Ohio University—Molecular and Cellular Biology

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MCB Alumni Newsletter

Dr. Robert Colvin

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Greetings Alumni and Friends of MCB!!

We are excited to be publishing our third issue of MCB Alumni News! We hope that this newsletter will remind you of friends and old acquaintances, as well as keep you up to date on what's new at MCB and Ohio University. I would especially like to thank Jessica Castle and Angie Nilsen for their hard work collecting information and working on the newsletter.

The MCB graduate program is a strong supporter of the genomics facility (http://www.dna.ohiou.edu/) at OU and bioinformatics initiatives at OU. The latest addition to the genomics facility is the Leica microdissection micrscope Using this microscope single cells or groups of cells can be microdissected from tissues or cell cultures for molecular analyses. A new graduate certificate in bioinformatics has been approved and MCB faculty are primarily involved in delivering the core course requirements for the certificate, visit the MCB web page (http://www.ohio.edu/mcb/curriculum.cfm) for more details.

One new faculty member, Dr. Ramiro Malgor, joined the MCB program this past year. Four new students were admitted to the program this year: William Broach, Andrew Kouse, Nima George, and Nan Jiang. You will find brief bios of these excellent students beginning on pg.12 of the newsletter. Wei Lin was also our recent graduate. We offer congratulations to all our fine students, although it is always difficult to say goodbye. I think that you will agree that the program is still committed to providing the very best training experience for its students.

The MCB Program fall retreat was held October 6-7 at new Baker Center on the OU campus. Believe it or not we celebrated the 25th anniversary since the graduate program began. Since that time, the program has graduated over 100 Ph.D. and Masters students. The new Baker Center is a great venue for a meeting and we had many excellent talks and posters presented by faculty, students and alumni. We were excited to continue our tradition of honoring one of our alumni as outstanding MCB graduate. This year that honor was bestowed upon Dr Xiao Chen, one of the very first graduates of the program. Many of you may remember that he worked with Dr. Tom Wagner, and he is currently Associate Professor of Biomedical Sciences at OU and the MCB Graduate Chair.

This was a difficult year for most academic institutions across the nation and OU was no exception. The MCB graduate program funding was reduced as were all academic units at OU. However, I am relieved that we were able to continue our support of graduate students at previous levels. Your support of the MCB graduate program is always needed, but is of critical need now, as we likely face additional cuts in the future.

I hope you will enjoy reading the latest news about *your* MCB graduate program. Please feel free to contact me at any time. In addition, don't be shy - send us some information about yourself, your "old" friends at OU would greatly appreciate hearing from you!

Bob Colvin
Spring 2009

MCB Fall Retreat — October 10-11, 2008

The retreat was a great success and afforded the participants an opportunity to interact, learn, relax, and celebrate the 25th year of existence of the MCB graduate program. The fall weather was exceptional! Over seventy five students, faculty and alumni attended the two day meeting. The retreat kicked off with a stimulating keynote address given by Bob Goldberg (himself an OU alumnus) on Genetic engineering in agriculture - impotance for food, fuel and the future.

The keynote talk was followed by a reception at the new Baker Center.

The retreat reconvened bright and early Saturday morning at the Baker Center for scientific sessions. A total of 38 posters and oral presentations were given by faculty, students, and alumni. A highlight of Saturday's activities was the dinner, where Dr. Norm Cohn gave a lighthearted (but accurate) reflection on the history of the MCB graduate program.

Of special note was the awarding of the second "outstanding MCB graduate" recognition to Dr. Xiao Chen. Xiao was one of the very first gradues of the MCB graduate program and worked with Dr. Tom Wagner - one of the founders of the MCB graduate program. His current research focuses on the areas of diabetes and cancer.

Above: Bob Goldberg gives the keynote speech Friday evening

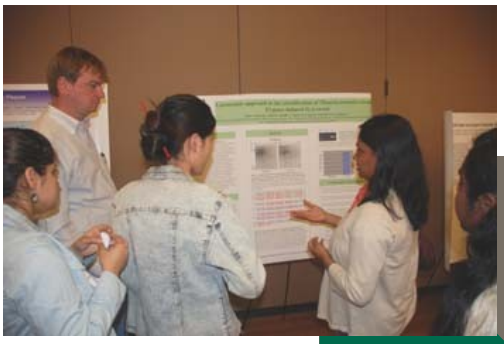
Right: Bill Bergmann, a founding faculty member, attended and gave a talk

Above: MCB Faculty and students discuss topics with VP for Research, Rathindra Bose

Left: Yunpeng Wu, MCB Alumnus, gives a talk on his research

Above: Rathindra Bose– VP for Research and Dean of the Graduate College

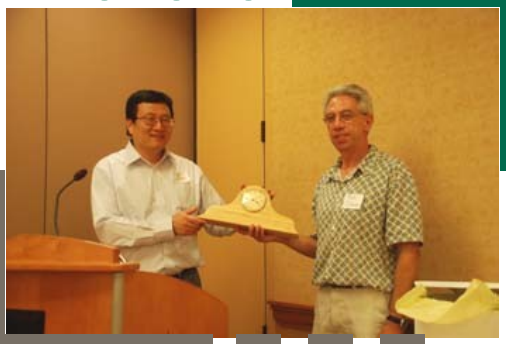
Right: Poster session



Above: Bill Bergmann, Paul Harding and Nick Okada

Right: Xiao Chen is presented with the 2nd Outstanding MCB Graduate Award

Below: Norm Cohn gave a light-hearted history of the MCB program



Above: Allan Showalter, Bill Bergmann and John Kopchick

Below: Saturday evening's dinner

Alumni

Ahmet Arman, PhD.

Greeting from the beautiful city, Istanbul to MCB people!

It was very nice to hear from you via the MCB Newsletter. I wanted to give good news for you and I became Associate Prof. at College of Engineering in Marmara University in January 9, 2009. Also, I was very happy since Prof. Dr. John Kopchick came to ECE Meeting held at Istanbul, Turkey on april 25-29, 2009, visited to my lab and University. Hopefully, Dr. John Kopchick liked Istanbul. If you come to Turkey, please visit us.

Tim Coleman

Tim graduated in 1993 from Dr. John Kopchick's lab. He left Athens to return to his home state of New Jersey and a Post-Doc at the Roche Institute of Molecular Biology (RIMB). After a 1 1/2 Post-Doc, he moved to Maryland and helped start one of the first Genomics companies, Human Genome Sciences. After nearly nine year at HGS, he moved into antoher start-up developing early diagnostic tests for cancer using serum proteomics, Correlogic Systems, Inc. He spent three years trying to develop the science into a commercial application before funding became tight and he had to leave. For the last 3 1/2 years, he has been running the Quality Control department at Lonza, formerly Cambrex, in Walkersville, MD. In March, he was promoted to the position of Global Director, Research and Development for Rapid Testing Systems.

Min Feng (via Morgan Vis)

During Spring Break this year, my husband and I visited Taiyuan, Wuhan and Beijing, China. While in Beijing, we had the good fortune to visit with Min Feng, a MCB alumna from Harvey Ballard's lab, and her family (see photo). Min is currently a Vice Director of the State Key Laboratory of Systematics

and Evolutionary Botany, IB, CAS. She works closely with the researchers and graduate students of her institution and also facilitates collaborations with institutions from other countries. Her institute is in a beautiful suburb of Beijing with lots of surrounding gardens that were just starting to bloom when we were there. We had a wonderful time catching up with Min; she is doing quite well. She gave us the royal tour of her institute, the Forbidden City, Tiananmen Square, the Summer Palace and the site for the 2008 Olympics. All in all it was a fantastic trip, we miss Min all over again and have already started to plan our next trip to China.

Deborah Moore-Lai

I am still working at Cell Signaling Technology in Danvers, MA. I have been here for 5 years now.
I am the Group Leader of the Monoclonal Production and Purification Group. My group produces and purifies all monoclonal antibodies (we currently have over 800) sold by Cell Signaling Technology. We have 2 boys, Nathan (5 years old) and Jacob (2 years old) and are expecting our third baby in September.

Wei Lin

I graduated from OU in the Spring of 2009 from Dr. Colvin's lab. During my Ph.D. study, I found the changes of intracellular zinc triggered by low concentration of exogenous NO. I also showed the induction of tolerance to OGD by exgenous NO and lipophilic metal chelator was required by intracellular zinc in cultured neurons. After graduation, I am working as a postdoctoral research fellow in Brookhaven national lab. I will be focusing on structural and functional studies of ZIP transporters.

Bhavana Mohandas

Boban and I are in Little Rock, AR. I will complete my Internal Medicine Residency end of June and will start fellowship in Adult Cardiology in July this year. Its a three year fellowship program. Boban will complete his residency in Medicine-Pediatrics and will start his fellowship in Pediatric Cardiology in July 2009. It looks like we are becoming 'Southerners'.

Li Yu and Family

Grants and Awards

Student Research and Creativity Fair Honorees

The Ohio University Student Research and Creativity Fair was held May 14, 2009 (see http://news.research.ohiou.edu/news/index.php?item=568 - for additional details). Several MCB students were honored:

Biological Sciences

Second Place:
Carolina Sempertegui

Biomedical Sciences
Second Place:
Yanyan Cao

Chemistry and Biochemistry
Second Place:
Pooja Majumdar

Environmental and Plant Biology
First Place:
Wei Zeng

Second Place:
Brian Keppler

Huzoor Akbar: "Role and the Mechanism of Action of Rac GTPases in Regulation of Platelet Function"

Research in our laboratory is focused on understanding the roles and mechanisms of action of Rho GTPases, namely Rac1, Cdc42 and RhoA in regulation of platelet activation. Rac1, Cdc42 and RhoA, members of the Rho/Ras family of GTPases, have been implicated in early platelet activation events such as lamellipodia, filopodia and stress fibers formation respectively. We have reported that Rac1 is also involved in regulation of platelet secretion and aggregation (J Thromb Haemost 2007;5:1747-1755). We are utilizing a dual approach of gene targeting and pharmacologic inhibition of Rac1, Cdc42 and RhoA to better understand their role in platelet activation.

Harvey Ballard: "REVSYS: Dismantling the Polyphyletic Genus *Hybanthus*"

As the third largest genus in the violet family, Violaceae, *Hybanthus* is distributed in tropical and subtropical regions worldwide and is morphologically diverse. Comprising approximately 100-115 species, the group has been subdivided in its early history into 11 genera. During most of the last century all taxa have been sunk into a broadly defined genus distinguished from others by its zygomorphic flowers with an enlarged and basally saccate bottom petal. Recent reevaluations of the family by Ballard and collaborators using traditional and molecular systematic evidence have revealed that *Hybanthus* comprises seven distinct evolutionary lineages, each distinguished by a divergent suite of leaf, flower and fruit features, as well as chromosome number and geographic distribution. Large chloroplast data sets of the *trn*L intron and *trn*L-F spacer, and *rbc*L for representatives of *Hybanthus* around the world confirm the separateness of these seven lineages and urge their recognition as formally recognized genera. The proposed research will complete long-term efforts by specialists and students in North America, South America and Australia to describe the genera (giving names to three unnamed ones) and species worldwide. This wealth of new and comprehensive information is currently unavailable. Data will be presented on a website, with a searchable BRAHMS database of specimen data and an interactive online key as well as in traditional monographic form. Completion of this research will provide critical products for taxonomists and will further future goals for floristic treatments to various New and Old World flora projects. Funding will support training for an early PhD student and a soon-to-be postdoc. Two summer REU undergraduate assistants will receive extensive training and mentoring in plant systematics, and will visit two of the country's most prestigious botanical institutes, during studies of this fascinating group of violets.

Stephen Bergmeier: "Chiral Separation of catechin and epicatechin to evaluate the effects of processing"

We plan to determine the quantities of catechin and epicatechin enantiomers in samples of cocoa beans and other selected cocoa products to investigate the effect of processing on these compounds.

Catechin and epicatechin enantiomers are important compounds related to the beneficial health effects of cocoa and cocoa products. This will provide information regarding optimal processing of cocoa products to maximize the amounts of specific catechins.

Mark Berryman: "Role of Clic in Epithelial Morphogenesis"

The main goal of this proposal is to determine how Clic proteins, which are highly conserved between humans and insects, control cell shape and movement. Clic proteins are relevant to human health because they are essential for hearing and balance and have been implicated in tumor formation and metastasis. The fruit fly will be used as a model system to understand how Clic works with other genes and proteins known to be important for cell shape and movement during embryonic development.

Karen Coschigano's NIH AREA grant: "Cross-talk between growth hormone and inflammation pathways in kidney damage"

Inflammation and the innate immune system have long been known to play a major role in many types of chronic kidney diseases. More recently, their involvement has been extended to include roles in diabetic nephropathy and even damage due to aging. We have been studying kidney damage in mouse models with different levels of growth hormone (GH) signaling ranging from over-expression to complete lack of GH signaling. Mice with above normal levels of GH signaling spontaneously develop kidney damage, progressing in severity with increasing age. Mice with reduced or no GH signaling are protected from damage, even when diabetes is induced. We and others have observed that levels of inflammatory markers are increased in the kidneys of the mice with increased GH signaling, indicating a positive correlation between GH signaling, inflammation and kidney damage.

Our overall goal is to study the relationship between GH signaling and inflammation in nephropathy. For this proposal we wish to test two hypotheses: 1) Expression of inflammatory markers will be reduced in kidneys of diabetic mice with disrupted GH signaling, as compared to expression in diabetic mice with intact GH signaling; and 2) Direct induction of inflammatory markers by exogenous cytokines in isolated glomeruli, or primary cell cultures or cell lines derived from isolated glomeruli (i.e. mesangial cells and podocytes), will depend on an intact GH signaling pathway.

To test the first hypothesis, we have induced diabetes in growth hormone receptor/binding protein knock-out (GHR/BP KO) mice, which lack GH signaling, and their non-transgenic (NT) littermates, which have intact GH signaling, by injection of streptozotocin, resulting in type 1 diabetes. After 10 weeks, we collected kidney samples to measure both RNA and protein levels of multiple inflammatory markers within the kidneys. The changes in expression will be correlated with changes in kidney morphology and function as well as with GH signaling capability. To test the second hypothesis, we are treating glomeruli and primary mesangial cell cultures isolated from NT and GHR/BP KO mice with cytokines that are key mediators of inflammation (e.g. TNF-alpha, TGF-beta1, IL-6) and measuring expression of cellular inflammatory markers as described above, correlating any changes in expression levels with GH signaling capability. The identification of cross-talk between GH signaling and inflammation pathways in kidney damage will aid in the design of specific, targeted approaches for the diagnosis, treatment or prevention of nephropathy. Second-year MCB student Sulalita Chaki and undergraduate juniors Audrey Lee and Amanda Harwood are participating in this project.

Ahmed Faik

Plant cell wall polysaccharides are important raw materials in the wood, paper, textile, fuel, and food industries. Some polysaccharides, especially those derived from seeds are important food additives. Cereal grains are the most important group of crops produced in the world and represent an important source for a wide range of food products, raw materials, and renewable energy. The plant organ with the greatest impact on the use of these crops is the cell wall. For example, efficient access to the starch and proteins packed in the endosperm cells depends on the physical structure and composition of the walls around the grain cells. Furthermore, hydrolysis of cell walls is an important prerequisite for improved utilization of starch and hemicelluloses in ethanol fermentation and other industries. Nutritionally, cell walls of the starchy endosperm are important sources of dietary fibers. They contain up to 70% arabinoxylans (AXs). These AXs are important functional ingredients in baked products affecting the bread making quality of cereal flours and the mechanical properties of dough. Their chemical compositions are well studied, but their biosynthesis is not, and no biosynthetic genes have been identified. Success in identifying the polypeptides involved in this process will open new avenues to crop improvement, and contribute to plant-breeding programs.

Also, AXs are the most abundant hemicellulose in the walls of cereal husk or bran and a major source of xylose. This xylose can be converted into important value-added products such as xylitol, a natural food sweetener, a dental caries reducer, and a sugar substitute for diabetics. Xylitol has an economic value of ~$12 per pound; its current market is approximately $125 million and growing. Therefore, understanding AX biosynthesis will help bolster the market for such a product by improving the production of xylan polymers in wheat and other plants.

Livestock-feed production has been rapidly increasing worldwide. The availability of wheat on world markets is predicted to increase. Wheat and barley are extensively used in poultry feeds in Australia, Europe, and Canada, however, their use (unlike maize) requires the addition of industrial enzymes (i.e., xylanases, glucanases) to degrade AX and make the starch more accessible to amylases.

Research projects in Dr. Faik's lab focus on understanding AX biosynthesis and degradation. Dr. Faik's work is funded by the following agencies:
NSF: $340,000. Title: "Arabino (glucurono)xylan Biosynthetic Genes Involved in Endosperm Cell Wall Elaboration in Wheat."
USDA: $50,000. Title: "A Matrix-Assisted Laser Desorption/Ionization-Time-of-Flight Mass Spectrometer (MALDI-TOF) for Plant Cell Wall Research"
OPBC: $10,000. Title: "Identification of novel endo-xylanases for industrial applications and analytical tools for the analysis of plant cell wall xylans"

Mario Grijalva: AREA: Characterization of Trypanosoma Cruzi in Southern Ecuador"

Dr. Grijalva received a three-year $201,839 NIH award recently for his grant proposal, "Characterization of Trypanosoma cruzi in Southern Ecuador. "Trypanosoma cruzi is the organism that causes Chagas, a parasitic human disease found mostly in Latin America. The disease is spread through the blood-sucking insect triatomines, also called "kissing bugs," which live between northern Argentina and the southern United States.

According to Grijalva, little is known about Chagas—even though an estimated 10 million people are infected with this potentially fatal disease, and about 200 million are at risk. Even Grijalva—a native Ecuadorian—had not heard about the disease until he came to OU-COM as a graduate student and began collaborating with Edwin Rowland, Ph.D., past MCB director (see page 14), on his Chagas research. Grijalva hopes to shed some light on Chagas by tracking the movement of the disease throughout the region of Loja, Ecuador. He will take samples from the triatomine bugs and from people and other mammals—rodents, dogs and cats—that have been infected with Chagas. Parasites isolated from these hosts will be compared molecularly to determine their degree of relatedness. According to Grijalva, understanding the transmission of Chagas will help inform country-wide Chagas disease control programs in Ecuador.

"This research allows us to strengthen current Chagas control initiatives, which will benefit millions of people," Grijalva said. "It also provides an ideal environment for training of students and faculty from Ecuadorian institutes and Ohio University."

This summer Grijalva will lead an interdisciplinary research team of 30 students—medical, undergraduate and graduate—to Ecuador. About half will be Ohio University students, and the other half hail from universities across the country. They will work together with Ecuadorian students and faculty, the Ecuador Ministry of Health, and both government and non-government organizations.

(http://www.oucom.ohiou.edu/news/stories/nih_grants_may_08/Grijalva.htm)

Tinyue Gu: "Simulation Software for Ion-Exchange Chromatography"

This project produced a software program that simulates ion-exchange operations in biopharmaceutical separations. It can be used to optimize an ion-exchange operation in a downstream process. Dr. Gu is a world leader in the area of modeling of liquid chromatographic operations. He published a monograph on the subject entitled "Mathematical Modeling and Scale-up of Liquid Chromatography."

Marcia Kieliszewski: Two Grants

National Science Foundation: Collaborative Research: *Dissecting the Role of RSH Extensin in Assembly of the Plant Cell Wall*

The plant cell wall is a self-assembling supermolecular structure whose properties arise from correct assembly. Malfunctions exemplified by cell wall mutants range from xylem collapse in cellulose deficient walls to lethal disorientation of new cross-wall formation in the *rsh* extensin mutant. However, defining the precise rules for wall self-assembly requires dissection at a molecular level.

One aspect of our work focuses on the Arabidopsis *rsh* embryo defective/ lethal mutant, which cannot assemble a functional cell wall because it lacks a specific hydroxyproline-rich glycoprotein, notably a crosslinking extensin designated RSH (root, shoot and hypocotyl). Thus complementing the *rsh/rsh* mutation with a series of RSH analogs will enable analysis of the contributions RSH makes to cell wall assembly. This involves manipulations of the wild-type gene and analogs produced through synthetic genes. RSH is ideally suited for a synthetic gene approach as its simple, highly repetitive polypeptide is largely comprised of the repetitive 28-residue repeat: $SP_4KKHY-VYKSP_4VKHYSP_3VYH$ in which the Pro residues are hydroxylated and the hydroxyproline (Hyp) subsequently arabinosylated. Notable features of the RSH repeat include: 1) isodityrosine (Idt) intramolecular crosslinking motif YVY also hypothetically involved in intermolecular extensin crosslinking via di-IDT; 2) abundant Lys and His residues hence a highly basic character; and 3) highly conserved repetitive glycomodules. Because the features of RSH that rescue the mutant most likely coincide with those involved in wall assembly, the essential structural features will be elucidated using designed RSH analogs with motifs altered throughout by YàF and L; KàL, E or Q; HàQ or A; and SàA mutations. As preliminary results indicate a requirement for an unmodified C-terminus, analogs with altered N- or C-terminal 'telopeptides' are also being tested. Finally native RSH, RSH analogs and Arabidopsis cell walls will be characterized biochemically, including *in vitro* crosslinking assays.

National Science Foundation: Award number MCB0618334: Collaborative Research: *Functional analysis of Arabidopsis formins, a family of actin-nucleating proteins*

Actin-nucleation, the polymerization of the first two to three monomeric actins, is the rate-limiting step in the formation of actin filaments, structures that underlie the actin cytoskeleton. Formins are one of two known families of actin-nucleating proteins. Our work also aims to determine the functional roles of 20 *Arabidopsis* genes, *AFH*1-20, encoding formin-homology proteins, in plant growth and development. Half of the *AFH*s (group I) have the plant-unique feature of having a potentially glycosylated extracellular and a transmembrane domain that anchor the cytosolic actin-interacting domain to the cell surface. Group I AFHs thus serve as perfect candidates for mediating extracellular stimuli directly to the actin cytoskeleton, analogous to integrins in other organisms but which have not been identified in plants. We propose to elucidate the functional roles for *AFH*s in plant growth and development through a combination of *AFH* expression, AFH protein localization and *afh* mutant analyses. We will also examine the actin cytoskeleton in affected cells to provide a cellular basis for the observed growth and developmental phenotypes. The glycosylation properties of selected group I extracellular domains and their functional significance will be examined. We will also examine if there are functional interactions among individual AFHs and the functional networking between AFHs and other interacting molecules.

Lonnie Welch

A HIGH PERFORMANCE COMPUTATIONAL BIOLOGY PIPELINE FOR REGULATORY GENOMICS

Biologists are studying the regulatory mechanisms of plants to gain insights that will lead to improved crop production. Experimental methods that provide useful data about regulatory genomics produce large amounts of data.

Unfortunately, current information technology is not sufficient to handle the resulting data. Therefore, biologists spend large amounts of time manually sorting through experimental data sets. To address this problem, we propose to develop a bioinformatics software pipeline that will integrate (1) the AGRIS repository of plant regulatory information (at Ohio State University), (2) experimental processes (ChIP-chip and microarray), and (3) the WordSeeker functional and regulatory genomics bioinformatics software suite (at Ohio University). The project will bring together Ohio researchers with knowledge of regulatory genomics, in-silico analysis, and experimental biology, and will result in a powerful toolkit for high throughput identification of the elements of regulatory networks. The resulting techniques will be applied to two case studies involving the model plant Arabidopsis thaliana. The project will provide a proof-of-concept for how a motif discovery capability can be integrated with a curated database and with experimental processes. This will help the investigators to seek funding to apply these techniques genome-wide, to identify functional elements throughout plant genomes.

THE OHIO BIOINFORMATICS CONSORTIUM (OBC)

The Ohio Bioinformatics Consortium strives to enhance educational opportunities and research infrastructure throughout the state to make Ohio a world leader in bioinformatics and to facilitate new discoveries in data-intensive biomedical research. We carry out this mission through several activities: Developing a statewide, comprehensive bioinformatics curriculum; providing scholarships for undergraduate and graduate students who are studying bioinformatics; performing outreach to encourage K-12 students to pursue careers in bioinformatics; organizing the annual Ohio Collaborative Conference on Bioinformatics (OCCBIO); developing bioinformatics infrastructure to facilitate new discoveries in biomedical research; performing basic research that will lead to better bioinformatics algorithms and models; discovering new knowledge by utilizing bioinformatics capabilities; interacting with the bioinformatics-related industry to understand their needs; and facilitating industry internships and research experiences for students.

Ohio researchers, educators and practitioners have collaboratively organized the annual Ohio Collaborative Conferences on Bioinformatics (OCCBIO) since its inaugural meeting in June 2006. The past and planned OCCBIO meetings are:

OCCBIO 2006 - June 2006, Ohio University, Athens, Ohio (102 registered attendees) (http://www.occbio.org/2006/index.shtml)

OCCBIO 2007 - July 2007, Miami University, Oxford, Ohio (164 registered attendees) (http://www.occbio.org/2007/index.shtml)

OCCBIO 2008 - June 2008, University of Toledo and Medical University of Toledo, Toledo, Ohio (198 registered attendees)(http://www.occbio.org/2008/index.shtml)

OCCBIO 2009 - June 2009, Case Western Reserve University, Cleveland, Ohio (http://www.occbio.org/2009/)

OCCBIO 2010 - June 2010, Ohio State University, Columbus, Ohio

OCCBIO 2011 - June 2011, Ohio University, Athens, Ohio

In August 2007 the OCCBIO conference leadership formally united to form a consortium to leverage the existing statewide research community to enhance Ohio's national role in the area of bioinformatics. In May 2008 the consortium was awarded $9M from the University System of Ohio and 11 academic institutions. The funds will provide scholarships to 345 graduate and undergraduate students who will study bioinformatics in universities across the state of Ohio.

Sarah E. Wyatt, PhD.: Multiple Grants

"GFP as a Tool for Multi-representational Visual Translation," The grant is funded through the NSF Division of Undergraduate Education and funds our efforts to develop new laboratory courses using cutting edge molecular tools such as reporter genes like the Green Fluorescent Protein (GFP). The courses provide students with practical research skills and knowledge needed for working in the field of cell and molecular research.

"MRI: Acquisition of Equipment for a Core Genomics Facility at Ohio University," The NSF grant funded the acquisition of several pieces of equipment to establish the Ohio University Genomics Facility. The facility opened in April 2007 and has been a huge success. It offers DNA sequencing, DNA fragment analysis, gene expression analysis at the genomic level (http://www.dna.ohiou.edu/). It provides OU researchers with tools to support cutting edge research in plant biology, biomedical and biological research. The facility is currently used by researchers in 3 colleges and 8 departments across campus.

"REU Supplement: MRI: Acquisition of Equipment for a Core Genomics Facility at Ohio University," This supplemental grant provides funding for an undergraduate internship in the Genomics Facility.

"Functional Characterization of a Cytochrome P450 Involved in Gravitropic Signal Transduction." This NSF grant funds research on a novel mutant (*gps1*) in Arabidopsis. The mutant is defective in its ability to respond to gravity. Plants use gravity as a signal to position shoots, roots, flowers, seed pods and other organs for optimal use of resources such as light and water. The gene disrupted in *gps1* was determined to be a cytochrome P450. P450s are a large group of enzymes and we are currently trying to determine the substrate of this P450 and its role in gravitropic signal transduction.

Ramiro Malgor: "Understanding Wnt5a and TLR-4 cross-signaling during Atherosclerosis"

Atherosclerosis is a highly prevalent chronic disease in the United States, with a striking impact on public health. Despite concerted efforts in changing lifestyles and the use of new pharmacologic approaches to lower plasma cholesterol concentrations (the main risk factor), currently, there is no specific treatment to curtail its development.

Atherosclerosis is a chronic inflammatory disease involving the walls of large and medium-sized elastic and muscular arteries and can lead to ischemia of the heart, brain, intestine or extremities, resulting in infarction.

While our recent work has clearly established the presence of Wnt5a in the macrophage rich regions of murine and human atherosclerotic tissue: **Wnt5a is Expressed in Murine and Human Atherosclerotic Lesions** *Am J Physiol Heart Circ Physiol* 294: 2864-2870, 2008; the role of Wnt5a in the pathogenesis of atherosclerosis has not been characterized, and the source(s) of Wnt5a has (have) not been determined.

Our goal is to understand the role of Wnt5a signaling as well as the crosstalk between this signaling pathway and Toll-Like Receptor-4 (TLR-4), another important signaling pathway involved in atherosclerosis. The long term goal of this project is to understand the pathogenic mechanisms involved in this disease.

Both *in vivo* and *in vitro* approaches involving immunostaining, *in situ* hybridization, laser microdissection, RT-PCR and western-blots, in atherosclerotic lesions of $ApoE^{-/-}$ mice, a well-accepted murine model of ATH, and human carotid artery samples obtained from patients undergoing endarterectomy, will be used to answer these questions. The results from this project will provide important information about the cellular and molecular mechanisms involved in the pathogenesis of atherosclerosis, which in turn will help in the development of new therapeutic strategies.

New Students

William Broach

I went to Eastern Kentucky University for undergraduate where I earned a BS in Biology and a minor in Chemistry. I am currently working with Dr. Erin R. Murphy on Shigella dysenteriae virulence and small RNAs. Once I complete my doctoral studies I hope to obtain a post-doctoral position working with clinically significant pathogens and eventually become a professor.

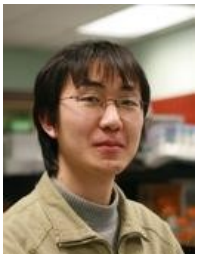
Nima Maria George

I joined the Department of Environmental and Plant Biology and started working with Dr. Sarah E. Wyatt's research group during fall 2008. I have completed my Bachelors in

Agriculture and Masters in Plant Biotechnology from India.

Currently I'm pursuing my Ph.D. in the Molecular and Cell Biology Program at Ohio University. My studies focus on the identification and characterization of gravity persistent signal 3 (*gps3*) gene in Arabidopsis mutants.

Nan Jiang



Nan received his undergraduate degree from Capital Normal University in Beijing, China. He is now working in Dr. Faik's lab, researching plant cell wall biosynthesis.

Andy Kouse

I am originally from Enon, Ohio and first came to Athens in the fall of 2005 to study Molecular and Cellular Biology. In the spring of 2008 I received my Bachelor's degree from Ohio University and have come back to O.U. for my graduate work.

I began my graduate work in the summer of 2008 and am currently, a first year graduate student in the Molecular and Cellular Biology program. My graduate work began with three rotations in the laboratories of Dr. Shawn Chen, Dr. Huzoor Akbar and Dr. Erin Murphy. In the winter of 2008 I made my decision to stay in Dr. Erin Murphy's laboratory where I am studying the temperature regulation of ShuA, a cell-surface heme receptor in Shigella dysenteriae, on the translational and transcriptional levels.

Previous Directors

Finie Murray

After retiring from Ohio University in 1998, I served as Dean of the Ellis College of Arts and Sciences at Henderson State University in Arkadelphia, Arkansas, and taught biology for two years. In 2000, I became Dean of the College of Arts and Sciences at Texas A&M University in Commerce, Texas. After two years, I was asked to serve as interim Provost and Vice president for Academic and Student Affairs for a year, and then I returned to serve another year as Dean of Arts and Sciences.

I also taught biology during the time I served as dean at A&M Commerce. In June 2004, I became Senior Vice Chancellor for Academic Affairs and Student Life at the University of Nebraska at Kearney. In this post, I had responsibility to develop international programs in China and Korea, in addition to my other duties. After announcing my intention to retire from UNK on June 30, I transferred my Vice Chancellor responsibilities to the new Senior Vice Chancellor on March 1, 2009, but from January 1, 2009 to the end of June, I have also served as interim director of the Office of International Education at UNK.

After June 30, we will move back to Texas, and after six weeks of visiting family in Texas and North Carolina, my wife, Deborah, and I will relocate to Weihai, Shandong, China, where we will teach (biology in the College of Marine Sciences for me and Management and Business Development in the College of Business for Deb) and work in the International office assisting students coming to America and American students studying in China. We anticipate working in these functions for several years, and we are excited about the new opportunities. We would be pleased to welcome students and old friends in either Texas or China!

Best wishes to everyone!

Ed Rowland

After stepping down as MCB chair in 1993, Ed Rowland's lab continued their work on the immunobiology of *Trypanosoma cruzi* infection and involvement with the Tropical Disease Institute. His teaching activities have involved the non-majors' microbiology course, parasitology and various duties in medical education including small group facilitation and histology instruction. When the Biomedical Sciences department was formed by COM in 1998, Ed served as Associate Chair from 98-03 and then Chair from 03-08. Upon early retirement in January of 09, he now teaches spring quarter. The doctoral graduates from Ed's lab are Shumin Yang (Maxigen Corp., CA); Tom McCormick (Dept of Dermatology, Case Western Reserve University); Mario Grijalva (Dept. of Biomedical Sciences, OUCOM); Zhuo Chen (computer consultant, CA); Deborah Moore-Lai (CellSignal Technologies, MA) and Jaime Costales (Catholica University, Quito, Ecuador).

Previous Directors (cont.)

Allan Showalter

I continue to conduct research on the plant cell wall and the hydroxyproline-rich glycoproteins (HRGPs) that are part of the wall. My current research involves: 1. the use of bioinformatics to discover new plant HRGPs, 2. examination of HRGP mutants in Arabidopsis to elucidate the function of these glycoproteins, and 3. the identification and characterization of the enzymes (i.e. glycosyl transferases) responsible for the addition of particular sugars to form these glycoproteins. This research is conducted in collaboration with other OU MCB professors including Drs., Ahmed Faik, Marcia Kieliszewski and Lonnie Welch and is supported by grants from the USDA and the Ohio Plant Biotechnology Consortium. I also continue to teach MCB 720 (Molecular Biology), MCB 730 (Molecular and Cellular Biology Laboratory) as well as other courses in my home department, Environmental and Plant Biology. One of my major service assignments at present is being the Graduate Committee Chair for my department.

When I'm not engaged in these academic pursuits, I enjoy spending time with my family, traveling, gardening, and playing tennis. I am looking forward to traveling to Hawaii this summer with my family to attend a meeting and then do some serious relaxing.

My best regards go out to all our MCB alumni. Please send me a line and tell me what you are up to if you have time. My email address is showalte@ohio.edu.
Cheers,
Allan

Martin Tuck

After leaving the MCB chairmanship in 2004, Dr. Tuck joined the Provost's Office at Ohio University as the Associate Provost for Academic Affairs.

In this position, his responsibilities relate to faculty issues such as promotion and tenure, faculty fellowship leaves, teaching awards as well as other university academic concerns such as accreditation and working with the University Curriculum Council on curricular issues. He also serves as the Provost's Office liaison related to academics.

While Dr. Tuck no longer maintains a research laboratory, he continues to teach a course each year in the biochemistry curriculum, and occasionally works with Honors Tutorial College students.

MCB Class Picture 2009

Row 1: Carolina Sempertegui, Nima George, Yingying Wu, Sulalita Chaki, Juan Ding, Shuhua Du

Row 2: Laura Cristea, Besty Justus, Pooja Majmudar, Mohor Chatterjee, Conny Bartholmes

Row 3: Kaiyu Shen, Nan Jiang, Chris Lewis, Lucila Sackmann Sala, Yi Lui, Wei Liu, Yanyan Cao, Yanli Ding

Row 4: Brian Keppler, Jian Li, Elahu Gosney, Bill Broach, Christian Stork, Andy Kouse, Zhenchao Wang

Not Pictured: Anandi Bhattacharya, Yan Liang