The CMB Transcript
Summer 2016
Message from the Chair

Greetings, CMB alumni, students, and faculty. Thank you for taking the time to catch up on the past year’s happenings in the CMB Program. It has been another exciting year. We have welcomed Lauren Weitkamp as the new Student Services Coordinator. Lauren replaces Jessica Skarlupka who has moved on to new opportunities as the Event and Continuing Medical Education Coordinator for the UW-Madison Department of Obstetrics and Gynecology. We have also seen students, past and present, make great strides in research and teaching. The newsletter contains a story about CMB alumnus Jason Kuehner (PhD 2008), who is working to coordinate science and technology activities between schools in the United States and China as well as a reprinted interview of the NIH Director Francis Collins by a current student Sarah Neuman. You can also read about the theses defended, papers published, and awards received by CMB students, including a story by Holly Cho about Shang Ma, who is this year’s recipient of the CMB Exceptional Thesis Award.

Lastly, Sarah Rempel has written about the 2015 Annual Student Retreat at Heidel House, a long-standing CMB tradition.

We continue to encourage CMB alumni to become involved in the professional development of CMB students. Please contact the CMB office (cmb@bocklabs.wisc.edu) if you would be willing to discuss your career path with CMB students.

In closing, I hope that you enjoy reading about the amazing accomplishments by members of the CMB Program.
- David Wasserman

Our New CMB Student Services Coordinator, Lauren!

Lauren joined CMB as the new Student Services Coordinator in April, and has immensely enjoyed getting to know the CMB students, faculty, and alumni over the course of the summer. She was an undergraduate at UW-Madison and recently received a Master’s degree from Boston University in Educational Leadership & Policy Studies. While in Boston, she worked in the Boston University Graduate Programs Office and in the MIT Registrar’s Office on the Curriculum and Faculty Support Team. Lauren is thrilled to be back in Madison—some of her favorite things to do here are exploring the farmers’ market, biking around town, and hanging out at the Terrace. She lives near Willy Street with her husband Carl and their 24-pound cat Ulysses.
When Shang Ma, the 2015 recipient of the CMB Exceptional Thesis Award, first joined Dr. Zhen Huang’s lab in the Neuroscience Department, his path to success was anything but certain. He was entering his third graduate research lab, after a leave of absence made necessary after having joined and left two successive labs. This was, as Dr. Huang will readily admit, not the usual resume that would convince a PI to take on a new student. But Shang’s journey had given him an unusual asset – his conviction.

Shang was born and raised in Beijing, where he grew up knowing he wanted to pursue science. After completing a bachelor’s degree in Canada, he came to UW-Madison, attracted by its long tradition of training top researchers in the life sciences and the flexible, student-oriented approach to the curriculum that is valued by the CMB program. But as many young PhD students know, things rarely proceed as expected in graduate school, and Shang found himself on a leave of absence with no lab to call home.

During those months away from the university, he was forced to reflect on what drew him to science, and whether he wished to continue with graduate school. He realized that he truly loved the feeling of discovery and that “science is a way to make people suffer less and live better.” He decided that he was young enough to deserve another chance and contacted Dr. Huang with an interest in joining his research group.

Shang returned to science with a newly matured attitude, realistic expectations, and the certitude of someone who had nearly let an opportunity slip through his fingers – ready to turn “a bad experience into a positive power.” During his rotation, he was determined to make up for lost time, and his dedication and work ethic were very apparent to Dr. Huang, as he came to the lab and worked hard every day, including weekends.

Shang’s work in the Huang Lab involved the use of mouse models to study brain development. His thesis research began with the discovery that a mutant in which neural progenitor cell division was genetically blocked did not have “dramatic neural abnormalities”, but unexpectedly, had disruptions in the vascular pattern in the developing brain. It became clear that neural progenitor cells have crucial roles in stabilizing blood vessels during development. During his time in the lab, he published three first-author papers detailing the molecular network regulating this developmental pathway as well as additional neuromuscular interactions.

When asked what he believed contributed to his eventual success despite his rocky start, Shang responded, “Ironically, one advantage of being a dropout (nearly) was that I came back to graduate school with a more mature attitude and developed a more efficient way of doing things.” He was also modest in taking credit for his achievements, saying, “I think that I was productive as a student, but this is thanks to my advisor Zhen, who encouraged me to start with simple experiments, followed by patient data collection and careful analysis.”

In response to the same question, Dr. Huang said “he has good instincts… but another factor of his success was his persistence, both in the time he spent in the lab as well as the time he spent digging into questions.”

Shang has received an award of $250, and his name has been added to a plaque that hangs in Bock Laboratories, where the CMB program is headquartered. He is now working as a post-doc with Dr. Ardem Patapoutian, an HHMI Investigator at the Scripps Research Institute, where he is studying mechanotransduction. He hopes to eventually contribute to science as an independent PI. With his experience, focus, and determination to succeed, it seems certain that Ma will be able to achieve great things in science – the road is finally clear.

By Holly Cho
Behind the Podium:
NIH Director Francis Collins, Keynote Speaker at TAGC

As the former leader of the Human Genome Project and the current Director of NIH, Dr. Francis Collins has led an illustrious and successful scientific career. Attendees of The Allied Genetics Conference (TAGC) will be treated to a robust discussion of current scientific advancements in the field of genetics and the importance of basic research during his keynote address at the meeting. Because his scientific roots are in genetics, Collins is particularly excited to be a part of TAGC and to interact with the genetics community at large.

One might wonder what makes a scientist like Dr. Collins “tick.” Trained as both a physician and a geneticist, Dr. Collins cites his clinical interactions with patients as a motivating force for his research on the genetic basis of disease. Work done by Collins and colleagues was instrumental in identifying the genes responsible for several diseases, including cystic fibrosis, Huntington’s disease, and progeria, a rare premature aging disorder. Collins regards this connection between basic science research and clinical treatment as a special privilege he was granted during his career. Collins’ expertise in medical genetic research led to his appointment as the director of the National Human Genome Research Institute, which oversaw the Human Genome Project. When asked what career accomplishment he has found most rewarding, Dr. Collins answered without hesitation: “[I was honored to have] the privilege of leading the Human Genome Project, to read out all those letters of the human DNA instruction book as well as all the other model organisms that were part of the project.”

When it comes to the future of biomedical research, Collins is enthusiastic about the role of genetics and model organisms. He thinks that we will depend on model organism research more than ever as we continue to unravel the mysteries of the human body and uncover the causes of disease. Collins notes that many experiments simply cannot be carried out in humans due to ethical concerns or the complexity of the human body. Throughout the decades, there have been many fundamental discoveries made in model organisms that were then applied to humans, and

Dr. Collins predicts that the field will continue to depend on these systems more and more to discover how life works and to understand what can go wrong in disease.

Dr. Collins also has some sage advice for early-career scientists. “This is the best time in history to get involved in science, particularly life science, but one should aim to try to answer important questions and not just obvious ones. And, you should count on doing this in a fashion where you ally yourselves with other talented people who have different expertise, because much of the excitement seems to happen at the interface between disciplines. This is not a time to be narrow.” Conferences like TAGC and organizations like GSA that unite researchers from diverse model systems provide an ideal platform to promote interdisciplinary collaborations that will help move science forward.

For anyone who is not yet sure if they want to attend TAGC, perhaps Dr. Collins’ “elevator pitch” will persuade you:

“Genetics has become the way in which we unravel the mysteries of life across the entire spectrum of animals, plants, and bacteria, and if you want to be doing something interesting in science right now, you are probably going to be using the tools of genetics to solve mysteries, and that should be on full display at this meeting.”

Written by: Sarah Neuman
Originally written for the Genes to Genomes blog
CMB Photo Album

Tricia Windgassen
Will Olson
Francisco Barros

Meihua Kwong
Kyle Quinney
Patrick Cervantes
Michelle Keller-Pearson
Assistant Professor of Biology Jason Kuehner (PhD 2008) traveled with Biology major Thomas Tallo, who is concentrating in health sciences, to Beijing, China to attend the International Beijing Science Festival (BJSF). The festival is sponsored by the Beijing Association for Science and Technology (BAST) with the aim of strengthening international cooperation on science popularization and science literacy.

The festival was held September 18th-25th, 2015 at the Beijing Olympic Park. Kuehner and Tallo were invited to the festival based on their volunteer service with a local nonprofit group, US China Scitech Education Promotion Association, which coordinates science and technology activities between schools in the United States and China. The two have been conducting research together at Emmanuel for two years - their research studies gene regulation during cell stress, including DNA damage and cell wall stress.

"I wanted to attend the festival to connect with scientists across the world and help spark interest in the sciences among students of upcoming generations," Tallo said. "I also enjoy experiencing other cultures and traveling." This trip was Tallo's first time in China.

At the festival, Kuehner and Tallo gave 20 different interactive demonstrations in nanotechnology for the general public and school groups. They worked with members of the Nanoscale Informal Science Education Network (NISE), which aims to foster public awareness, engagement and understanding of nanoscale science, engineering and technology. They also worked with Brad Herring, director of NISE and multimedia developer at the Museum of Life and Science in Durham, North Carolina, and Frank Kusiak, project manager at the Lawrence Hall of Science at the University of California, Berkeley, as well as Chinese middle school student volunteers from Beijing and science outreach professionals from China, Denmark, Germany, England, Switzerland, South Africa, Israel and Australia.

"This experience was important for Tom and myself because it exposed us to international science outreach methods, helping us to see the 'universal best practices' that can break down even the most significant obstacles like language barriers," said Kuehner. "If you're excited about a topic and can convey that enthusiasm, the science can sell itself."

"My biggest takeaway is that good science outreach can capture a child's imagination despite what appears to be an insurmountable obstacle," Dr. Kuehner said.
Tallo added, "It was rewarding to see the kids get excited and express genuine interest in the activities we held with the rest of the group."

Kuehner was further convinced in the universality of science when he saw Herring conduct a demonstration that made nearly 30 Chinese middle schoolers simultaneously gasp in awe. He also said Tallo also performed a demonstration that involved a balloon “nano tube sculpture” and the Emmanuel senior was surrounded by dozens of excited students.

“My biggest takeaway is that good science outreach can capture a child's imagination despite what appears to be an insurmountable obstacle,” Kuehner said.

Outside of the festival, Tallo and Kuehner had the time and opportunity to do some sightseeing, which was equally as important and informative to them. They explored the Great Wall of China, Beijing National Stadium (also known as the Bird's Nest), Tiananmen Square and the Forbidden City, and dined at several restaurants in the city.

Tallo and Dr. Kuehner interacted with student volunteers and were part of a group as they traveled across the city, which Dr. Kuehner said gave them all a chance to learn and challenge their previously held assumptions about Chinese and American culture.

Tallo agreed, saying, “I realized that there are many misconceptions in the United States about the Chinese people, their government and their way of life. The biggest takeaway was becoming more knowledgeable about the Chinese culture.”

As a student in the CMB Program, Dr. Kuehner researched the mechanism and regulation of eukaryotic gene expression, both at the level of transcription initiation and termination, under the direction of Dr. David Brow. He has been an Assistant Professor at Emmanuel College since 2012.
CMB graduate student Adriana Golding and Professor Bill Bement spent a month in the lab of their collaborator, Dr. George von Dassow, at the Oregon Institute of Marine Biology this past summer. Professors Bement and von Dassow have discovered that a series of proteins required for cell division become organized into repetitive activity waves in the cell cortex as the cell prepares to divide. The waves become progressively confined to the equatorial cortex of the cell where they direct the formation of the so-called cytokinetic apparatus, the structure that ultimately splits the cell in half. This behavior indicates that the cell converts its cortex into an “excitable medium”, a kind of dynamic system long studied by physicists and mathematicians but previously thought in biology to be confined to cell ensembles such as neural networks. And, unlike the excitability in neural systems, which is carried by ions and ion channels, the excitability studied by Golding, Bement, and von Dassow is carried by cytoskeletal proteins and their regulators. This research represents a remarkable convergence of scientific fields, and will likely prompt studies to determine whether other cells display cortical excitability in different contexts.
STUDENT PUBLICATIONS


Colluru VT, Johnson LE, Olson BM, McNeel DG. (2016) Preclinical and clinical development of DNA vaccines for prostate cancer. Urol Oncol. 34, 193-204.


STUDENT PUBLICATIONS


**STUDENT PUBLICATIONS**


**STUDENT PUBLICATIONS**


I first learned of the annual CMB retreat during my recruitment weekend last year. I heard tales of epic photoscavenger hunts, impressive (or at least hilarious) talent show performances, and the power of jumping in a freezing cold lake at midnight to bring together CMB students from all corners of biology. It wasn't until months later, when I arrived for orientation, that I learned that this mythical getaway also served as an opportunity to present and hear about others’ research!

The student-organized 2015 Annual CMB Retreat took place the weekend of November 7-8 at Heidel House in Green Lake, WI. We arrived early Saturday morning in time for a quick breakfast before the talks began. The day was filled with eleven talks that exemplified the range of CMB student research, beginning with a metabolic look at Toxoplasma gondii infection and ending with the role of collagen and environmental stiffness in breast cancer.

Organizers Nadia Khan, Drew Doering, and Francisco Barros Becker kept the energy up throughout the day with breaks including talent show acts, Lab Libs (think Mad Libs), and Lab Olympics. Instead of just grabbing more coffee during breaks (okay, maybe in addition to grabbing coffee), we heard the musical stylings of the Second Years, we raced one another to stuff tip boxes and carry stacks of petri dishes to the end of the room and back, and we heard some fungal humor during Michelle Pearson's stand-up act.

Of course one of the most valuable aspects of the Annual CMB Retreat is that it allows us to bond as a program, especially given that our far-flung scientific interests sometimes mean less interaction than other programs. Saturday evening of the retreat is devoted to just that. A photo scavenger hunt sent us running around the resort, grabbing makeshift props from friends’ rooms, posing in hallways or on the lawn, or even jumping in the freezing cold Green Lake.

The scavenger hunt was followed by trivia (did you know Bucky's full name is Buckingham U. Badger?) before the scavenger hunt photos were reviewed and judged. The winning team was awarded the much-coveted golden pipette.

Sunday morning we woke up for a few more talks and the First Years’ talent show act before driving home, tired but with new friends, new knowledge of CMB students’ research, and with new stories to recount and laugh about come recruitment season.

Sarah Rempel
CMB Student
This year’s student retreat will take place November 5-6, 2016 at Heidel House. If you are interested in getting involved in the planning of next year’s retreat, you will have the opportunity to sign up during the retreat!

Honors and Awards

Students

Tippapha Pisithkul (Class of 2013, Amador-Noguez lab)
HHMI International Student Research Fellowship

Sarah Neuman (Class of 2011, Bashirullah lab)
Straka Fellowship, 2016-17

Jiarong Gao (Class of 2016, Newmark Lab)
HHMI International Student Research Fellowship

Marissa Gaskill (Class of 2016)
Molecular Biosciences Training Grant (MBTG) awards, 2016-2017

Ani Varjabedian (Class of 2016)
Molecular Biosciences Training Grant (MBTG) awards, 2016-2017

Faculty

Andrew Mehle
UW2020 Initiative Award
(In collaboration with the Friedrich group)

David Brow
2016 UW-Madison Chancellor’s Distinguished Teaching Award

Elected to the American Academy of Microbiology

Anjon Audhya
Vilas Faculty Early Career Investigator Award

Xuehua Zhong
NSF Career Award to study Molecular Dissection of DNA Methylation Mechanism in plants
Honors and Awards

Alumni

Ahna Skop (PhD 2000 and CMB faculty trainer)
2016 UW-Madison Chancellor's Distinguished Teaching Award

2015 Kavli Frontiers of Science Fellow

To read more about Ahna and her awards, check out these articles!


http://news.cals.wisc.edu/2016/03/05/ahna-skop-honored-with-uw-distinguished-teaching-award/
Craig Barcus - Prolactin and the collagen extracellular matrix: partners in driving progression of estrogen receptor alpha positive breast cancer
  Post-doc, Washington University School of Medicine

Esteban Carrillo - Extracellular matrix stiffness dictates changes in gene expression during breast cancer progression
  Post-doc, Wisconsin Institutes for Medical Research

Nicholas Davenport - Molecular and cellular determinants of pattern formation during wound repair in Xenopus laevis
  Post-doc, UW-Madison Bement Lab

Antoinette Dummer - Probing the biological functions and interactions of the Fkh1 FHA domain in Saccharomyces cerevisiae
  Post-doc, UW-Madison Fox Lab

Maria Garcia Mendoza - Effects of a collagen-dense microenvironment on myeloid cells
  Post-doc, University of Texas MD Anderson Cancer Center

Tony Hanson - Characterization of stabilizing mutations in the H5N1 hemagglutinin influenza protein
  Regional Associate, WiSyS Technology Foundation

Brittany Jacobs - Rheb and TSC2 are critical regulators of mechanically-induced mTOR Signaling
  Biologist, Environmental Protection Agency - Office of Water

James Kirui - Conserved polymerase structural features and ubiquitination regulate the influenza virus RNA replication machinery
  Post-doc, HIV Dynamics and Replication Program, Center for Cancer Research

Matthew Larson - Myosin-10 and Wee1 coordinate mitotic spindle positioning dynamics with mitotic progression
  Medical Student, UW-Madison School of Medicine and Public Health

Rob Lera - Novel strategies for decoding the functions of Polo-like kinase 1
  Research Associate, Wisconsin Institutes for Medical Research

Ronghui Li - The role of MeCP2 in the regulation of alternative splicing
  Post-doc, Salk Institute

Justin Massey - Analysis of host membrane-shaping reticulon proteins in HIV-1 replication
  Medical Student, UW-Madison School of Medicine and Public Health

Jarred Rensvold - Identification and characterization of an adaptive mitochondrial biogenesis response to iron deprivation
  Assistant Scientist, Morgridge Institute for Research

Bryan Sibert - Multimerization and membrane interactions of bromovirus 1a protein in RNA replication complex assembly and function
  Post-doc, UW-Madison Ahlquist Lab

Zhangli Su - The molecular relationship between chromatin-reading modules and combinatorial histone modifications
  Post-doc, University of Virginia Department of Biochemistry and Molecular Genetics

Anqi Wang - Characterization of EBV nuclear protein 3 (EBNA3) genome binding and gene regulation in EBV transformed lymphoblastoid cell lines (LCLs)
  Post-doc, University of Urbana-Champaign, Developmental Biology Department

Jae-Sung You - The role of diacylglycerol kinase zeta in mechanotransduction: A positive regulator of skeletal muscle mass
  Post-doc, UW-Madison Hornberger Lab

Hao Zeng - Epigenetic and transcriptional control in human breast cancer
  Post-doc, Wisconsin Institutes for Medical Research
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The Governing Body of CMB

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