membrane receptors. Lesson Learned Two – Find a Great Collaborator.

We’ve put a few bricks into the wall of knowledge, but my most significant contributions have undoubtedly been in nurturing, challenging, and “growing” students, both graduate and undergraduate. It is extremely gratifying to know that my students have accomplished amazing things in their careers as Physicians, Dentists, Veterinarians, University Professors, Pharmaceutical Researchers, Hospital, FDA and CDC Administrators, and in Business. Lesson Learned Three – Develop a Team.

I have been equally privileged over the past decade to contribute to the growth of the faculty and staff of our Department. We have a vibrant,



Dr. Jeff Becker and his students and staff

productive, and collegial group of faculty members working together to teach, carry out significant research, and develop our students. Moreover, our staff is fabulous as demonstrated by their abilities to navigate the administrative nuances of UT and support, with alacrity and pleasant demeanor, our amazingly diverse faculty and students. Lesson Learned Four – Get Lucky and Build a Team (see the thread?).

None of this would have been possible without the many extraordinary mentors I have had over the years: Herman Lichstein (U. Cincinnati),

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Words from the Department Head: Professor Jeffrey Becker

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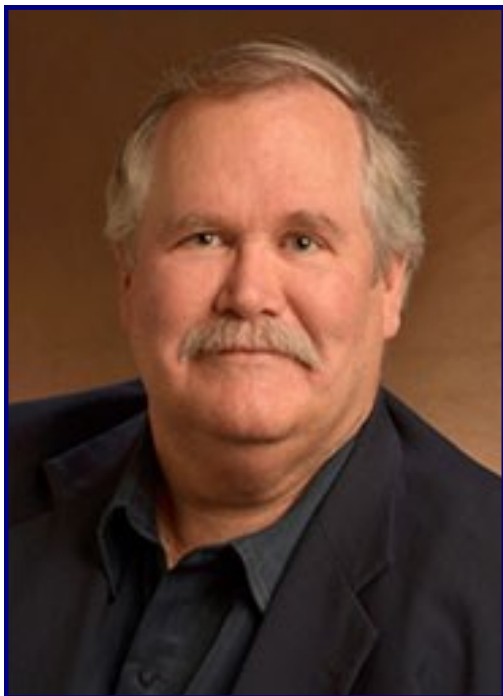
Meir Wilchek (Weizmann Institute), Ephraim Katzir (Weizmann Institute), Arthur Brown (U. Tennessee), Bruce Bursten (U. Tennessee), and Theresa Lee (U. Tennessee), who have mentored my research and administrative efforts over my entire career. [Lesson Learned Five- Find Great Mentors.](#)

I thank Erik Zinser who has taken over the production of this newsletter from Steve Wilhelm and our student intern Victoria Knight for her great work in writing up all of the articles.

I also thank all of you who are reading this *MicroScope* newsletter for your support and wish you continued health and success so that we all may go from strength to strength.

— Jeffrey Becker, Microbiology Department Head and Chancellor's Professor

The man of many research interests: Terry Hazen



Terry Hazen, a member of the original research team on the BP oil spill joined the UT Microbiology Department in 2011. He now manages several large-scale research projects at UT and Oak Ridge National Lab.

Terry Hazen, a joint professor of microbiology, civil and environmental engineering, and earth and planetary sciences is a man of many research interests. Hazen, a [UT -Oak Ridge National Laboratory Governor's Chair](#), relocated to UT in 2011 from Lawrence Berkeley National Laboratory (LBNL), and has ongoing projects there, as well as at ORNL, and at field sites in Puerto Rico, Alaska, Panama, Australia, Mediterranean, Caspian Sea, Angola, and the Gulf of Mexico.

Hazen and his group at LBNL were the original research group who became famous for discovering a hydrocarbon degrading bacteria that was decreasing the amount of oil in the ocean in the wake of the [2010 British Petroleum Deep Water Horizon oil spill](#) in the Gulf of Mexico.

And just a few of the other projects Hazen is currently overseeing are the ORNL Joint Institute for Biological Sciences (JIBS) tropical soil and methane project, ENIGMA, BP Deep Water Sites testing, Norwegian Science Foundation small droplets of oil study, and a fracking and methanotrophs multinational company study.

The ORNL JIBS research project studies tropical soil samples from Panama and observes whether through carbon cycling and decomposition of lignin they may be able to produce methane, and what the future implications of that could be.

ENIGMA or Ecosystems and Networks Integrated with Genes and Molecular Assembly is a project run out of LBNL that has a \$13.5 million a year grant, and focuses on microbial community structure and stress. At Department of Energy (DOE) sites around the country the microbial community structures in different environments are observed to understand ecological networks, gene networks, and the behavior of microbes within a community.

The BP Deep Water project has sites around the world, where Hazen and his research affiliates at MIT analyze the ocean drill sites for the potential of microbial oil biodegradation and possible impacts of an oil spill on the environment. Research sites for this next year include the
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The man of many research interests: Terry Hazen

(Continued from page 2) East Mediterranean off the coast of Egypt, the Great Southern Bite in Australia, the Caspian Sea in Azerbaijan, the Central Mediterranean off of Libya, Angola off of Africa, and the North Sea off of the UK, Brazil, Trinidad/Tobago, and possibly others.

The Norwegian Science Foundation's small oil droplets project observes whether small droplets of oil are able to degrade faster than large droplets of oil based on their surface area ratio. The fracking and methanotrophs project applies the use of the methanotrophs which degrade oil in the Gulf to the process of fracking. Hazen also has a couple of research projects he calls "orphan projects," which he assists with if funding is available. One focuses on the technique of pushing air into the bottom of landfills to significantly degrade the garbage faster, and the other focuses on using clay and chitin to precipitate out algal blooms and observe how microbial communities may change in response.

This might seem like an overwhelming amount of research projects, but Hazen has a dedicated laboratory team to help him. A strong advocate for what he terms, "team science," Hazen requires every member of his 25 person laboratory at UT to meet once a week to discuss their research progress. "We go through a list, and see

who is having problems or issues with something. Then we prioritize it and address it," he explained. "That way I can see everything that goes on in the group, and everyone else knows what's going on too. I've used this for two decades, and it has always been successful. The great thing is that when everybody knows what other people are having trouble with it allows others to step in and help. It brings them together, and helps them to be able to conduct the research whether I'm there or not."

Though the main role of Governor's Chairs is to conduct groundbreaking research and advance the UT Top 25 Initiative, Hazen also thoroughly enjoys teaching. This past fall he co-taught a Micro seminar course with Frank Löffler, Ph.D., and in the spring he also co-taught a graduate class with Larry McKay, Ph.D., on academic careers. Graduate students from all different areas of study took the course which was dedicated to the history of universities and the faculty system, how to obtain academic positions, and the correct way to apply for university positions. Hazen sincerely hopes it helped the students, because that's his whole reason for being a professor: "I really want to help the next-generation of scientists and students. Because that's what really matters."

Highlights from the Microbiology 2014 Research Experience for Undergraduates



The participants of the 2014 Microbiology REU were in Knoxville for 10 weeks, both conducting research within various UT departments, and exploring East Tennessee. The student's projects covered a range of topics, including diversity of algal viruses, microbial peptidase activity, *Lactobacillus* and malaria, growth of archaea, and the Marcellus Shale microbial community.

REU director speaks on the value of the program in its second year

Self-described as the “cruise director” of the [UT Microbiology Research Experience for Undergraduates](#) (REU) program, Dr. Gary LeCleir plays a variety of supporting roles.

“I do everything from keeping the website updated to handling the application and admissions process. I also organize the seminars and workshops, social activities such as the hiking and camping trips, and the housing arrangements.”

The Micro REU, which focuses on microbial community interactions and functions is in its second year at UT. It is a 10-week summer research training opportunity that allows undergraduate students to conduct individual research projects in one of the faculty laboratories of the Microbiology, Ecology & Evolutionary Biology, Earth & Planetary Sciences, Biosystems Engineering & Soil Science or Environmental Engineering Departments. This year the REU hosted 10 students from May 25 to Aug. 1 who hailed from a variety of institutions and backgrounds, including the University of Southern California, University of Massachusetts, Wartburg College and Bard College.

LeCleir cites the research experience as having multiple benefits, both for students and the department. “One benefit is that we get excellent undergraduates coming to UT to conduct research. These students might then apply to graduate school here. It is a great way to expose more students to the wonderful faculty and staff we have in the Micro Department,” LeCleir explained. “For the students it allows them to gain high-quality research experience in



The Microbiology REU 2014 cohort. From left to right: Sprio Papoulis, Djibril Niang, Alden Ho, Tristan Jordan, Eric Gann, Sarah Mullinax, Seth Menzer, Jennifer Gribble, Katherine Mulligan, and Katie Moccia.

one of our laboratories, and also help them solidify their decisions to pursue doctoral, medical or law degrees.”

And LeCleir seems to be correct in these postulations. Last year three students who had previously participated in the REU program applied to the Micro Department for graduate school. Even more are expected to apply this year.

The REU seems to both attract and foster successful students. Jessica Stevens who was a 2013 REU participant recently won a prestigious Goldwater Scholarship and another student Nicole Perry published a book chapter in conjunction with Dr. Steve Ripp of the Micro department. But to LeCleir all of the students are success stories. “They come here and work really hard and learn a lot. We have had two wonderful groups of students and I think they have all walked away with

valuable experience,” he said.

The students are required to make a poster and present it at a poster session at the conclusion of the program. This year the projects ranged from research on soil dynamics in decomposition, to fungal diversity in mice, to even culturing pure archaea.

Though this summer’s program just ended, LeCleir is already looking forward to next year and is grateful for the support from the entire department. “Though the grant is awarded to Dr. Zinser and Dr. Wilhelm, it requires the assistance of many others. If not for the great faculty and graduate students in the department we would not be able to offer these undergraduates such an awesome experience. I am very appreciative of the enthusiasm the faculty and students have brought to the program,” he declared.

Former graduate student begins faculty position at JMU in August



Now an assistant professor at James Madison University, Morgan Steffen poses with her algal samples on a research cruise. She was a graduate student in professor Steve Wilhelm's laboratory.

In her second semester of college Morgan Steffen did a research rotation in a microbiology laboratory and was hooked as soon as she streaked her first agar plate. Now Steffen is about to begin her first faculty position at James Madison University (JMU) as an assistant professor of biology.

"To start, I will be teaching two semesters of micro lab," Steffen said. "After my first year, I am expected to develop a microbial ecology course with a lab and will also continue to teach micro lab and genomics courses. I will begin setting up my research lab this fall and will develop a program based on some discoveries we made during my dissertation work."

Steffen was a doctoral student in Dr. Steve Wilhelm's laboratory whose research focused on understanding how biotic and abiotic factors interacted to make *Microcystis aeruginosa* successful in its environment. *M. aeruginosa* is a toxic freshwater cyanobacterium that forms algal blooms and can grow in various warm bodies of water.

In fact, Steffen's research becomes increasingly relevant in light of the [recent water contamination incident at Lake Erie](#). In the city of Toledo, Ohio, residents were told to not drink the water because the toxin levels from *M. aeruginosa* were unsafe. Because algal blooms like this one have the potential to occur in the summer, this could become a recurring problem. That means it

becomes even more important to understand *M. aeruginosa* and ways that it can be controlled to prevent future public health emergencies.

While she was a graduate student at UT, Steffen taught microbiology lab classes for two semesters. "I found it to be one of the most rewarding experiences of graduate school, and it is what motivated me to apply for the position at JMU," she explained.

But teaching was not the only part of graduate school that Steffen enjoyed. "I really liked the camaraderie of the Micro Department – I think it is something that is unique to UTK, and having that support system really helped during the stressful times," she said. "I also had a lot of fun conducting field work and exploring the sites where we collected our samples. Plus, attending meetings and interacting with other scientists in the field has always been a great experience."

Though she was sad to leave UT, Steffen is excited about starting her new position at JMU in fall 2014.

New faculty member studies interaction between plant hosts and soil microbes

On the first day of her post-doctoral position at the University of North Carolina at Chapel Hill (UNC), Sarah Lebeis wore dress clothes, but by the middle of the afternoon found herself in a field shoveling dirt. "Now I always try to keep a change of clothes with me in lab, just in case," she said.

Finding herself in a dirt field in North Carolina was just the first step in Lebeis' transition into focusing on a different area of microbiology. As a doctoral student in microbiology and molecular genetics at Emory

University, she studied the mammalian immune responses to intestinal pathogens, but she transitioned to plant and soil microbial studies at UNC. "I was always drawn to this idea of a battle back and forth between pathogen and host, but I wanted to move into studying host-microbe relationships in a healthy state," she explained. "I also liked that this was an emerging field with a new set of challenges."

Now as an assistant professor in the Microbiology

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Department, Lebeis' research examines the mechanisms plants use to limit the types of microbes allowed to colonize from their complex microbial environments. This will also help elucidate how hosts interact with and control their microbial environments.

So how exactly do plants prevent certain microbes from passing through their roots? Lebeis explained: "We think there are at least three major factors that contribute to the exclusion of microbes from the roots. The first factors are physical, such as the barriers microbes must pass through and the different nutrient availabilities inside the root. The second factor is how plants directly control microbial growth through the production of antimicrobial compounds and sugars secreted through the roots. The last major factor is how the microbes interact with other microbes – for example, the production of antibiotics by one microbe could affect the growth of other microbes."

The research Lebeis and her laboratory group conducts is important because the environment of Earth is changing, and the fields and mechanisms used to grow our crops are changing along with it. The work they are doing to optimize plant growth could potentially provide alternative methods to improve yield for food and fuels – both of which will be needed if we are to cope with changing conditions in the future.

Lebeis also has a soft-spot for teaching, something which was ignited when she was an undergraduate biology major at Michigan State University. "All of the

classes in my program focused on how science fits into society, and I loved learning about the subject from the professors. It made me realize that I wanted to become a professor and share knowledge like that with students," she said. While in her postdoctoral position at UNC, Lebeis participated in a teaching fellowship program, called Seeding Postdoctoral Innovators in Research and Education (SPIRE). The three-year program trained post-docs in different teaching methods and then required them to teach for two semesters at a minority serving institution.

Recently, Lebeis attended the International Society of Molecular Plant-Microbe Interactions conference on the island of Rhodes in Greece to present her research. There were 1200 participants and researchers from 55 countries who came together to discuss a range of unique topics such as plant immunity, symbiosis, effector biology, epigenetics, recognition of microbes, biotechnology and biocontrol. She also always attends the Joint Genome Institute User's Meeting which convenes annually every March.

In her free time Lebeis likes to alternate weekends in Knoxville with traveling out of town to visit family and friends. When she does happen to spend the weekend in Knoxville, Lebeis and her husband love going to the Market Square



Sarah Lebeis changed research focuses between her doctoral and postdoctoral research and has never looked back. Now at UT she studies the host-microbe relationships in plants.

Farmer's Market or hiking in the Great Smoky Mountains.

Lebeis is looking forward to teaching the immunology course at UT next fall – which brings her back to the shift in her postdoctoral research area – "It was a big leap switching fields between my graduate and postdoctoral research. It was challenging and it was a lot of work, but definitely worth it. And now that I'm about to start teaching immunology, I see that I didn't leave my mammalian immunology training behind, I just added to it in an unusual way."

The best part of being a faculty member in the Micro Department for Lebeis has been the people.

"Everyone has been so supportive and helped me to get set up in my lab, so I can be productive. I love the environment here, and am looking forward to what the future will bring," she said.

Both students and professors enjoy “Build-a-Microbe” competition



The Decepticons team holds up the victorious WWE title belt after winning the “Build-a-Microbe” competition. .

Associate professor Erik Zinser and assistant professor Elizabeth Fozo presented the 12 students in their MICRO 650 spring 2014 course with an open-ended challenge – team up and build microbes from scratch; these microbes would then be competed against one another in a series of environments, ending up in the GI tract of a human host.

The students were split into four super-villain teams of three: the Decepticons, the NY Yankees, the Cobra Kai and the House of Lannister. For Casey Martin, a member of the Decepticons and the only undergraduate student in the course, he described it as the first group project he’s ever enjoyed working on.

“This group project was different from others because everyone in the groups was actually in it to win it,” Martin said. “In other words, we all wanted to read the papers and

conduct the research to figure out what our microbe needed and what would be feasible for us to add on to our microbe. And then of course, it also helped that we were competing against each other and wanting to take the other teams’ microbes down. It was great because we all learned a lot, but it also allowed us to be creative and have fun at the same time.”

After a full semester of working on the microbes in their teams, it was time for what the professors termed the “Build-a-Microbe” competition. Held at Barley’s Taproom and Pizzeria in downtown Knoxville, the competition was divided into a semifinal and finals, with the student’s microbes facing each other in a battle to survive. Students were given ten minutes to describe their microbe in front of everyone else, and then five minutes to describe why it would defeat the opposing microbe. The other team was then

given the same opportunity. A rebuttal period was allowed for each team, and then it was up to the judges to decide.

For Fozo and Zinser, the enjoyment was in sitting back and having other faculty, Drs. Becker, Buchan, and Reynolds, judge the microbes. Each team’s microbe was judged on three different criteria: whether the organism could kill the other, if the organism could outgrow the other, and if it could survive outside of a host.

Quite fittingly, the winning team was rewarded with a WWE belt, but it was not theirs to permanently keep. “We are going to get the team’s name and individual’s names engraved onto the title belt, but we’re going to display it in the Microbiology Department office,” Zinser said. “And then the next year for the competition whoever wins will also get their name engraved on it. We almost want to create a sort of mentorship and dynasty for future students. The same team names will be used each year and we’re thinking about letting older students come in and mentor the students, and help them defend their team’s legacy.”

Martin’s group, the Decepticons, with two deadly endogenous viruses, a bacteriophage and norovirus embedded into its genome, ended up beating out the other microbes and winning the competition. With a multi-faceted life cycle, the bacteriophage would cause cells to erupt and the norovirus would infect the target organisms. Other characteristics included phenotypic plasticity, lipid vesicles that would

(Continued on page 8)

(Continued from page 7) bud off to target competing microbes, and an intracellular invasion strategy.

Some of the other team's microbes included unique features such as an archaeal membrane, an HIV rotavirus, and the capability to cause an infected individual to lose over 40 gallons of fluids a day.

"Nobody made a perfect organism," Zinser said. "All of them had some kind of flaw, because students are bound to miss something. It's hard to make a microbe as well as nature does – but they did their best and came up with some really creative stuff. Overall I think it was a great way to expose young graduate students and high achieving undergraduates to ecology and pathogenesis,

and along the way, make them take some ownership of their learning."

Fozo and Zinser plan to continue teaching the class, though it will likely only be held every other year.

Fozo reflected that the competition aspect of the class seemed to be what made it so successful. "Students had to critically analyze their competitor's microbes to identify potential flaws," she explained. "And when studying the competitor's microbe, students would then recognize the flaws in their own design and have to strategize how to handle potential criticism from the competition. Plus it was all good natured fun, and in the end, who wouldn't want to win the title belt?"

UTK Microbiology — In the News



As a part of the [NIMBioS Working Group for Viral Dynamics](#), professor Steven Wilhelm and several other UT scientists had their research recently published in the journal *Nature Reviews Microbiology*. Their research used a biophysical scaling model to understand the connection between marine viruses and the marine biogeochemical cycles. The research findings suggested that virus particles seem to be rich in phosphorous, which could increase the phosphorous levels and affect the cycling of carbon, nitrogen, and phosphorous within the ocean. The biophysical scaling model will be used to further explore the research and understand the effect of phosphorous in marine viruses within the whole ocean ecosystem. Read more [here](#).

Graduate student receives honor of attending 2014 Lindau Nobel Laureate Meeting

Only 600 young researchers are invited to each of the [Lindau Nobel Laureates Annual Meetings](#) that occur at the small and picturesque island of Lindau in Germany. Sarah Davis, a microbiology doctoral student in associate professor Todd Reynolds' laboratory, was one of the lucky few who received this prestigious honor. Sponsored by the Alcoa Foundation, she [attended the 2014 meeting in physiology or medicine](#) June 24 –July 4.

The young researchers who receive this invitation must make it through a preliminary evaluation and a review panel of the Lindau Nobel Laureate Meeting. For those who attend, they are given the opportunity to listen to lectures by the Nobel Laureates and participate in roundtable scientific discussions. According to the Nobel Laureates Meeting website, "the entire

conference concept is designed to allow such encounters between the scientific elite of today and those of tomorrow, as well as to positively encourage and inspire them for the benefit of their own future research."

Davis especially enjoyed attending panels where Laureates would talk about current issues that impact science, including the future of medicine, the importance of "big data," and ethics. At the evening dinners, there was a chance to mingle with the Laureates and Davis was able to talk to [Oliver Smithies](#), who developed a method to knockout genes in mice using transgenic DNA as well as starch gel electrophoresis for protein separation, and [Walter Gilbert](#) who helped to determine the base sequences in nucleic acids. (Continued on page 9)



Sarah Davis and Nobel Laureate Walter Gilbert, who shares the Nobel Prize in Chemistry for 1980 alongside Frederick Sanger and Paul Berg.

(Continued from page 8) The Nobel Laureate meetings in chemistry, physiology or medicine and physics has existed since 1951. The mission of the meetings is “to provide a globally recognized forum for the transfer of knowledge between generations of scientists.”

Davis was also honored last year to receive an NIH fellowship that provides two years of funding for her graduate stipend and research. “The fellowship has two aims,” she explained. “The first explores the hypothesis that the phospholipids phosphatidylethanolamine (PE) and phosphatidylserine (PS) affect virulence by affecting cell signaling

that regulate key virulence factors. The second aim is to determine the roles of PS and PE in evading the host innate immune system.”

The overall goal of Davis’ research is to understand how the changes in phospholipid composition of the fungi *Candida albicans* can result in the loss of virulence factors, and how this may mediate the host immune response.

“*C. albicans* is important to study because it is one of the most significant fungal pathogens of humans,” said Davis. “*C. albicans* is the fourth most common cause of deadly systemic infections, with a

~30% mortality rate in intensive care units. Because phospholipid synthesis in fungi is so different from synthesis in humans, creating drugs that target phospholipid synthesis genes could be very successful. My research will give insight into how we could target these genes for drugs and how phospholipid synthesis may mediate disease.”

Davis has also spent time as a teaching assistant for MICRO 319: Introduction to Microbiology. She really enjoyed teaching the class because of its introductory nature and the wide variety of students who take it: “Often times this is the first time a student has used a microscope or really thought about the importance of microbiology. There was also a great mix of students that take the course – they may want to go into biological research, medical school, nursing or veterinary. And all of them learn that microbiology is important in each of these fields.”

“But my favorite part of being a graduate student is conducting successful experiments and working with my fellow lab-mates,” she said.

Upon completion of her doctoral degree, Davis hopes to find a postdoctoral research position in microbial pathogenesis and host response.

UTK Microbiology — In the News

Karen Lloyd, an assistant professor of microbiology and her husband Andrew Steen, an assistant professor of earth and planetary sciences, were featured in *Tennessee Today* in June 2014. Both professors have spent their last two summers conducting a summer research program for high school students at Malcolm X Shabazz High School in Newark, New Jersey. The students were able to participate in a hands-on research experience in the area of aquatic biogeochemistry. Read the article [here](#).

(Photo courtesy of TN Today) Malcolm X Shabazz High School students working on the aquatic biogeochemistry project in New Jersey.



Microbiology Undergraduate Club Updates

The [UT Microbiology Undergraduate Club](#) (MUC), a student-run and faculty advised organization had an array of diverse speakers, programs, and activities for the 2013-2014 school year. A sampling of them included:

- “Composing Resumes and CV’s: What’s the difference?” — Justin Rice, STEM coordinator for Career Services and Erik Zinser, associate professor of microbiology
- “Getting personal about Personal Statements!” — Todd Reynolds, associate professor and chair of graduate admissions for microbiology
- “Human Health/Animal Health: Emerging Infectious Disease and Life-Changing Service” — Tamara Chavez-Lindell, Epidemiologist, TN Department of Health
- The Centers for Disease Control and Prevention, (CDC) trip, where several MUC members visited the CDC museum and met with Vincent Hill, the team lead for the water, sanitation and hygiene laboratory team.
- Slime a Microbiologist Day, where for \$3 students could slime Drs. Reynolds, Sparer, Ganusov or Fozo. All \$384 raised went to the MUC Relay for Life team to support the American Cancer Society.

Events for the Upcoming Fall 2014 semester include: “Securing POSITIVE Recommendation Letters,,” “Research Lab Experience: Why should I do it AND how do I get involved?,” and “Clinical Laboratory Sciences: What is this program and what is life like for a clinical lab scientist?”.



Microbiology professors, (from left to right), Reynolds, Sparer, Ganusov and Fozo after being slimed, and MUC President, Micaha Hanson (Photos courtesy of MUC).

Promotions, Awards, Honors and Accolades

Recent hires and promotions of alumni of the Microbiology Department graduate program:

- **Mark Lubowitz**, who graduated with his doctoral degree from Becker’s laboratory, was promoted to professor at St. Michael’s College, Vermont.
- **Seraj Uddin**, who graduated with his doctoral degree from Becker’s laboratory, was appointed as an assistant professor at Chittagong U., Bangladesh.
- **Jeff Morris**, who graduated with his doctoral degree from Zinser’s laboratory, was appointed as an assistant professor at University of Alabama at Birmingham.
- **Morgan Steffen**, who graduated with her doctoral degree from Wilhelm’s laboratory, was appointed as an assistant professor at James Madison University.
- **Nathan Cude** who graduated with his doctoral degree from Buchan’s laboratory, was appointed a research scientist position in the BioAg division of Novozymes, Research Triangle, North Carolina.

Promotions, Awards, Honors and Accolades

Participation in competitive international courses and events:

- **Sarah Davis**, a doctoral student in Reynold's laboratory, attended the 2014 Lindau Nobel Laureate Meeting in Lindau, Germany.
- **Nana Ankrah**, a doctoral student in Buchan's laboratory, participated in MicroTrop, an advanced training program in tropical microbiology for early career scientists in Dakar, Senegal.
- **Andrea Rocha**, a postdoc in Hazen's laboratory, participated in a course, "Microbially-driven facilitation systems in environmental biotechnology" at the Facilis 2014 conference in Milan, Italy.
- **Mohammad Moniruzzaman**, a doctoral student in Wilhelm's laboratory attended the Marine Biological Laboratory Workshop on Molecular Evolution in Woods Hole, Massachusetts.

External Awards and Accolades:

- American Association for the Advancement of Science, 2013 Class of Fellows — **Terry Hazen**, professor
- Edith (Jackie) Ronne award from the Society of Women Geographers— **Jill Mikucki**, assistant professor
- American Cancer Society Research Scholar Award— **Nathan Schmidt**, assistant professor
- UT Office of Alumni Affairs "Impact Big Ideas" award — **Alicia Purcell**, master's student in Mikucki's laboratory
- Great Lakes National Scholarship Award — **Lauren Krausfeldt**, doctoral student in Wilhelm's laboratory
- Ruth L. Kirschstein National Research Service Award (NIH) and Graduate Student Biology Award — **Sarah Davis**, doctoral student in Reynolds' laboratory
- Science Alliance Award— **Morgan Steffen**, doctoral student in Wilhelm's laboratory
- American Society for Microbiology Student Travel Award — **Abby Smartt**, doctoral student in Sayler's laboratory
- UTK Exhibition of Undergraduate Research and Creative Achievement (EURECA), Best Poster in College of Arts and Sciences and Bronze Award for Best Natural Sciences Poster— **Kaela O'Dell**, undergraduate in Hazen's laboratory
- UTK Exhibition of Undergraduate Research and Creative Achievement (EURECA), Divisional Award in Natural Sciences from College of Arts and Sciences— **Elisabeth Pitt**, undergraduate in Sparer's laboratory
- Ed Hawkins Memorial Scholarship— **Savannah Sadler** and **Katielynn Parrot**, undergraduate microbiology students

Departmental Awards:

- Undergraduate Faculty Teaching Award— **Erik Zinser**, associate professor
- Excellence in Graduate Research— **Morgan Steffen**, doctoral student in Wilhelm's laboratory
- Graduate Teaching Award— **Jeremy Chandler** and **Caroline Grunenwald**, doctoral students in Zinser and Su's laboratories
- David C. White Graduate Travel Awards— **Chelsi Cassilly** (Reynolds), **Sarah Davis** (Reynolds), **Pranay Dogra** (Sparer), **Ashley Frank** (Buchan), **Virginia Hargest** (Sparer), **Elizabeth Johnson** (Ganusov), **Jiang Liu** (Hazen), **Jenny Onley** (Loeffler), **Elisabeth Pitt** (Sparer), **Keats Shwab** (Su), **Megan Silbaugh** (Zinser), **Sarah Sloan** (Schmidt), **Abby Smartt** (Sayler), **Morgan Steffen** (Wilhelm), **Marty Szul** (Zinser), **Jia Wen** (Fozo)
- D. Frank Holtman Microbiology Undergraduate Academic Achievement — **Amy Metcalfe**, undergraduate
- Lisa Kahn Undergraduate Research Award — **Brandon Merial**, undergraduate in Becker's laboratory
- Outstanding Staff Award— **Sarah Kim**, administrative assistant

Contributors to the Microbiology Department in Fiscal Year 2014

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