The Lipman Log

April, 2011

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News from the Chair

News from the Chair, Max Häggblom

Spring Greetings from Lipman Hall! As always, we have much to report. We are continuing our multi-year revitalization of our scholarly and educational programs. Central is a multi-year cluster hire to fulfill research and curricular needs, combined with much needed renovations of aging research laboratory space, the strengthening of the undergraduate programs in microbiology and biochemistry, and the establishment of a new Graduate Program in Microbial Biology.

Our "cluster search" in the areas of microbial biochemistry, physiology and bioinformatics is now complete, with Jeffrey Boyd (microbial biochemistry and physiology) and Yana Bromberg (bioinformatics) joining the department last fall. Jeff brings expertise in microbial biochemistry and physiology, specifically the study of iron sulfur proteins. His current research interests are in understanding the physiological response of pathogenic bacteria, such as *Staphylococcus aureus*, to oxidative stress. Yana brings much needed expertise in bioinformatics. Her interests are in bioinformatic approaches to protein function prediction and genome variation analysis. You can read more about their work on pages 2 and 3 of this issue.

The Department provides the leadership for the new SEBS-based Graduate Program in Microbial Biology rooted in the rich traditions of microbiology at Rutgers. The program is focused on microbial life processes and their applications, offering advanced study on the biology of microorganisms with a strong focus in microbial physiology and ecology, evolution, environmental microbiology, and the applications of microbiology. The program will provide a broad range of courses and research opportunities with over 40 faculty members from over ten departments and institutes across the New Brunswick campus. The graduate program launched in the fall of 2010 with an entering class of 13 students. We have just completed the selection and admission for Fall 2011. Core funding for our entering students comes from two endowed graduate fellowships, The H. Boyd and Jeanette I. Woodruff Microbiology Fellowship in the field of Soil and Environmental Microbiology and the recently established James Macmillan Fellowship in Microbiology (read more about this on page 4).

Our Annual Microbiology Symposium continues to bring together all microbiologists on campus with speakers from SEBS, the School of Arts and Sciences, and Rutgers-Camden (page 5). In February 2011 we had the pleasure of welcoming back Professor Raina Maier (Ph.D. in 1988) who worked under the direction of Professor Richard Bartha.

We have had a multitude of celebrations, from honoring Jim Macmillan, to Stan Katz's 80th Birthday Party, to promotions and awards, and several thesis defenses. We congratulate H. Boyd Woodruff on his award of the National Academy of Sciences for Industrial Application of Science. Another wonderful year!

As always, I wish to thank all our donors for your support. We hope that you will continue to show your support for the department in the future.

RUTGERS
School of Environmental and Biological Sciences

Inside this issue:

Jeff Boyd—Microbial Physiology

Dr. Boyd's research is focused on the detection and response of *Staphylococcus aureus* to oxidative stress.

Staphylococcus aureus is a bacterium that is naturally carried by approximately one-third of the human population. This bacterium can cause infections that range from relatively harmless furuncles and carbuncles to life threatening endocarditis and necrotizing pneumonia. *Staphylococcus aureus* infections have historically been associated with open-wounds, hospital visits and immuno-compromised persons, but recently, an increasing number of infections are being seen in relatively healthy individuals that have not been associated with hospital settings (community acquired (CA) infections). Reports suggest that these CA-S. aureus strains are exceptionally virulent and many are resistant to nearly all commonly used antibiotics, including methicillin (MRSA), greatly complicating the treatment of infections caused by this aggressive pathogen.

Neutrophil granulocytes are white blood cells that provide humans with a "first line" of defense against CA-MRSA infections. Neutrophils engulf and kill bacteria, in part, by bombarding them with poisonous oxidants such as bleach, superoxide and hydrogen peroxide. Remarkably, strains of CA-MRSA can survive this attack and successfully invade host tissues. Our lab uses a variety of biochemical and genetic techniques to understand what is unique about the physiology of CA-MRSA that allows it withstand such a high degree of oxidative stress. We also study how CA-MRSA detects and responds to the presence of neutrophils and chemical oxidants **(Fig. 1)**.

Figure 1. Oxidant sensing and virulence factor production. Colonies of our parent CA-MRSA strain (left) and a strain with a mutation in a gene that we hypothesize is used to sense and respond to neutrophil generated oxidants (right) were plated on sheep blood agar plates. Note that the colony on the right produces more golden pigment which is an antioxidant and has a smaller zone of clearing. The zone of clearing is a result of toxin production that is caused by erythrocyte lysis

One target of neutrophil generated chemical oxidants are small inorganic cofactors called iron-sulfur ([Fe-S]) clusters. Proteins with [Fe-S] clusters have an ever-expanding repertoire of biological functions including DNA, protein, carbohydrate, sulfur, and lipid metabolism, environmental sensing, redox reactions and cofactor biosynthesis. Neutrophil generated oxidants react with [Fe-S] clusters resulting in Fe(II) release or cluster disintegration. This chemistry leads to protein inactivation resulting in metabolic standstill **(Fig. 2)**.

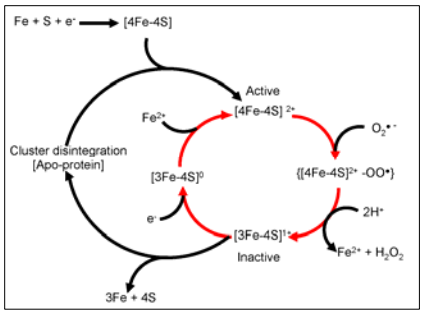

Figure 2. Our model for the "life-cycle" of a solvent exposed iron-sulfur cluster in *S. aureus*.

Despite the recognized and central role of [Fe-S] clusters in biology, our understanding of how these inorganic cofactors are metabolized is limited by our lack of basic knowledge in which gene products control the synthesis, trafficking and repair of these cofactors and how these gene products are integrated into cellular metabolic networks **(Fig. 3)**. Our group has identified a number of genes involved in [Fe-S] cluster metabolism and found that CA-MRSA strains that are defective in [Fe-S] cluster metabolism are more susceptible to killing by chemical oxidants, human neutrophils and antibiotics. These mutant stains also show attenuated virulence in mouse models of infection. Importantly, the mechanisms and proteins that *S. aureus* uses to metabolize [Fe-S] clusters are different from those used by humans suggesting that this may be a process to target for anti-microbial therapy. Another goal of our research is to determine how organisms metabolize [Fe-S] clusters and how they alter the requirement for, and metabolism of, [Fe-S] clusters upon exposure to oxidants and antimicrobials.

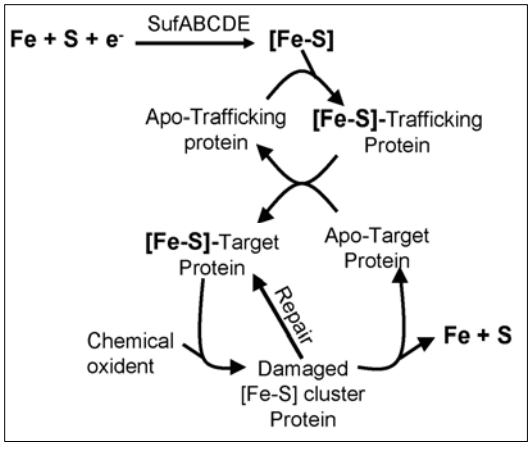

Figure 3. Our working model for iron-sulfur cluster metabolism in *S. aureus*. Although the processes of biosynthesis, trafficking and repair of [Fe-S] clusters are known to occur, many questions remain about the mechanistic details and protein players involved.

Yana Bromberg– Bioinformatics

Dr. Bromberg's lab's research proceeds in two general, currently exclusively computational, directions: evaluation of effects of mutations and annotation of protein function. In more detail: (1) Computational analysis of genetic variation has many potential benefits. It is generally a fast and efficient way to study disease predisposition and answer questions in the realm of pharmacogenomics. It also promises to bring new insight to evolutionary studies. (2) Protein function annotation is a necessary step in dealing with the deluge of the sequencing data and a key to better understanding of cellular interactions and pathways. Currently, less than half a percent of known proteins are experimentally annotated, making computational approaches necessary for further research.

To further our knowledge in these two directions the lab makes use of many available bioinformatics tools and databases. We also design our own computational tools and automatically mine scientific literature for relevant concepts (e.g. gene and organism names, mutation effects, and diseases.) The overlying theme of all research done in the lab is to determine, by any means necessary, how we got here (evolutionary metrics), who we are now, and how we interact with our environment (human/microbiome variation, gene function), which should determine where we go next. Current lab members: Arik Harel (2011 -present) – Post-doctoral scientist; studying evolution of redox-related proteins and Chengsheng Zhu (2011-present) – Ph.D. student; evaluating 16S rRNA utility in differentiating organisms.

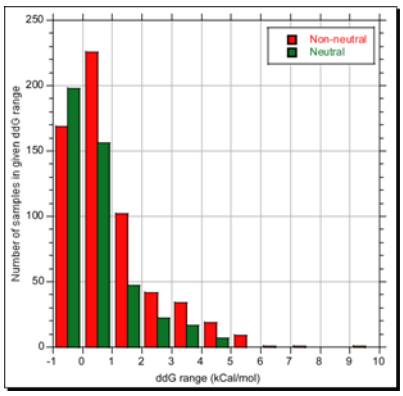

Fig 1. SNAP predictions of functional effects of mutations correspond with experimental annotations of protein stability changes. Mutations extracted from the ProTherm database were evaluated using SNAP. Non-neutral SNAP predictions clearly correspond to changes in protein stability.

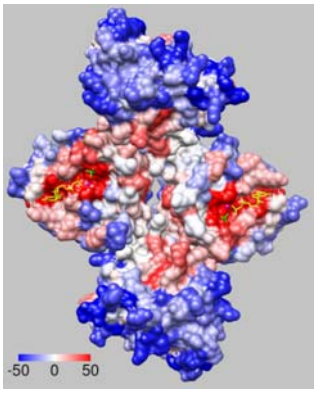

Fig 2. The structure of the tetramer of Ras-related protein Rab5A GTP-binding domains (PDB code: 1TU4) bound to GDP and highlighted based on SNAP predictions. The colors indicate a range of SNAP scores from 50 (red; predicted to be an active site) to -50 (blue; predicted to be a site with low or no activity). GDP is shown as a yellow wire model, the green wires are sulfate ions, and the magenta

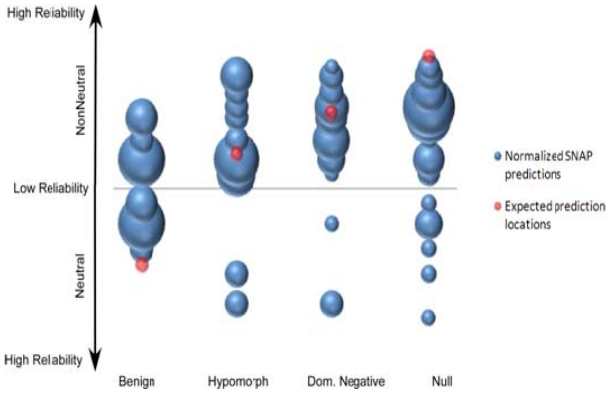

Fig 3. SNAP predicts functional effects of SNPs in the BBS family of genes. Mutations in a family of genes associated with the oligogenic Bardet-Biedl Syndrome have been comprehensively tested both computationally and experimentally. SNAP predictions pinpoint the majority of disease causing mutations.

Our Undergraduate and Graduate Students

Congratulations to the following students on their Departmental Awards:

David H. Strumeyer Award for Academic Excellence in Biochemistry - **Agnieszka Rucki**
Selman A. Waksman Award for Academic Excellence in Microbiology - **Nathaniel Girer**
Theodore Chase Award: **Michael Dimtsios; Allison Hicks; Ashley Jennings; Alanna Murday and An Truong**

Charles O'Brien and **Ileana Perez-Rodriguez** (Vetriani Lab) are recipients of the Robert S. and Eileen A. Robison Scholarship Award for Excellence in Graduate Studies. This prize is through the generosity of Jeff and Dan Robison in honor of their parents, an annual contribution to this fund.

George H. Cook Scholars Program
Six of our Biochemistry and Microbiology students have presented their George H. Cook honors theses: **Nathanel Girer** (Advisor Max Häggblom), **Tzeh Keong Foo** (Advisor Tamar Barkay), **Agnieszka Rucki** (Advisor Lori White), **Andrew Truong** (Advisor Lori White), **Alanna Murday** (Advisor Lori White) and **Hamidah Raduwan** (Advisor William Belden). We congratulate them on a job well

Macmillan Party

The gift by Linda and Dennis Fenton of a graduate Fellowship to honor Professor James D. Macmillan, was recognized Saturday, October 9th at a dinner at the New Jersey Agricultural Museum. President Richard McCormick and Dean Robert Goodman noted Professor Macmillan's commitment to the university. His graduate students, some of whom had flown in from the mid-West and the west coast, thanked him for his sage advice, often over a beer, in solving life's problems. The first holder of the fellowship, Tiffany Louie, was able to thank the donors and talk with Professor Macmillan. The generosity of the Dennis and Linda Fenton was keenly felt, especially with the initiation of the new graduate program in Microbial Biology, with the effects to be for years to come.

L-R: Dean Robert Goodman, Jim and Laura Macmillan

L-R: Dennis and Linda Fenton and Jim Macmillan

Tiffany Louie (pictured right) our first-year Microbial Biology Graduate student has been awarded a fellowship by the NSF-Rutgers IGERT on Renewable and Sustainable Fuel Solutions for the 21st Century.

L-R: Jim Macmillan, Tiffany Louie and Max Häggblom

2011 Symposium on Microbiology at Rutgers University:
Cultivating Traditions, Current Strength, and Future Frontiers

Raina Maier, Keynote speaker

L-R: Max Häggblom, Jason Cavanaugh, Melinda Maghirang and Allison Isola

Desmond Lun's (RU Camden) talk.

The Department of Biochemistry and Microbiology (SEBS) sponsored a highly successful symposium, Microbiology at Rutgers University: *"Cultivating Traditions, Current Strength and Future Frontiers",* February 3 & 4, 2011 at the Douglass Campus Center. The keynote speaker, Raina M. Maier, Professor of Soil, Water and Environmental Science, University of Arizona illuminated the activities of microbes *"Making a living while starving in the dark: The NSF Kartchner Caverns Microbial Observatory*." Her focus was the potential roles of microbes in the formation of the exquisite stalactites and stalagmites. Dr. Maier earned her Ph.D (Rutgers, 1988, Graduate Program in Microbiology) with Richard Bartha.

The Symposium featured the research of nine Rutgers faculty (listed below) from across the campuses, it being noteworthy that for the fifth year all speakers were new to the Symposium testifying to the breath and strength of Rutgers Microbiology. There was maximal time for discussion of diverse studies presented in 65 posters. A convivial atmosphere pervaded the meeting with great dialogue of ideas, and further research by the attending 175 researchers. The financial support through the offices of Bob Goodman, Executive Dean SEBS, Philip Furmanski, Executive VP for Academic Affairs, Jo Messing, Director of the Waksman Institute, and the Linda and Dennis Fenton Fund is gratefully acknowledged.

Jeff Boyd, Biochemistry and Microbiology, SEBS
"An enemy at the gates: Investigating the *Staphylococcus aureus* neutrophil interface"

Robert A. Niederman, Molecular Biology and Biochemistry, SAS
"Structural and functional proteomics of photosynthetic membrane assembly"

George Carman, Food Science, SEBS
"Regulation of lipid metabolism in yeast"

Yana Bromberg, Biochemistry and Microbiology, SEBS
"Identifying protein functional sites using in silico mutagenesis"

Desmond Lun, Computer Science, Camden
"Modeling of microbial metabolism for drug discovery and metabolic engineering"

Nina Fefferman, Ecology, Evolution and Natural Resources, SEBS
"Evolutionary pressures on social groups"

Faith Belanger, Plant Biology and Pathology, SEBS
"Plant and fungal gene expression in the fungal endophyte/grass symbiosis"

Lily Young, Environmental Sciences, SEBS
'Biodegradation of oil, from the Exxon Valdez to the Deepwater Horizon"

Gediminas Mainelis, Environmental Sciences, SEBS
"Use of electrostatic collection method to sample airborne microorganisms"

J. Bennett, R. Maier, L. Young and T. Barkay

Lily Young

Please mark your calendars for our 2012 Microbiology Symposium on February 2 - 3, 2012

Our Faculty

NJ *HEROES* Group—William Ward

Last January, **Dr. William Ward** was invited to give a 90 minute presentation, in the field of chemistry, to a group of 12 extraordinarily gifted and talented youngsters who are part of the central New Jersey HEROES group. One hundred students came, along with their parents, to participate in the second annual HEROES conference held at the Rutgers Continuing Education Center on Douglass Campus. The HEROES program was created by Rita Ostrager who has one of her own children in the program. Children eligible for the HEROES program are all in the upper 0.1 percentile of IQ. Ms. Ostrager's is working closely with the Rutgers Office of Continuing Professional Education to provide these youngsters, most of whom are home schooled, with opportunities to acquire Rutgers credit for special college--level courses that accommodate their needs.

At last years' conference, he presented, to a group of gifted students. This exercise, called three phase partitioning (TPP), is one Dr. Ward teaches, Socratically, to senior level industrial scientists who register for his internationally known, Rutgers-affiliated short course, Protein Purification www.rci.rutgers.edu/~crebb/protein.html. Presenting TPP in the same Socratic style, he has found that the HEROES students were just as able to handle this challenge as the most experienced industrial scientists he has taught. In fact, a 7 year old girl and a 9 year old boy answered questions just as fast as experienced senior research scientists in the biopharmaceutical industry.

So much did he enjoy this first experience with the *HEROES* kids that Dr. Ward has volunteered to return for the 3rd annual HEROES conference in 2011 this time to give two 3 hour presentations. www.marineimpressions.net.

Max M. Häggblom

The Department celebrated with cake and libations to congratulate Max Häggblom on his promotion to Professor II.
Max Häggblom was elected Fellow of the American Academy of Microbiology.

Dr. Stanley Katz's 80th Birthday Party

March 22nd was a surprise 80th birthday party for **Dr. Stanley Katz.** It was a real surprise on two bases. The guests kept it a secret. Wow. Secondly it was held four days after his birthday. Stan noted his surprise and commented that he was speechless for the first time (ever - The editors). We all wish him well and all success in years to come.

Stan remains active recently mentoring Susan Parlato (Antimicrobial sensitivity and resistance development caused by nutraceuticals, MS 2010) and also working with Paula (PM) Ward in directing Jocelyn Mendoza, Trenton High School, in her NJ Science project (Antimicrobial activity of cat saliva).

Elaine & Stan Katz

In Print

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Ph.D Theses-2010-2011

Riqing Yu (Environmental Sciences)

Microbial Mercury Methylation and Demethylation: Biogeochemical Mechanisms and Metagenomic Perspectives in Freshwater Ecosystems

Advisor: T. Barkay

Abstract: Elevated concentration of methylmercury (MeHg) in fish is a worldwide concern due to its detrimental effects on human health. Although Hg methylation is a key issue regarding MeHg contamination, neither abiotic nor microbial methylation mechanisms are well understood. The overall objective of this study was to link the potential for microbial methylation and demethylation to the molecular characterization of microbial communities in two typical freshwater ecosystems and to gain in-depth understanding of Hg methylation mechanisms by syntrophy.

Sunday Lake is a remote and "pristine" forest lake exposed to Hg mostly through atmospheric deposition in the Adirondack Mountains. This study demonstrated that floating *Sphagnum* moss mats near the lake water front was a hot spot for MeHg accumulation and microbial methylation, and the place where sulfate reducing bacteria (SRB) community was highly developed. SRB were identified as a major group of Hg methylators, as sulfate addition to the mat samples doubled the potential Hg methylation rates and molybdate significantly inhibited them. The dominant distribution of *Syntrophobacter* spp. in the *Sphagnum* mats led me to investigate the involvment of syntrophy in Hg methylation. By incubating mono- or co-cultures of *Syntrophobacter* spp., with *Desulfovibrio* spp., this study was the first to demonstrate that a *Syntrophobacter-Desulfovibrio* coculture significantly increased growth of both syntrophic partners and stimulated MeHg synthesis compared to activities of *Desulfovibro* spp. monoculture. Syntrophy could stimulate MeHg synthesis by two pathways: *Desulfovibrio* growing with methanogens in sulfate -free environments, and *Desulfovibrio* growing with *Syntrophobacter* in sulfate-limited environments where sources of energy and carbon are limited.

In the South River, an industrially Hg-contaminated site in VA, high Hg methylation rates and low demethylation activities were observed in nine sites downstream from the contaminating source, partially explaining why fish in this river have high MeHg levels. 16S rRNA sequencing from sediment cDNA showed that at least three groups of SRB and one group of Geobacter-like iron reducing bacteria (IRB) that were closely affiliated to known Hg methylators, were active in the sediments. Further metabolic inhibition and stimulation experiments confirmed that both SRB and IRB were involved in the microbial methylation in South River sediments.

The new **Dr. Yu** is planning to stay with us as a postdoctoral fellow. He will be associated with the Barkay and Yee (Environmental Sciences) groups.

Sharron Crane (Ecology and Evolution)

Mercury Effects on Axenically Grown Fungal Isolates and on *Pinus rigida* and its Rhizoshpere Fungal Community

Advisors: T. Barkay and J. Dighton

Abstract: Ectomycorrhizal fungi (ECMF) were axenically grown in agar cultures and tested to determine their sensitivity to mercury (Hg). At micromolar concentrations, Hg significantly inhibited the radial growth rate of ECMF. This inhibitory effect was lessened in some ECMF when an established colony was exposed to Hg. Mercury lowered biomass production by some ECMF, and ECMF accumulate Hg from a solid growth substrate in direct relation to the amount of Hg added to the media.

The effect of Hg on *Pinus rigida* (pitch pine) and the development of its rhizosphere fungal community were investigated. Addition of high concentrations of Hg to soil increased mortality of pitch pine seedlings and reduced abundance and diversity of ECMF and rhizosphere soil fungi but did not significantly affect seedling growth. Pregrowth in artificial soil or native New Jersey Pine Barrens soil reduced seedling mortality, and pregrowth in artificial soil enhanced phosphorus uptake in seedlings exposed to Hg. Seedlings preplanted in native soil demonstrated enhanced nitrogen uptake and increased chlorophyll content over seedlings preplanted in native soil regardless of Hg exposure status.

Barkay Lab (L-R): L. Cabral, Kritee, Z. Freedman, T. Barkay, R. Yu, Sharron Crane and A. Chatziefthimiou

Our Department

Yana Bromberg spoke at the first Critical Assessment of Genome Interpretation (pre-pro CAGI) workshop, Berkeley, CA Dec. 10, 2010 about computationally predicting molecular, cellular, or organismal phenotypes from provided genomic data against unpublished observations. For one of the available data sets, Dr. Bromberg's computational method, (Screening for Non-Acceptable Polymorphisms)" "SNAP" outperformed other methods. A news-brief about the event can be found in Nature (Dec 17th, Mutation-prediction software rewarded, http://www.nature.com/news/2010/101217/full/news.2010.679.html)

Maryam Honarbakhsh, graduate student in the Bini Laboratory was awarded a $5000 graduate student grant from the New Jersey Water Resources Research Institute (NJWRRI) for her project "Identification and characterization of novel antibiotic resistance genes from wastewater effluents and surface waters."

Max Häggblom was appointed as the new Chief Editor for FEMS (Federation of European Microbiological Societies) Microbiology Ecology, one of the leading journals in the field of environmental microbiology and microbial ecology. His five-year appointment begins January 2011. Dr. Häggblom has served as one of the Editors for the journal since 2003.

In October, **Max Häggblom** was an invited speaker at the Hudson-Delaware Regional Chapter of the Society of Environmental Toxicology and Chemistry Fall Workshop on Oil in the Environment: What We Know and What We Are Learning All Over Again, (Oct. 13, 2010). This workshop focused on oil contamination from the BP oil spill and discussion on environmental effects and methods for remediation.

In November **Max Häggblom** was a plenary speaker at GeoTrop 2010 Conference, the 6th International Conference on Environmental Geochemistry in Tropics - Urban Issues, held at the Chinese Academy of Sciences in Xiamen, China, Nov. 4-6, 2010. The GeoTrop 2010 Conference focused on the fate and effect of persistent toxic substances, the biogeochemistry of nutrients, and the systematic analyses of urban metabolisms in tropical and subtropical urbanized regions.

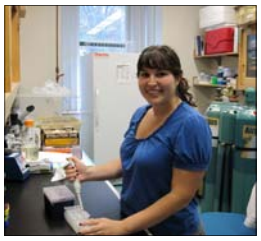
While in China **Max Häggblom** also visited and gave talks at South China University of Technology, College of Environmental Science and Engineering in Guangzhou. Continuing on his "tour" Dr. Häggblom gave one of the plenary talks and served as Chair for one of the working groups at the MicroPerm Workshop, an international workshop to initiate the circumpolar integration of permafrost microbiological studies held November 8-10, 2010 in Potsdam, Germany. He served a member of the International Steering Committee of this conference.

On October 29-31, **Costantino Vetriani** participated in the Ridge 2000 Community Meeting in Portland, OR (http://www.ridge2000.org/science/meetings/WorkshopInfo.php?workshopID=2010r2k), to discuss the current status and ten-year vision of deep-sea research. At the meeting, Costa Vetriani was one of the leaders of the Integrated Study Sites working group on the East Pacific Rise, and he presented a summary of the current status and future direction of biological research at deep-sea hydrothermal vents.

On November 30-December 4, **Costantino Vetriani** was invited to visit the Observatoire Oceanologique de Banyuls-sur-Mer, in France. During the course of his visit, Costa gave two lectures in the training course "Extreme environments and deep-sea ecosystems" as a lecturer on the theme: "Extremophilic microbes: adaptation to temperature and toxics /Microbial diversity and metal/hydrocarbon detoxification at vents and seeps" and presented a seminar to the faculty and students of the observatory entitled: "Chemosynthetic microbial biofilms from deep-sea hydrothermal vents: insight from laboratory and in situ studies".

Costa Vetriani (pictured third from left) was an invited speaker at the symposium "IV Frontiers in Environmental Microbiology: A Deep Look into Nature" which was held at the Universidad del Turabo, Puerto Rico, on March 25th, 2011.

Costa Vetriani's Deep Sea Microbiology Lab welcomes two new members. **Donato Giovannelli** (pictured right) is a visiting graduate student from ISMAR-CNR (Institute of Marine Sciences - National Research Council) in Ancona, Italy. Donato's visit at Rutgers will extend until July 2011.



Welcome to **Marie Bolognini** an MS student in the Vetriani Lab. She is enrolled in the Masters of Business and Science in Biotechnology and Genomics at Rutgers University.

Ileana Perez-Rodriguez (Vetriani lab) received an offer for a postdoctoral position at the Carnegie Institution for Science in Washington, DC. Ileana is planning to graduate in September, 2011, and move to DC.

Lori White and her graduate student **Tiffany Kung** attended the 5th Aquatic Models of Human Disease Conference in Corvallis, OR, where Ms. Kung's abstract entitled "Using the zebrafish (*Danio rerio*) model to investigate changes in gene expression and behavior following developmental exposure to pyrethroid pesticides" was selected for presentation in a platform session.

What' Shaking

Vita Marie Villano Swiatek arrived into the world on Saturday, March 26th weighing in at 6 lbs and 14 oz - Her proud parents Caren Villano (Ph.D 2009 - White Lab) and Gavin Swiatek (Ph.D 1999 - Eveleigh Lab) are both tired but elated!

The department welcomed several visitors during the fall and spring semesters:

Lucelia Cabral (pictured right) visiting from Brazil to **Dr. Barkay's** lab on a Fellowship from the Ministry of Science and Technology of Brazil, she is a Ph. D student at Federal University of Rio Grande do Sul, Porto Alegre, Brasil and will be with us until December 31, 2011.Lucelia Cabral, a PhD student from the Department of Soil Science in the Federal University of Rio Grande do Sul (UFRGS), Brazil, is visiting the Barkay lab from Jan. to Dec. of 2011. UFRGS is located in Porto Alegre, the capitol of Rio Grande do Sul. Lucelia studies methylmercury resistant bacteria selected from mercury contaminated sites such as land farming and soils reconstructed with sewage sludge following strip-mining activities. During her stay at Rutgers she will carry out research on the genetics and biochemistry of mercury transformations that are carried out by her bacterial isolates. Lucelia is supported by a fellowship from The National Council for Scientific and Technological Development (CNPq) which is linked to the Ministry of Science and Technology (MCT) to encourage research in Brazil (http://www.cnpq.br/).

Ponlada Permpornsakul visiting from Thailand to **Eveleigh/Kobayashi** labs supported by a grant from the Royal Golden Jubilee Program (RGJ). Nan's study addresses lignin transformations based on the use of Thai white rot mushrooms. After her half year study here (July 29, 2010 – February 28, 2011) Nan returns to Bangkok to put the finishing touches to her thesis.

Congratulations to **Tzeh Keong Foo,** an undergraduate student in the **Barkay Lab** who is the recipient of the NJAES Student Research Poster competition award in the category of Undergraduate/basic research.

Jessica Ricci, an undergraduate student who worked in **Costantino Vetriani's** lab, graduated in 2010 with a major in Biochemistry from Cook College. Jessica is now a doctoral candidate at Caltech, she has just won a NSF graduate fellowship. "*I am in the biology department and I have joined Dianne Newman's lab. There I will be studying hopanoids, a group of cholesterol like lipids that are produced by bacteria.*" We wish her much success!

Grants

Max Häggblom received a third year of funding (total 87,500 Euro) from the Maj and Tor Nessling Foundation in Finland on his project "Assessing the potential for anaerobic microbial dechlorination of PCDD/Fs in River Kymijoki sediments" MH is the advisor for a PhD student, Sanna Kuokka, at the University of Helsinki, who is working on this project in collaboration with Dr Anna-Lea Rantalainen at the Dept of Environmental Science.

New Jersey Turfgrass Foundation, "Promotion of Turf Health Through Early Pathogen Detection-Development of a Turf Patho-CHIP", PI. $5,500.

Ning Zhang and Bruce Clarke (Plant Biology & Pathology, Co-PI) were awarded a $60,000 US Golf Association Research grant for "Promotion of Turf Health Through Early Pathogen Detection-Development of a Turf PathoCHIP".

Alumni

H. Boyd Woodruff (Ph.D, 1942) is to be congratulated on his award of the prestigious **National Academy of Sciences (NAS) Award for Industrial Application of Science, 2011.** The recipient receives a prize of $25,000 and will be honored in a ceremony on Sunday, May 1, during the National Academy of Sciences' 148th annual meeting.

Dr. Woodruff in his thesis studies in the department, discovered actinomycin, the first actinomycete antibiotic. This led to international screening and discovery of multiple antibiotics, revolutionized medical treatments and surgery, with concomitant enhancement of world public health programs. The NAS Award is for original scientific work of intrinsic scientific importance and with significant, beneficial applications in industry. Dr. Woodruff led the programs in the development of multiple antibiotics, vitamin B12, and the avermectins, the latter revolutionizing parasite treatment in livestock and humans, while at Merck & Company.

"... I came to Rutgers to start graduate school in July 1939. Waksman immediately said, "There are a couple of practical problems that I'd like to have solved and why don't you take these [on] as your initial projects?" So, it was a direct assignment. In other words, I had no input at all into the assignments.

One had to do with a problem in the area in Central New Jersey where they grow potatoes. Potatoes grow very well in New Jersey soils, but there's a serious disease called potato scab that will make them unsalable, they became so wrinkled and rough, but the disease is called scab [*Streptomyces scabies]* and is caused by a microorganism. The actinomycetes all ... enjoy neutral or basic conditions in the soil. Acidic conditions are very inhibitory. So, if you make the soil acid, you can grow potatoes very well because the *S. scabies* is inhibited. The way to make the soil acid is to spread sulfur on the soil, and then, you depend upon microorganisms in the soil that convert the sulfur to sulfuric acid, to make the soil acid. I was supposed to find which is most efficient: Do you inoculate the sulfur with the microorganism before you put it on the soil or do you ... inoculate the soil first with the microorganism? In other words, what's the best procedure to make it acid? So, I started out with that project. It went along very smoothly. It was chemistry, of course, so, it was something I knew about.

... I also felt that maybe the best thing to resolve this would be that, since I had a departmental fellowship during the period I was there, that it would be well to set up a departmental fellowship, ... an endowed assistantship that would ... be limited to a graduate student in the Microbiology Department at Cook College, working in the field of soil microbiology or ... environmental microbiology. Environmental microbiology is the more popular name, rather than soil microbiology, now.

In the meantime, the years roll ahead. I'm eighty-seven now, she's (Jeanette) ... eighty-four, and, how much longer we have, I don't know, [laughter] but we're treating it as though it's forever. I guess that's the best way to put it. ... I must admit, I'm sort of sitting around now, wondering what to do with myself, ... also, because of the fact that I have not gotten back into the laboratory work since the museum work was finished, and I doubt that I will now, so, I don't know. I've been writing papers and doing the various things of that sort. ... I haven't settled down yet. ... *I'm having my retirement crisis at eighty-seven, rather than at sixty-five, [laughter] trying to decide what to do next. …"*

For more oral history go to:
http://oralhistory.rutgers.edu/Interviews/woodruff_h_boyd.html

Rutgers Oral History Archives 2004
New Brunswick History Department

Congratulations to **Patty Ryan** (Ph.D 1997 - Macmillan Lab) and Andrew Farnsworth: their daughter Aja Carolina Farnsworth was born on October 23, 2010 at 2:26 a.m., a six pounds, one ounce, happy, healthy, bundle of joy!

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Graduate Program in Microbial Biology

The new Graduate Program in Microbial Biology launched in Fall 2010. The program offers a focus on microbial life processes with a strong emphasis on microbial physiology and ecology, evolution, environmental microbiology, and the applications of microbiology. The entering class has 13 students, six in the Ph.D. program and seven in the M.S. track. Two endowed graduate fellowships (Woodruff and Macmillan) provide core funding for the program.

Shown on the left are Amanda Aulicino and Tiffany Louie, Kyle Skalenko with Doug Eveleigh. Shear Islam and Hang Dam (who has a 2-year Graduate fellowship from the Vietnam Education Foundation). Max Häggblom and Zuelay Rosario-Cruz. The whole group consuming pizza and fermentation products.

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Thanks to all who assisted in writing, assembling, editing, nudging, preparing, critiquing (always constructively), and producing this newsletter. Please feel free to email corrections, complaints, submissions to: maguire@aesop.rutgers.edu

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