



Annual Newsletter of the Department of Microbiology & Molecular Genetics

Issue 1.

July 2010

<http://microbiology.okstate.edu/>

A Message from the Department Head

We send our heartfelt greetings from OSU's Department of Microbiology & Molecular Genetics! This is the first newsletter from the Department since I arrived at Oklahoma State University in June 2009 to assume the position of Department Head. The transition has been filled with ups and downs, but I have come to truly appreciate the special resources we have at OSU in the College of Arts & Sciences, within the life sciences departments, and especially with our faculty and students. The MMG faculty members have been busy balancing teaching and research and there has been a renewed enthusiasm to seek out and acquire extramural funding to support our research and training efforts. A listing of our most recent professional accomplishments is provided at the end of this newsletter. Our collective efforts to enhance our standing among top tier academic research institutions has already paid dividends as we are currently the highest externally funded department in the College of Arts & Sciences at Oklahoma State University. A significant reason for this success must be attributed to the hard work of our graduate students who are responsible for carrying out the day to day research in the Department. Our graduate students are becoming an increasingly active group who represent the Department and OSU admirably as our scientific ambassadors. Their recent successes can also be seen later in this newsletter, but I am especially proud that they successfully put on the First Annual MMG Graduate Student Symposium in the 2009 Fall semester (see photos at the end of this newsletter). The MMG graduate students head into the 2010-11 academic year with a newfound confidence and I am convinced that good things are coming their way. Our undergraduates have also accomplished many great things. Kryston Griffin was our Outstanding Senior and Lydia Meador (a triple major in Botany, Microbiology and Biochemistry) was the recipient of a prestigious Goldwater Scholarship for the coming year. So as you can see, good things are happening in the Department of Microbiology and Molecular Genetics at OSU. Please read on to hear about our accomplishments, about how we are training the next generation of Microbiologists, and about how we are conducting research that will contribute to human health, the health of our environment, and the generation of renewable energy. We will continue to explore new ways to educate our undergraduate students, train our graduate students, and elevate the status of our research programs on the national and international levels. Please read on to learn more about what is going on in Microbiology and Molecular Genetics at Oklahoma State University and how you can help in our mission.



Create / Innovate / Educate / GO STATE!

MMG Professor Heads to Washington as Invited NSF Program Manager



Dr. Rob Burnap has spent the last year serving as an invited program manager in the Division of Molecular and Cellular Biochemistry at the National Science Foundation. This was a one-year assignment through the Visiting Scientist Engineer and Educator program and it has been extended through December 2010 so that Dr. Burnap can lead a program solicitation for a joint U.S.-United Kingdom photosynthesis competition. Rob has been a faculty member in the Department of Microbiology & Molecular Genetics since 1991, where his research has explored the basic mechanisms of photosynthesis. He uses a range of interdisciplinary approaches in his work, including molecular genetics and biophysical techniques. Rob's research has been consistently supported by both the National Science Foundation and the Department of Energy and he is currently editing and contributing to a book that will be made available this year titled **Functional Genomics and Evolution of Photosynthetic Systems**. We welcome him back in Spring 2011 and we hope to learn from

his experiences at the NSF.

A Note from the Graduate Program Director – Dr. Wouter Hoff

During the last 12 months, 28 graduate students actively participated in our graduate program. Our graduate students were involved in 29 regional, national, and international meetings during this period, including the regional ASM meetings in Lawrence, KS and Manhattan, KS, the Great Plains Infectious Diseases Meeting in Kansas City, MO, the national ASM meetings in Philadelphia, PA and San Diego, CA, the ISME meeting in Seattle, WA, and the International *Dictyostelium* meeting in Estes Park, CO. Eleven of our graduate students were co-authors on papers published in peer-reviewed international scientific literature in 2009/2010, including papers in *Infection & Immunity*, *FEMS Microbiology Letters*, *Cellular Signaling*, *Microbiology*, *Developmental Biology*, *the ISME Journal*, *Journal of Applied Microbiology*, *Journal of the American Chemical Society USA*, and *Applied & Environmental Microbiology*. The research



published by our graduate students described progress on important problems in both applied and fundamental microbiology, including protein secretion systems used by pathogenic bacteria to affect human hosts, signaling during eukaryotic differentiation and morphogenesis, the unexpected presence of a photoreceptor in a deep sea bacterium, the properties of a novel bacterial candidate division protein, and biodegradation of environmental toxins by halophilic bacteria. In 2009-2010 two students graduated from our MS program and 4 from the PhD program. We are proud to report that all of the 13 students who have graduated from our program since 2008 have been admitted into professional programs or found employment in an area related to microbiology (see below)

The Department has actively made a number of changes to improve our graduate program, particularly in the areas of regularly assessing the progress and productivity of our students through the development of new monitoring tools. We are also working with our students to create an increasingly collegial environment. Things are progressing well with the MMG graduate program and we look for many good things to come.

Recent graduate student degree awardees (and where they are now):

Reema Biswas (MS 2008): Doctoral program, University of Oklahoma

Robyn Burns (MS 2008): Teaching high school science

David Melson (PhD 2008): Assistant Professor, Department of Life Sciences (Lander University, Greenwood, SC)

Majed Nasser (PhD 2008): Research Faculty in Saudi Arabia

Sumit Punj (PhD 2008): Industrial biotech position (Portland, OR)

Brent Raisley (PhD 2008): Postdoctoral Fellow, Iowa State University

Timmy Hung King Tiong (MS 2008): Doctoral program, OSU Center for Veterinary Medicine

Sei Azetsu (MS 2009): Industrial biotech position (Japan)

Lisa Barton (PhD 2009): Medical school. OU Health Science Center

Kent Morgan (PhD 2009): Postdoctoral Fellow, USDA (Fort Pierce, FL)

Shawn Daley (PhD 2010): Postdoctoral Fellow, Ohio State University

Seema Haridas (PhD 2010): Teaching Faculty (Coastal Carolina Community College, Jacksonville, NC)

Chris Sheehan (MS 2010): Microbiologist, FDA, Regulatory Affairs-SW Region, Arkansas Regional Lab (Jefferson, AR)

Student awards

5th Annual Graduate Research Symposium in the Biological Sciences (OSU, Noble Research Center) – MMG Award recipients: [Nghia Nguyen](#) and [Chelsea Epler](#)

ASM Missouri Valley Branch Meeting (Kansas State University, Manhattan, KS) – 7 student participants (MMG Award recipients: [Ratnakar Deole](#) (1st place in Environmental Biology and [Phil Adam](#) 2nd place in Medical Microbiology and Immunology))

Spring 2010 **Gruha Award** winner: [Nghia Nguyen](#)

ASM Sustaining Member Travel Grant and Outstanding Student Poster Presentation: [Audra Ligenstoffer](#) (2010 ASM General Meeting, San Diego, CA)

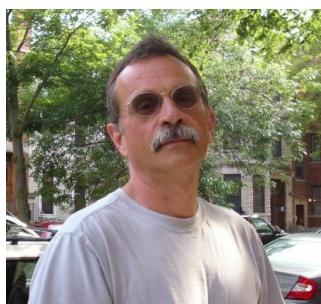
Invited speaker, 9th International Mycological Congress (Edinburgh, Scotland): [Audra Ligenstoffer](#)

Wentz Scholar: [Amanda Curtis](#), [John Cloud](#) (winner of Wentz Symposium student paper competition), [Dillon Langley](#), [Sarah Oppel](#)

Niblack Scholars: [Nicole Clarkson](#), [Lydia Meador](#)

MMG Outstanding Senior 2010: [Kryston Griffin](#)

Barry M. Goldwater Scholar: [Lydia Meador](#)



Microbiology Undergraduates Welcome New Advisor

The Department is pleased to welcome **James (Jim) Hull** as our new Undergraduate Student Advisor. He replaces **Pam Hathorn** who left OSU to become Associate Dean in the College of Science and Health Professions at Northeastern State University in Tahlequah, OK. Jim takes on this position along with duties in PreHealth Advising within the College of Arts and Sciences Student Academic Services. Jim brings extensive advising experience from his former position as advisor for the Biological Sciences and the Department of Botany here at Oklahoma State University. He is very familiar with the Microbiology program and we look forward to his input as we continue to increase the number of majors in Microbiology and look for new and innovative ways to improve upon the existing academic programs within the Department. Welcome aboard Jim!

Microbiology and Molecular Genetics Graduate Students Association's Corner! (by **Saugata Mahapatra**)

Greetings from the MMGGSA! This past academic year MMGGSA organized the 1st Annual Microbiology Symposium at Oklahoma State University. The symposium was well attended and proved to be a great platform for promoting knowledge in the field of microbiology and fostering interaction between department members. The symposium began with poster presentations by Microbiology graduate students followed by the keynote address by Department alumnus **Dr. Frank Champlin** from the Department of Biochemistry and Microbiology at the OSU College for Health Sciences in Tulsa. Dr. Champlin spoke on the "Influence of Gram-Negative Outer Membrane Permeability Properties on Triclosan Efficacy in *Pseudomonas aeruginosa* and *Pasteurella multocida*"

MMGGSA also sponsored a guest seminar in the Fall 2009 Department of Microbiology Seminar series. The Seminar titled "Rickettsia prowazekii: Probing Obligate Intracellular Growth One Gene At A Time" was given by **Dr. David Wood**. He is the current Department Head of Microbiology and Immunology at University of South Alabama College of Medicine. Students had a great time interacting with Dr. David Wood! MMGGSA wishes to thank the other sponsors of this event – American Society of Microbiology, Graduate & Professional Student Government Association, Oklahoma State University, College of Arts and Sciences and the Department of Microbiology, Oklahoma State University.

Department Reaches Out as Part of National Lab Day – Celebration of Research



The Department was a participant in the first National Lab Day event (see <http://www.nationallabday.org/about>). Students from regional high schools were invited to attend events and demonstrations celebrating research and training in all aspects of laboratory work. Projects developed by the Department included: 1) "Isolation, Detection and Characterization of Bacteria" where students learned how to isolate bacteria on specialized growth media that provided information on bacterial physiology and learned to use electrophoresis to purify DNA sequences from microorganisms; and 2) "Bacterial Motility" where students talked about bacterial movement and got to look at swimming bacteria using a microscope. This event was supported by the OSU College of Education with **Dr. Ed Shaw** serving as the Department liaison for the event. Dr. Shaw (left) and **Dr. Marianna Patrauchan**

(right) directed the projects done within the Department.

Opening of the Henry Bellmon Research Center (HBRC)

Oklahoma State University is celebrating the opening of the new Interdisciplinary Science Research Building which the Board of Regents has renamed the Henry Bellmon Research Center (HBRC) in memory of the former U.S. Senator and Oklahoma Governor died last spring at the age of 88. Bellmon graduated from OSU (Oklahoma A&M) in 1942. **Drs. Rob Burnap** and **Wouter Hoff** will be moving into the new facility which is located across the street from Life Sciences East where they will conduct collaborative research. The \$70 million HBRC facility is nearly complete with new investigators now moving in. The HBRC is a high-tech, 124,000-square foot building that will provide laboratory space for a wide range of disciplines. The building has three floors plus a basement and will house facilities for research in biodiversity, biophysics, photonics, synthetic chemistry and advanced materials. This is more evidence of the increasing emphasis OSU is placing on cutting edge research and the infrastructure needed to become an international research center.



The Department Mourns Loss of Former Student

The Department of Microbiology and Molecular Genetics mourns the loss of one of our former students. Dr. David Melson (PhD, 2008) unexpectedly passed away this Spring. Dr. Melson worked with Dr. Kim Burnham in the Department and he was a new Assistant Professor in the Department of Life Sciences at Lander University in Greenwood, SC. David was an outstanding teacher, beloved by the students in the lab sections that he instructed here at OSU, as well as his fellow graduate students and the MMG faculty and staff. David also had a great sense of humor. At his funeral, it was mentioned that he once told his mother-in-law (who was actually a very dear friend) that he was going to send her a Mother's Day card but that it had been too long since Halloween and there were no cards about witches left! David will be greatly missed by many in our Department both past and present. And our thoughts and prayers go out to his wife, Frances, and his two sons, Jon and Jeb.

Microbiology Website is Undergoing Reconstruction

The MMG departmental website is currently undergoing reconstruction. While the site is not yet complete, we invite you to visit us at <http://microbiology.okstate.edu/>. You can learn about our academic programs and our current faculty along with their research interests. Information for prospective students regarding degree options and course offerings at both the undergraduate and graduate level can be accessed at the site. There is also information on awards and scholarships with links to our most closely affiliated professional organizations. Please feel free to browse the site and provide your feedback for ways to improve our visibility at the national and international level.

Other News from the Departments

The Department celebrated the career of **Dr. Helen Vishniac** as she officially retired from OSU and moved on to new surroundings in Pittsfor, NY. Dr. Vishniac remains active as a scientist by continuing to publish her research. Her most recent paper just appeared in print (Vishniac and Takashima, 2010, *Rhodotorula arctica* sp. nov., a basidiomycetous yeast from Arctic Soil, International J. Systematic and Evolutionary Microbiology **60**:1215-1218). Meanwhile, **Dr. Masato Kumauchi** was recently promoted to Research Assistant Professor in the Department. Dr. Kumauchi was previously a postdoctoral fellow with Dr. Wouter Hoff. Meanwhile, **Dr. Nick Dickenson** was awarded an NIH (F32) Postdoctoral Fellowship in 2009 which he will continue into the coming year.

You can help the Department and OSU through your generous gifts

Our academic programs are among the region's best for training in Microbiology and related disciplines. However, strong academic programs come at a financial cost. In weak economic times, our public universities come under increasing stress for maintaining the resources needed to maintain competitive programs and many prospective students are left out of education and

training programs because of the absence of suitable support. Thus, the Department benefits greatly from your generous gifts by being able to send students to present their research at professional meetings, being able to invite world renowned scientists to speak at our campus, and being able to acknowledge the achievements of our students and support their training by providing awards and scholarships. Please consider providing a tax-deductible contribution to further enhance the great things we're doing in the Department of Microbiology and Molecular Genetics at Oklahoma State University. Please consider designating your donations for the Department of Microbiology and Molecular Genetics via the following OSU link: <http://osugiving.com/>

Many donors have already generously stepped forward to take advantage of the Pickens Legacy Scholarship Match to help departments within the College of Arts & Sciences. This opportunity to increase the power of your gifts was established by T. Boone Pickens' amazing \$100 million challenge gift. You can learn more about the Pickens Legacy Scholarship Match at <http://www.osugiving.com/PickensMatch/>.

If you wish to further discuss your planned gift to the Department, please feel free to contact the Department Head directly (Bill Picking at william.picking@okstate.edu) or call the Department of Microbiology and Molecular Genetics at (405) 744-6243. All gifts, no matter the size, are welcomed and we will automatically provide you with updates on the successes of the Department with your continuing contribution. Contributors to the Department include **Mr. Vaughn O. Vennerberg, II** (XTO Energy Inc.) whose contribution is being matched as part of "**Branding Success: The Campaign for OSU**" (for more information please see http://osu.okstate.edu/index.php?option=com_content&task=view&id=1133&Itemid=90). Mr. Vennerberg was recently honored for his contributions to OSU by the College of Arts and Sciences who named him the **2010 CA&S Distinguished Alumnus**.

Research Milestones

New grants awarded

Bill Picking – NIAID 2010, "*Maturation of the Shigella type III secretion apparatus tip complex*"

Bill Picking – OCAST 2010, "*Targeting Shigella Secretion to Prevent Dysentery*"

Bill Picking/Wendy Picking – National Institute of Allergies and Infectious Disease (NIAID), 2009, "*Mucosal immunity, vaccines and microbiota interplay in humans and animal models - Antigen production Core laboratory*"

Wendy Picking – NIAID 2010, "*A L. lactis-based vaccine for children with broad spectrum for enteric pathogens*"

Wendy Picking – PATH 2010, "*Vaccine against diarrhea causing gram negative bacteria*"

Marianna Patrauchan- American Heart Association Foundation, 2009, South Central Affiliate Beginning Grant-in-Aid Program: "*Calcium and Pseudomonas aeruginosa infective endocarditis*"

Gilbert John – NSF, 2009, Supplement from the Louis Stokes Alliance for Minority Participation (LSAMP) to attend a summer Faculty and Student Research Training (FAST) program sponsored by the Brookhaven National Laboratory, Long Island, NY

Wouter Hoff - OSU Orange Book, 2010, "*Applied technologies for multistage chem-bio threat preparedness*"

Babu Fathepure – NSF RAPID Program Proposal (in response to Gulf oil spill). CoPI with Estella Atekwana and Eliot Atekwana

Babu Fathepure – U.S. Dept. of Transportation (DOT) Sun Grant, 2009, "*Development of enrichment cultures that degrade lignin*"

Babu Fathepure – Oklahoma DOT, 2009, "*Characterization and Mediation of Microbial Deterioration of Concrete Infrastructure*" (Co-PI with Ramsey)

Mostafa Elshahed – National Science Foundation (NSF), 2009, *Microbial Observatories and Microbial Interactions and Processes Program "REU: Screening of environmental DNA and BAC libraries to identify genes and genomic fragments belonging to novel candidate divisions"* (REU for **Brandi L. Bavido**)

Mostafa Elshahed – Devon Energy Corporation, "*Microbiological study of the Barnett shale waters*"

Mostafa Elshahed – Oklahoma Bioenergy Fund, "*A genomics and enzymatic approach for exploiting lignocellulolytic genes in anaerobic fungi (Phylum Neocallimastigomycota) in biofuel research*". CoPI with Dr. Andrew Mort, **Rolf A. Prade**, and M. Wilkins (OSU).

Mostafa Elshahed – NSF Oklahoma EPSCoR, 2009, "*Biofuel production from lignocellulosic biomass using of members of the anaerobic fungi (Phylum Neocallimastigomycota): A dual bioprospecting and strain development strategy*. Part of Oklahoma EPSCoR 2008-2013 project.

Department Publications (2009-present)

Burnap Lab

Hung CH, Hwang HJ, Chen YH, Chiu YF, Ke SC, Burnap RL, Chu HA. 2010. Spectroscopic and functional characterizations of cyanobacterium *Synechocystis* PCC 6803 mutants on and near the heme axial ligand of cytochrome b559 in photosystem II. *J Biol Chem.* 285:5653-63.

Elshahed Lab

MS Elshahed and NH Youssef. Novelty and uniqueness patterns of rare members of the soil biosphere In F. de Bruijn (editor) *Handbook of Molecular Microbial Ecology II: Metagenomics in Different Habitats*. Wiley/Blackwell Publishing CO (*In Press*).

Liggenstoffer AS, Youssef NH, Couger MB, Elshahed MS. 2010. Phylogenetic diversity and community structure of anaerobic gut fungi (phylum Neocallimastigomycota) in ruminant and non-ruminant herbivores. *ISME J.* (*In press*).

MS Elshahed. 2010 Microbiological aspects of biofuel production: current status and future directions. *J. Adv. Res.* (*In Press*).

Savage KN, Krumholz LR, Gieg LM, Parisi VA, Sufliata JM, Allen J, Philp RP, Elshahed MS. 2010. Biodegradation of low-molecular-weight alkanes under mesophilic, sulfate-reducing conditions: metabolic intermediates and community patterns. *FEMS Microbiol Ecol.* (*In press*).

Heise SR, Elshahed MS, Little SE. 2010. Bacterial diversity in *Amblyomma americanum* (Acari: Ixodidae) with a focus on members of the genus *Rickettsia*. *J Med Entomol.* 47:258-68.

Youssef N, Sheik CS, Krumholz LR, Najar FZ, Roe BA, Elshahed MS. 2009. Comparison of species richness estimates obtained using nearly complete fragments and simulated pyrosequencing-generated fragments in 16S rRNA gene-based environmental surveys. *Appl Environ Microbiol.* 75:5227-36.

Spain AM, Krumholz LR, Elshahed MS. 2009. Abundance, composition, diversity and novelty of soil Proteobacteria. *ISME J.* 3:992-1000.

Davis JP, Youssef NH, Elshahed MS. 2009. Assessment of the diversity, abundance, and ecological distribution of members of candidate division SR1 reveals a high level of phylogenetic diversity but limited morphotypic diversity. *Appl Environ Microbiol.* 75:4139-48.

Youssef N, Elshahed MS, McInerney MJ. 2009. Microbial processes in oil fields: culprits, problems, and opportunities. *Adv Appl Microbiol.* 66:141-251.

Youssef NH, Elshahed MS. 2009. Diversity rankings among bacterial lineages in soil. *ISME J.* 3:305-13.

Fathepure Lab

Sei A, Fathepure BZ. 2009. Biodegradation of BTEX at high salinity by an enrichment culture from hypersaline sediments of Rozel Point at Great Salt Lake. *J Appl Microbiol.* 107:2001-8.

Hadwiger Lab

Thapa, P.S., J. N. Barisci, D. J. Yu, J. P. Wicksted, J. A. Hadwiger, R. H. Baughman, and B. N. Flanders. 2009. Directional growth of conducting polypyrrole and polythiophene wires. *Appl. Physics Lett.* 94:033104.

Nguyen HN, Raisley B, Hadwiger JA. 2010. MAP kinases have different functions in *Dictyostelium* G protein-mediated signaling. *Cell Signal.* 22:836-47.

Raisley B, Nguyen HN, Hadwiger JA. 2009. Gα5 subunit-mediated signaling requires a D-motif and the MAPK ERK1 in *Dictyostelium*. *Microbiology.* 156:789-97.

Nguyen HN, Hadwiger JA. 2009. The Gα4 G protein subunit interacts with the MAP kinase ERK2 using a D-motif that regulates developmental morphogenesis in *Dictyostelium*. *Dev Biol.* 335:385-95.

Hoff Lab

Xie A, Hoff WD. IR spectroscopy illuminates protein structure and function. 2009. *BioOptics World.* 18-21. **Feature Focus article**

van der Horst MA, Stalcup TP, Kaledhondar S, Kumauchi M, Hara M, Xie A, Hellingwerf KJ, Hoff, WD. 2009. Locked chromophore analogs reveal that photoactive yellow protein regulates biofilm formation in the deep sea bacterium *Idiomarina loihiensis*. *J. Am. Chem. Soc.* 131, 17443-51.

Philip AF, Nome RA, Papadantonakis GA, Scherer NF, Hoff WD. 2010. Spectral tuning in photoactive yellow protein by modulation of the shape of the excited state energy surface. *Proc. Natl. Acad. Sci. USA* 107: 5821-26. **Selected for inclusion in "Faculty of 1000 Biology"**

Lee B-C, Kumauchi M, Hoff WD. 2010. Modulating native-like residual structure in the fully denatured state of photoactive yellow protein affects its refolding. *J. Biol. Chem.* 285: 12579-86.

John Lab

Macwana SR, Punj S, Cooper J, Schwenk E, John GH. 2009. Identification and isolation of an azoreductase from *Enterococcus faecium*. *Curr Issues Mol Biol.* 12:43-8.

Punj S, John GH. 2009. Purification and identification of an FMN-dependent NAD(P)H azoreductase from *Enterococcus faecalis*. *Curr Issues Mol Biol.* 11:59-65.

Miller Lab

Miller RV, Gammon K, Day MJ. 2009. Antibiotic resistance among bacteria isolated from seawater and penguin fecal samples collected near Palmer Station, Antarctica. *Can J Microbiol.* 55:37-45.

W. Picking Lab

Rathinavelan T, Zhang L, Picking WL, Weis DD, De Guzman RN, Im W. 2010. A repulsive electrostatic mechanism for protein export through the type III secretion apparatus. *Biophys J.* 98:452-61.

Ramirez K, Ditamo Y, Rodriguez L, Picking WL, van Roosmalen ML, Leenhouts K, Pasetti MF. 2009. Neonatal mucosal immunization with a non-living, non-genetically modified *Lactococcus lactis* vaccine carrier induces systemic and local Th1-type immunity and protects against lethal bacterial infection. *Mucosal Immunol.* 3:159-71.

Markham, A.P., Barrett, B.S., Esfandiary, R. Picking, W.L., Picking, W.D., Joshi, S.B. Middaugh, C.R. 2010. Formulation and immunogenicity of a potential multivalent type III secretion system-based protein vaccine. *J. Pharm. Sci. (In press)*.

Barrett, B.S., Markham, A.P., Esfandiary, R., Picking, W.L., Picking, W.D., Joshi, S.B. and Middaugh, C.R. 2010. Formulation and immunogenicity studies of type III secretion system needle antigens as vaccine candidates. *J. Pharm. Sci. (In press)*.

B. Picking Lab

Picking, W.L. and Picking, W.D. 2009. Dissection of the early steps in type III secretion induction. *Microbe (News Magazine of the American Society for Microbiology)* 4:554-9.

Epler CR, Dickenson NE, Olive AJ, Picking WL, Picking. 2009. Liposomes recruit IpaC to the *Shigella flexneri* type III secretion apparatus needle as a final step in secretion induction. *Infect Immun.* 77:2754-61. **SPOTLIGHT PAPER: Articles of Significant Interest Selected from This Issue by the Editors**

Prade Lab

Balázs A, Pócsi I, Hamari Z, Leiter E, Emri T, Miskei M, Oláh J, Tóth V, Hegedus N, Prade RA, Molnár M, Pócsi I. 2010. AtfA bZIP-type transcription factor regulates oxidative and osmotic stress responses in *Aspergillus nidulans*. *Mol Genet Genomics.* 283:289-303.

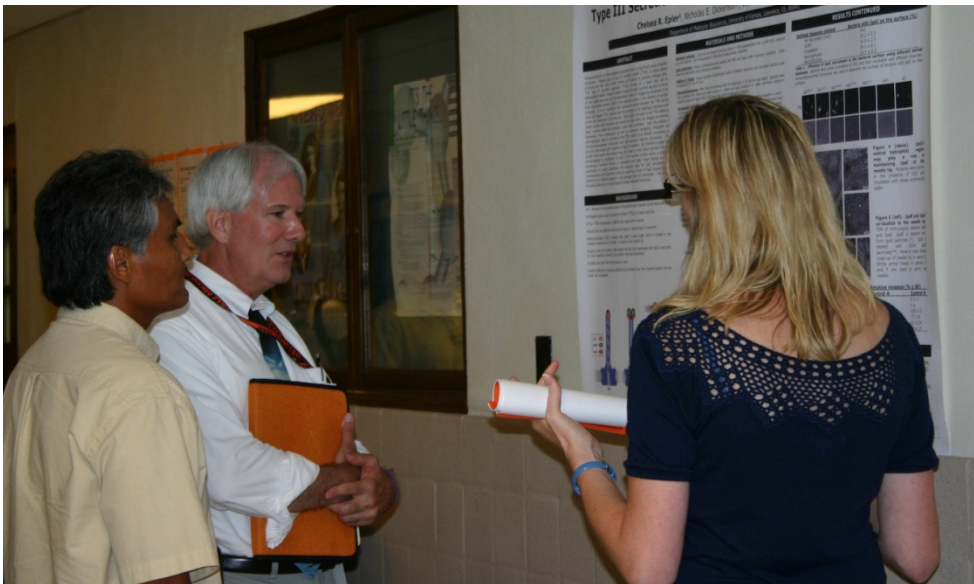
Squina FM, Prade RA, Wang H, Murakami MT. 2009. Expression, purification, crystallization and preliminary crystallographic analysis of an endo-1,5-alpha-L-arabinanase from hyperthermophilic *Thermotoga petrophila*. *Acta Crystallogr Sect F Struct Biol Cryst Commun.* 65:902-5.

Squina FM, Mort AJ, Decker SR, Prade RA. 2009. Xylan decomposition by *Aspergillus clavatus* endoxylanase. *Protein Expr Purif.* 68:65-71.

Shaw Lab

Morgan JK, Luedtke BE, Shaw EI. 2010. Polar localization of the *Coxiella burnetii* type IVB secretion system. *FEMS Microbiol Lett. (In press)*.

The 1st Annual Microbiology and Molecular Genetics Graduate Student Symposium – Aug. 24, 2009



Top: Chelsea Epler presents her research to with symposium keynote speaker and MMG alumnus Dr. Frank Champlin and Dr. Gilbert John. **Middle left:** Graduate students Ratnakar Deole and Jim Davis discuss data during the MMG symposium. **Middle right:** Sonal Dalvi explains her research to Dr. Marianna Patrauchan. **Bottom left:** MMG faculty and students gather on the third floor of Life Sciences East to discuss research and share ideas. **Bottom right:** Dr. Nick Dickenson (postdoctoral fellow) questions graduate student Chris Sheehan about his research.



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