



# Microscoop

SPRING



## DEPARTMENT OF MICROBIOLOGY & IMMUNOLOGY

### WHY CAN'T IT BE YOU?

by Teri Robinson & Jonathan Levine

"Why can't it be you" is the question that was originated from the Microbiology & Immunology department competition created in January. The M&I Cup competition is a semi annual —semester based contest open to all labs that collaborate with the Microbiology & Immunology department. It was designed to improve the camaraderie between faculty members, lab employees and grad students across the UMB campus. The object of the competition is to be the lab that earns the most "Marti Points" by attending the journal clubs, seminars, student events and/or displaying the most research posters.

Within less than a year, the M&I cup competition increased the social interactions and collaborations between the M&I department, Dental School, CVID, IGS and the department of Surgery to name a few. During these collaborations, department members have the opportunity to discuss new and existing scientific research and brainstorm about future School of Medicine ventures. At the end of each semester, a winner is announced and awarded the Kaper Scope Trophy (see Figure 1) until the next semester winner is determined. Additionally, each winning lab earns bragging rights and has their name engraved on a custom made plaque designed just for the competition.

With over 15 labs currently in participation, the M&I Cup has been a great success, according to the chair of the department Dr. James B. Kaper. Increasing the moral and energy level of the department members, there is hope that the M&I Cup competition will become a beloved department tradition that will someday gain the interest of other departments.

The M&I Cup committee was proud to announce our first M&I Cup winner for the **Spring 2011** semester is the **Flainik Lab**. If your lab has not registered, please do as soon as possible in the Administrative office because it too can be you.



Fig 1: Microbiology & Immunology Kaper Scope Trophy

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## Baltimore Marathon Relay

Need a little exercise? Feeling competitive?  
Join the Baltimore Marathon Relay - teams of 4  
people each run 5-7 miles.

For details, watch for an email or contact Carly  
Page at [cpage001@umaryland.edu](mailto:cpage001@umaryland.edu).

**October 15, 2011**



## Scientific Meetings

### **American Society of Microbiology 2011 (ASM)**

The ASM 2011 meeting took place this year from May 20-24<sup>th</sup> in New Orleans, Louisiana. The conference offered an array of career development workshops, panel discussions, invited lectureships, and poster/ oral presentations. ASM 2011 focused on accumulating additional data on the role of microbes in health and disease and addressed significant advances in microbial pathogenesis, environmental microbiology, and applied microbiology. Some of the workshop topics covered this year were Emerging Food Safety Problems with non-O157 EHEC, Clinical Impact of Newer *B-lactamases*, The Complexity of Chronic Infection in Cystic Fibrosis, and The History, Microbiology of Anthrax, and Bacterial Sensing Mechanisms. One interesting featured workshop examined the Epidemiology of *C. difficile*, a pathogen that is commonly seen in individuals who are patients in a hospital environment for an extended period of time. David Weber from UNC Chapel Hill discussed new disinfection practices that could possibly reduce risk of infection to patients.



### **98<sup>th</sup> Annual Meeting of the American Association of Immunologists (AAI)**



The AAI held its 98<sup>th</sup> meeting in San Francisco, California May 13-17<sup>th</sup> of this year. The AAI is the official publisher of the *Journal of Immunology*. The AAI Lifetime Achievement Award was presented to James P. Allison, Ph.D., HHMI of the Memorial Sloan-Kettering Cancer Center. Some of the most popular career development workshops included a session on how to convert a CV into a resume (followed by one-on-one counseling) and a session on career transitions between academia, NIH, and Industry. Several faculty member and students gave research presentations or participated in panel discussions at the meeting. Some of the topics touched on include: Vaccine Development, Immune Regulation in Chronic Infection, Leukocyte Migration in Cancer, and The Role of Dendritic Cells in Sensing Self and Non-Self. The Annual Meeting also included a gala in celebration of immunology at the San Francisco Museum of Modern Art.

### **2011 American Academy of Allergy, Asthma, and Immunology Annual Meeting (AAAI)**

The AAAI Annual Meeting took place in San Francisco, California March 18-22<sup>nd</sup>. Many workshops were focused on the management of human allergy and asthma using new therapeutics, such as: The use of Inflammatory Biomarkers to Diagnose and Treat Asthma, Mouse Models of Asthma: What Have We Learned that Translates to Human Disease?, and Discussions on Recent Advances in Epigenetic Regulation and Prenatal Intervention Strategies. Furthermore, the role of genetics and gene-environment interactions in the pathogenesis of asthma was covered, along with presentations on the role of epithelial cell-derived cytokines in airway inflammation and Siglecs/ other Inhibitory Receptors in Allergic Inflammation and Mucosal Immunity. Several unique clinical cases of persistent asthma or severe allergic reactions and exacerbations were presented by clinicians.



## Graduating Students



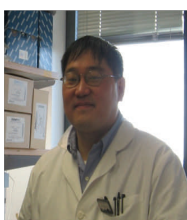
**Victor Ayala**, who got his PhD from Dr. Nicholas Carbonetti's lab, defended his thesis last month. During

his time in the Carbonetti lab, Victor worked on *Bordetella pertussis*- the causative agent of whooping cough, and the immune response to this pathogen. Victor's defense began with a warm and heartfelt introduction by his mentor who commended his keen interest and constant flow of innovative ideas. He said he was proud of an enthusiastic and dedicated student like Victor and that he would most certainly make an excellent investigator.

Victor acquired a Bachelor's degree in Puerto Rico and then got a Master's from Johns Hopkins. He joined UMB for a PhD in Molecular Microbiology and Immunology in 2005. His thesis research focused on how *B. pertussis* infection exacerbates subsequent influenza infection. His journey through graduate school is marked by many publications, presentations and conferences. He was awarded the ASM Travel Grant in 2009 and a Training Grant from the National Institutes of Allergy and Infectious Disease. He also won the L. Kirschstein National Research Service Award in 2008.

Victor is now a post-doctoral fellow in the AIDS and Cancer Virus Program at the National Cancer Institute at Frederick. Besides being a student with deep-rooted interest, he is also a favorite in the community. Victor never hesitated in interacting with the people around him, seeking a helping hand when necessary and lending one when need be. There is hardly anyone in the department that has not befriended Victor in their time here.

**Mark Lafferty**, who recently graduated from Dr. Alfredo Garzino-Demo's lab, has always been known for his keen acumen for research and immunology in particular. Mark's thesis work involved studying HIV infection in lieu of the immune response at the Institute of Human Virology where the Garzino-Demo lab is located. His research focuses on CD4+CCR6+ T cells in the gut-associated lymphoid tissue. His thesis research culminated in the discovery of a unique CCR6-dependent, post-entry mechanism for HIV inhibition through the host restriction factor APO-BEC3G. This work enabled the completion of a proposed model for HIV inhibition- consisting of two pathways. One of these is the inactivation of virions, while the other is post-entry inhibition mediated by CCR6. This major contribution to the current understanding of pathways that underlie intrinsic immunity to HIV -1 may ultimately guide the development of effective therapeutics to selectively target and protect CCR6+ cells. This spectacular achievement led to an opportunity to stay in Dr. Garzino-Demo's lab as a post-doctoral researcher and continue his research in this field.



Mark has not only shone as an outstanding investigator in terms of HIV research, but has also been an asset for his peers and juniors at UMB. He was the chairperson of the Graduate Student Presentations committee in 2010 and has always helped newer student, particularly in their preparation for the qualifying exams- a milestone that he was easily able to surmount.



**Brian Peters**, a stellar student who was in the last issue of the *Microscope* for winning the prestigious

Otani Award has now graduated. Throughout graduate school, Brian has published numerous papers in esteemed journals. His thesis work comprised of studies on *C. Albicans* and *S. aureus* dual-species biofilms. His research was conducted in Dr. Mark Shirliff's lab which studies various bacterial infections in the context of biofilm formation. This is of particular significance because bacteria growing in biofilms are extraordinarily resistant to antibiotic therapy and pose a particularly large risk for hundreds of patients undergoing implants every day. Such implanted devices foster the formation of biofilms and provide the perfect haven for such biofilm-forming bacteria. Brian's work was a particularly interesting facet of this issue since it involved dual-species biofilms- an area into which few researchers have yet ventured.

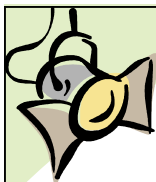
Brian has always proved to be an outstanding achiever in terms of research goals, publications, grants, participating in national and international conferences such as the ASM, etc. His entire journey from the beginning of graduate school to his thesis defense in 2010 is every graduate student's dream. A smooth road marked only by achievements, awards and honors has now become Brian's hallmark. Besides being an outstanding researcher, Brian was also busy contributing to the student community here at UMB. He was on the organization committee for the 2010 Graduate Student Presentations. Considering his well rounded personality, along with his profound research achievements, it is not surprising that Brian easily bagged a position at the Louisiana State University as a post-doctoral researcher.

**Susan Steyert** entered the University of Maryland Baltimore in 2005 and joined the Kaper lab in the department of Microbiology and Immunology. Her thesis was completed under the guidance of Dr. James Kaper and is entitled 'The role of urease in the pathogenicity of Shiga toxin-producing *Escherichia coli*'. Her research focuses on shiga-toxin producing *E. coli* (STEC). This pathogen is of particular relevance due to its dangerously low infectious dose. It causes severe symptoms like hemorrhagic colitis and hemolytic uremic syndrome. Susan was able to show that the pathogenicity of STEC is supplemented by the ammonia released as the bacterium uses urease to break down urea. This ammonia buffers the pathogen during stomach transit and also acts as a nitrogen source in the colon circumventing the need for STEC to compete with other microbes for nitrogen. After graduation, Susan plans to join Dr. David Rasko's lab in the IGS as a post-doctoral researcher.



Besides having completed an impressive thesis, Susan has always been an active student. She helped organize the graduate student symposium and single-handedly scheduled and coordinated reviewers for all the participants. Being an outstanding student, she received the training grant for Infection and Immunity from the NIH and has always been an active member and presenter in the American Society for Microbiology. Her strong previous educational background sports a PhD in physical chemistry from the University of California, Berkeley!





# Faculty Spotlight

by Justin Taylor



Dr. Julie Hotopp Dunning



## What is your education/research background?

### Education

- 1997 B.S. Microbiology and Immunology, *magna cum laude*, distinction in research, University of Rochester, Rochester, NY.  
Mentor: Dr. Robert E. Marquis
- 2002 Ph.D. Microbiology and Molecular Genetics, Michigan State University, Lansing, MI, Thesis: "Characterization of the Substrate Specificity of 2,4-Dichlorophenoxyacetic Acid/a-Ketoglutarate-dependent Dioxygenase,"  
Mentor: Dr. Robert P. Hausinger.

### Post Graduate Education and Training

- 2002-2005 Postdoctoral Fellow, The Institute for Genomic Research, Rockville, MD, Focus: microbial genomics  
Mentor: Dr. Hervé Tettelin.



## What are your research interests at University of Maryland Baltimore?

My most significant scientific contribution relates to our ground breaking work documenting extensive lateral gene transfer between symbionts and invertebrates. This paradigm-shifting discovery was highlighted in numerous news articles for both the science community and the general public. This includes a 73rd place ranking by *Discover Magazine* in its listing of the top 100 discoveries of 2007. Currently, we are examining such mutations that have the potential to impact human health, either by impacting parasites or by impacting somatic cells in the human genome. In addition, I still work on numerous eukaryote and prokaryote sequencing projects including sequencing and analysis of 160+ *Neisseria meningitidis* strains. I also hope to start working on the genomics of the brown marmorated stink bug this summer.

## Where did you grow up?

Franklinville, NY, which is a small town an hour south of Buffalo near Holiday Valley ski resort.

## What do you do for fun?

I like to play video games, particularly cooperative Xbox360 games with my husband. My favorite game is *Borderlands*; right now I am also playing *Fable 3*. I always play a male brute character when given a choice; this compliments my husband's choice of a slight female magician. Since I've done a lot of work with insects, my avatar on Xbox Live is "SupremeQueenB" if anyone wants to friend me.



## Where is your favorite place to grab lunch on or around campus?

I am sad that Donna's is gone, but happy to have a Potbelly and Jimmy Johns nearby. A trip on the Charm City Circulator might easily deliver me to James Joyce – but the trip back is always an adventure.

## M&I Softball Team

Interested in taking a break from lab? Come play or cheer for the departmental Softball team! Games will be held every Wednesday **June 8, 2011 – July 13, 2011 at 6pm and 7:15pm** conveniently located just 15 minutes south of campus, at Unger's Field, Northeast Highland Park.



Requirements for playing are shoes, a glove, and a water bottle.  
Only 5 roster spots remaining so hurry and sign up!

Contact Brian Astry at [bastr001@umaryland.edu](mailto:bastr001@umaryland.edu) for more details.



## Annual MMI Picnic



In August come join the fun at the MMI annual picnic. Mingle with classmates, meet faculty and enjoy lots of food, games, & excitement!

August 12th at Fort Smallwood Park

Look for more info from **June Green– GPILS Coordinator**

### STUDENT RECRUITMENT RECAP



The fall semester always brings a sense of excitement for the year to come, hopeful students must have also been excited at the prospect of joining our department, because applications started quickly rolling in for the 2011 academic year and created our largest pool of applicants to date. Over the winter more than 170 applications were reviewed by the admissions committee and 34 applicants were invited to come interview. The many prospective students visited our campus in three rounds during which they were interviewed by multiple faculty, while also being introduced to GPILS, life in Baltimore and most importantly the ongoing research in our department. Mother nature was a bit more cooperative this year, without any large snowstorms and with help from many current students, faculty, and especially June Green, these days were a great success! As a result nine new students will be joining us this summer. For the first time all of the accepted students have opted to take the summer bridge course as a warm up for the fall semester. The summer bridge is a great time to get to know new classmates, become familiar with campus, and complete a first rotation before they have to immerse themselves in the CORE course. Among these new first years, Yu-Chen Chen, LaTey Jones, Sabina Kaczanowska, Justin Mancini, Rebecca Pelc, Alexandria Reinhart, Talie Shimanovich, Jeticia Sistrunk, Lalena Wallace, we have an international student and an MD/PhD, which means our department now has 44 (awesome) graduate students. Look for these new students to be profiled in the fall addition of the Microscoop, and until then if you see a new face around the halls make sure to say hello!



### ***"Nature Medicine" article featuring Dr. Mark Shirtliff***

by Teri Robinson

Dr. Mark Shirtliff, Associate Professor with the School of Dentistry Microbial Pathogenesis department has an article featured in the June 2011 edition of *Nature Medicine* called "Caught on Film."

The article reports on new vaccines that aim to prevent microbes from building biofilms. As a Vaccinologist, Mark Shirtliff thought it would be best to create a vaccine to stop the formation of biofilms and for the last decade, "he has narrowed in on which biofilm proteins to immunize against and has developed an experimental vaccine that has shown some early signs of success in animal trials," says Michelle Pflumm, author of the article.

Shirtliff and his team has been searching for key biofilm antigens, growing them in flow reactors in their lab and then performing a transcriptomic, proteomic, and animal model studies to determine the cell surface proteins that are important for the formation of biofilms. They are targeting proteins that are produced by microbes and in their vaccination approach. Dr. Shirtliff says, "The best way to cure a persistent biofilm infection is to prevent it from occurring in the first place!"



**Seeing it through:** Dr. Mark Shirtliff observing bacteria being flushed through to create biofilms on tubing.

To see the article in full text visit [www.nature.com/nm/journal/v17/n6/full/nm0611-650.html](http://www.nature.com/nm/journal/v17/n6/full/nm0611-650.html).

## UMB– UMCP Symposium & June Presentations



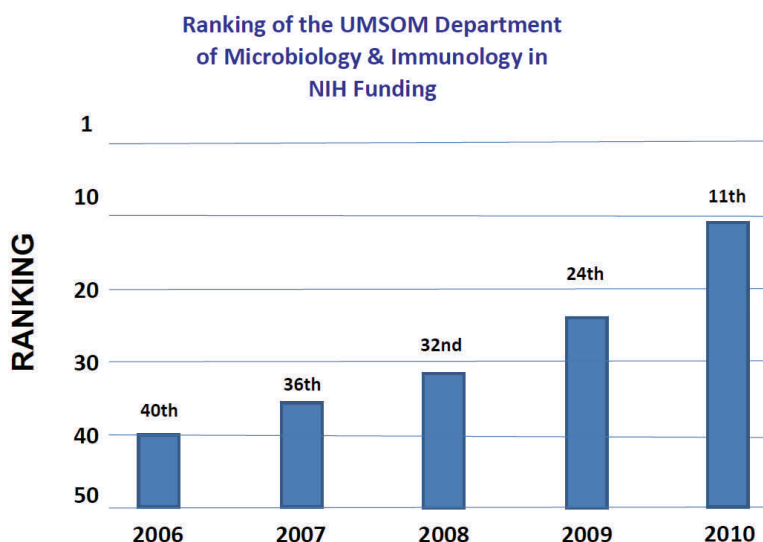
The first two weeks of June were a busy time for the Microbiology and Immunology Department. On June 3<sup>rd</sup>, the 2<sup>nd</sup> Annual UMB-UMCP Research Symposium was organized by the Department of Microbiology and Immunology and the Department of Microbial Pathogenesis. *Crosstalk* is a collaborative effort between the University of Maryland Baltimore and the University of Maryland College Park and aims at fostering cooperative efforts between the two campuses. This year's *Crosstalk* was held here at the BioPark and students like Caitlin Doremus, Nicholas Dorsey, Teresa Hsi and Carly Page, along with others from UMCP gave talks on their research. The event also featured a wide array of posters presented by students from both campuses. The symposium had over 100 attendees and was highlighted by a keynote talk entitled, "Mycobacteria, Dimorphic Yeasts and Salmonella: An Unholy Alliance", by Dr. Steven Holland, Chief of the Laboratory of Clinical Infectious Disease and Chief of the Immunopathogenesis Section of NIAID. The symposium was followed by an Orioles game, which was a great time even though the Orioles fell 4-8 to the Toronto Blue Jays.

Less than a week after the UMB-UMCP Research Symposium, the students in the Molecular Microbiology and Immunology Graduate Program participated in the annual Graduate Student Presentations. This event showcased more than 30 presenters working in a gamut of areas in microbiology and immunology. The event was organized at the Southern Management Corporation Student Center by a student-run organization committee. The presentations ran flawlessly due to the hard work of Priyanka Balasubrahmanyam, Preeta Dasgupta, Melissa Hayes, and Kristen Shatynski, who were assisted by the faculty advisor, Bob Ernst, Ph.D. and the program liaison, June Green.

## Department of Microbiology & Immunology rises in NIH rankings

The Department of Microbiology & Immunology has made impressive increases in NIH funding in recent years and is now ranked 11<sup>th</sup> out of 99 microbiology/immunology/virology departments in the U.S. Each year, the Blue Ridge Institute for Medical Research (<http://www.brimr.org/>) analyzes the publically available NIH data base of grant funding and ranks individual departments and medical schools according to the amount of NIH funding received in the previous fiscal year. Not all microbiology & immunology departments are named Department of Microbiology and Immunology and so for the purpose of reporting grant funding, NIH groups any department with "microbiology", "immunology", or "virology" (or any recognizable variant thereof) into a general microbiology/immunology/virology classification. In fiscal year 2010, the Department of Microbiology & Immunology in the UM School of Medicine was credited with \$13.7 million in total NIH research funding, which includes funding for any principal investigator with a primary academic appointment in the Department (even if they are physically located in the Institute for Genome Sciences, IHV, CVID, etc.). This total amount of funding ranks the Department as 11<sup>th</sup> among micro/immuno/virology departments in all public and private U.S. medical schools and 7<sup>th</sup> among all public medical schools. This ranking is up from 40<sup>th</sup> in fiscal year 2006 (see accompanying figure).

Congratulations to everyone whose grants have contributed to this impressive achievement!!



\*Data from Blue Ridge Institute of 99  
Department of Microbiology ranked according to total NIH Funding  
(excluding R+D contracts and ARRA Funding)

## GRANTS/ AWARDS/ HONORS

**Paul Antony, Ph.D.** received a \$562,000 Department Of Defense Cancer Idea Award titled: 'Mechanisms of Relapsing Cancer and the Origin of Melanoma-Specific Regulatory T Cells' (2011-2014).

**Nate Archer** (Shirliff Lab) has been selected as a trainee for the T32 Training Program in Oral and Craniofacial Biology (May 1, 2011-April 30, 2012).

Professors **Abdu Azad, Ph.D.** and **Stefanie Vogel, Ph.D.** were made American Association for the Advancement of Science Fellows. Election as a Fellow of AAAS is an honor bestowed upon members by their peers. Fellows are recognized for meritorious efforts to advance science or its applications.

**Joana Carneiro da Silva, Ph.D.**, Assistant Professor, Department of Microbiology & Immunology and Institute for Genome Sciences, received a five-year \$1,640,357 grant entitled, "Dimensions: Collaborative: Uncovering the novel diversity of the copepod microbiome and its effect on habitat invasions by the copepod host," from the National Science Foundation.

**Preeta Dasgupta** (Keegan Lab)-Received a \$1000 research grant from the Graduate Student Association, UMB (March 2011) and also won a travel award from BioLegend for the American Association of Immunologists 2011 meeting (February 2011).

**Nicolas Dorsey** (Keegan Lab) was awarded a 2011 UNCF/Merck Graduate Science Research Dissertation Fellowship (Sept 1, 2011-Jan 1, 2013).

**Kristen E. Shatynski** (Williams Lab) won a 2011 AAI Abstract Trainee Award for the 98<sup>th</sup> American Association of Immunologists Annual Meeting in San Francisco, CA.


**Yuko Ota, Ph.D.** received a "2011 AAI Junior Faculty Travel Grant" for the 98th American Association of Immunologists Annual Meeting (May 13-17).


**Hervé Tettelin, Ph.D.**, Associate Professor, Department of Microbiology & Immunology and Institute for Genome Sciences is the PI on a 1.5 year \$418,920 project entitled "Phylogenomics of *Yersinia pestis* – Plague spread, zoonotic disease, and forensics." This is a subproject to the IGS contract "Genome Sequencing Centers for Infectious Diseases," Claire Fraser-Liggett PI – NIAID HHSN272200900009C.

**Hervé Tettelin, Ph.D.**, Associate Professor, Department of Microbiology & Immunology and Institute for Genome Sciences is the PI on a one year \$357,993 project entitled "Comparative genomics of clinical isolates of *Mycobacterium abscessus*." This is a subproject to the IGS contract "Genome Sequencing Centers for Infectious Diseases," Claire Fraser-Liggett PI – NIAID HHSN272200900009C.



## NEWS & ANNOUNCEMENTS

 **Patrik Bavoil** began serving his second term as President of the Chlamydia Basic Research Society in March.

**Caitlin Doremus** is sporting new jewelry;  she and her fiancé Quincy were engaged in March.

On December 29, **Daniel Powell** and his wife Becky welcomed a baby boy, Aaron Patrick Powell  to their family.

**Kristen Shatinsky** has started **SUPER**, a science policy organization here at UMB. Students United for Policy, Education, and Research (SUPER) is an organization that focuses on involving professional students in health science policy. Science policy is an area of public policy concerned with issues that affect the conduct of the science and research enterprise. The goal of science policy is to consider how science can best serve the public. Science policy serves as a bridge between our research here in the lab at UMB and the practical application of our research. SUPER is an official student chapter of Academy Health the professional home for health services researchers, policy analysts, and practitioners, and a leading, non-partisan resource for the best in health research and policy. Regardless of what you decide to do after graduation, whether it be a job in academia or not, it's helpful to be up to speed on current affairs when networking and making connections with future employers. SUPER invites UMB students from all disciplines to participate in discussing issues in the field of science and medicine that are beyond the bench.





## PUBLICATIONS

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