



Department of/Office of Biochemistry & Molecular Biology

Annual Report:

January 2020 – December 2020

Madhavi Kadakia, Ph.D.
Professor and Chair

1

Statement from the Chair/Associate Dean

Development of Origins 1 module for the Wright curriculum: In 2020, the Origins module saw continued development of the innovative WrightCurriculum along with substantial faculty effort devoted to modifications due to the pandemic in order to maintain an excellent learning outcome. BMB faculty continued to play crucial roles in Origins ranging from module co-director to teaching major sections of the module. Major changes for 2020 were as follows: 1) Peer instruction was modified to run remotely (and simulate live sessions as closely as possible) by a combination of Blackboard Collaborate Ultra for material presented, Turning Point for mcq responses, and Webex for student subgroup discussion; 2) Team Based Learning used the TBL app in pilot, Webex for team discussions, and Blackboard Collaborate Ultra for the application cases and questions; and, 3) As usual, all learning events from the prior year were carefully evaluated and refinements introduced throughout the module. BMB faculty were also key contributors by serving as WrightQ facilitators for three modules: Staying Alive, Beginning to End, and Balance and Control. Our faculty responded to the teaching challenges presented by the pandemic and maintained excellent learning outcomes for our students. Further, the modules were well-received as reflected in student evaluations.

BMB undergraduate program: I am very pleased with the progress we have made so far in a relatively short period. The Undergraduate BMB program graduated 7 majors (6 in the Spring 2020 and 1 in the Summer 2020) and 4 minors (all in the Spring 2020). All of the 2019 graduates are now in grad school or working. We expect an additional 10 students to graduate in the spring of 2021. Two new elective courses were offered for the first time in 2020, including Human Microbiome and Medical Biochemistry, with the latter being popular even beyond our own majors. Additionally, BMB 3990 was run again as an undergraduate teaching assistant course where teaching assistants helped facilitate active learning teaching strategies, but for the first time was used to facilitate courses that were taught completely online. In Fall 2020, we had 34 pre-BMB or intending, 15 BMB majors, and 9 BMB minors.

The new 4+1 program which integrates the undergrad program to the master's program in BMB program was approved at the state level in 2020, Currently two undergraduate students accepted in the 4+1 program last year are taking graduate courses towards the completion of their masters while simultaneously completing their undergraduate degrees. Finally, the BMB undergraduate program was submitted for third party accreditation through the American Society for Biochemistry and Molecular Biology (ASBMB) in September and was approved for provisional accreditation on December 22nd. Students within our accredited program are eligible to sit for the 2021 certification exam to be offered starting March/April 2021.

Grant Funding and scholarship: BMB faculty received funded grant funding totaling \$709,023 (\$475,726 in direct costs and \$233,297 indirect costs). A total of 21 grant submissions were submitted by BMB faculty in 2020. BMB published a total of 11 manuscripts in 2020, with another 3 in press or submitted. As a result of COVID-19 related restrictions and cancellation of the Central Research Forum and CoSM Celebration of Research, national and international meetings, opportunities for faculty and students to present their research were limited. Students and faculty from the department presented 5 research talks in WSU seminar programs and

presented 4 poster or platform talks as national and international meetings. In addition, BMB faculty presented 2 invited talks on their research.

BMB staff and graduate students and research personnel: In 2020, we had a total of 2 BMB admin staff, 12 Ph.D. students, 7 Master's students, 9 undergraduate researchers, 1 post-doctoral fellow, 1 research associate, and 1 technician. Of the 19 graduate students, 1 M.S. and 1 Ph.D. student graduated by end of 2020. Organized virtual BMB faculty retreat virtually in October 2020.

Award: Dr. Campbell was named an Online Teaching Fellow, Dr. Paliy was named a World Learning Fulbright Specialist, and Dr. Ren was awarded the WSU Women in Science Giving Circle Faculty Award.

2 Programs/Divisions

Name of Division or Program	Director	Dates
M.S. in Biochemistry and Molecular Biology	Dr. Weiwen Long	Jul 1, 2020 – present
B.S. in Biochemistry and Molecular Biology	Dr. Chad Campbell	Jan 1, 2017 – present

3 Fully Affiliated Faculty

Name and Academic Position	Research Interests
Campbell, Chad Instructor	<p>This past year I have served as the Undergraduate Program Director and as such was responsible for program evaluation, development and administration. In the Spring, I was the course director for BMB 1010: Topics in Biochemistry, BMB 2100: Introduction to Biochemistry, BMB 3900: Scientific Communications and BMB 4230: Biochemistry and Molecular Biology II. In the Fall, I was the course director for BMB 1000: Freshman Seminar, BMB 2000: Careers in BMB, BMB 3850: Biochemistry Laboratory, BMB 4100: Senior Reflection and BMB 4210: Biochemistry and Molecular Biology I. Additionally, I used BMB 3990 to “employ” successful students from previous BMB 4210 semesters as learning assistants in the current semester of BMB 4210. I received very positive course evaluations from students in both the Spring and Fall semester. I have served as the BMB program advisor guiding students in our major and those transferring into our major towards successful graduation. Moreover, I have also participated on various different committees at the departmental (6) and college (3) level and worked with the department chair in efforts related to undergraduate program marketing and outreach and BMB major social gatherings. External to institutional service I was also active in the research community as a publication reviewer (4 reviews) and reviewer of new content materials for publishers (5th edition of Foundations of Biochemistry for Minderhout</p>

Name and Academic Position	Research Interests
Cho, Kwang-Jin Assistant Professor	<p>and Loertscher). Finally, I was able to grow as a professional through the attendance of a virtual SABER conference where I was able to review current trends in biology education research, verify my teaching pedagogies and interact with other biology education researchers in the U. S. Additionally, I participated in the CTL online teaching and learning community.</p> <p>The Ras GTPases comprising three main isoforms H-, N- and K-Ras operate at the plasma membrane as molecular switches in essential signaling pathways. Approximately 15% of all human carcinomas have activating point mutations in RASgenes. Oncogenic K-Ras mutants are found in 90 percent of pancreatic, 45 percent of colorectal and 35 percent of lung cancers. Despite significant efforts to directly target Ras activity, no anti-Ras drugs have been developed and taken into the clinic. Since Ras proteins must be anchored to the inner leaflet of the plasma membrane for full biological activity, inhibition of K-Ras plasma membrane interaction is a valid therapeutic approach to abrogate oncogenic K-Ras activity. My research investigates molecular mechanisms of K-Ras interaction with the plasma membrane, and discovery of compounds and proteins that regulate K-Ras plasma membrane interaction. Such compounds and/or proteins may be a starting point to develop novel anti-cancer therapies that specifically target K-Ras-driven cancers. From a high content cell-based screen of chemical and human siRNA libraries, I identified both exogenous and endogenous regulators of the K-Ras plasma membrane interaction. Three classes of compounds and a set of proteins that induce K-Ras dissociation from the plasma membrane were identified. The mechanisms, which reduced K-Ras signaling were: (1) Increased K-Ras phosphorylation by the AMPK/eNOS/PKG pathway, and (2) perturbation of cellular phosphatidylserine (PS) distribution. Characterization of these novel mechanisms will provide new insight into K-Ras plasma membrane interactions, and form the basis of a novel approach to inhibit K-Ras plasma membrane interaction.</p>
Craig, Michael Research Assistant Professor	<p>Dr. Craig utilizes next-generation sequencing of microRNA isolated from serum exosomes, tissue biopsies, and formalin-fixed archival samples to identify biomarkers of exposure and biomarkers of disease. He has developed collaborations with the Dayton VA Medical Center, from which he helped to identify miRNA biomarkers of Barrett's esophagus (BE) and Esophageal adenocarcinoma (EAC) that has potential clinical value in improving detection of individuals at</p>

Name and Academic Position	Research Interests
Kadakia, Madhavi Chair and Professor	increased risk of progressing to EAC. He is a contributor on an Office of Naval Research MURI Initiative aimed at identifying microRNA biomarkers of athletic performance to aid in the optimization of physical training protocols. His other funded work includes identifying microRNA profiles in individuals with Parkinson's Disease, during aging, and associated with muscle inflammation in end-stage osteoarthritis.
	My research program employs bench-based research that integrates clinical studies with the goal of translating biomedical research findings to the bed-side. My laboratory has focused on three areas of research. The first area is focused on identification of signaling pathways that play a role on cancer and development. We are studying the mechanism by which p53 family members, comprising of both oncogenes and tumor suppressors, are deregulated in non-melanoma skin cancer. Specifically, my laboratory has been studying the role of p53 family of proteins (p53, p63 and p73) either directly or via modulation of other proteins in development and progression of cancer. Our studies demonstrated that vitamin D receptor (VDR) is regulated by p63 and p73, another member of the p53 family and its biological significance. Our studies on examining the mechanism behind feedback regulation of p63 by VDR and VD3 demonstrated a dose dependent effect of VD3 on inhibition or promotion of cell survival which further provided an insight into its use as a chemotherapeutic adjuvant for anti-cancer therapy and fill the gap in the understanding of VD3 mediated regulation of $\Delta Np63\alpha$ levels and its role in the development and progression of non-melanoma skin cancer. We have identified the histone acetyltransferase TIP60 as a regulator of p63 stability and activity. Since TIP60 regulates the cellular response to DNA damage, we are investigating the potential implications of the TIP60/p63 axis in the DNA damage response and chemoresistance. Further, we have identified a novel mechanism by which p63 regulates cancer cell migration and invasion through regulation of the rho GTPase RAC1, thus providing key insights into the role that p63 plays in cancer progression and metastasis. Taken

Name and Academic Position**Research Interests**

together, these studies will address the discrepancy whether VD3 inhibits or promotes cell survival and provide further insight into the role that p63 plays in its use as a chemotherapeutic adjuvant for anti-cancer therapy and fill the gap in the understanding of VD3 mediated regulation of $\Delta Np63\alpha$ levels and its role in the development and progression of non-melanoma skin cancer. Further, my laboratory is currently focused on identification of microRNAs regulated by p63 and how it impacts its downstream signaling and its role in cancer progression.

The second area of focus in my laboratory has been to identify biomarkers that can help differentiate different stages of cancer and in long term lead to personalized patient care. Towards this goal I have obtained grant funding to purchase state-of-the art, next-generation sequencing (NGS) tools as well as a high throughput, real time PCR machine which will aid in these studies. Developments in next generation sequencing (NGS) technology have revolutionized our understanding of the complexity of cellular gene expression. NGS provides a better understanding of the molecular mechanisms involved and is the most suitable approach to develop biomarker discovery pipelines. We will compare the differential expression of known microRNAs in tissue and plasma samples from patients with Barrett's esophagus (BE) and Esophageal adenocarcinoma (EAC) in order to identify circulating microRNA biomarkers for early detection of EAC. Endoscopy is currently the only way to diagnose BE and EAC, so identification of noninvasive biomarkers is critical for the improvement of current screening tools and for the identification of patients at high risk for progression to cancer who will benefit from surveillance. We have also used NGS to identify microRNAs and mRNAs regulated by both VD3 and p63.

In addition, my laboratory has obtained funding from Ohio federal research network and Multi-university related research initiative from office of

Name and Academic Position	Research Interests
Leffak, Ira Professor	Naval research to study microRNA as biomarkers for motion disorders and High intensity training, respectively.
Long, Weiwen Associate Professor	<p>The work in our laboratory is built on our discovery of the human c-myc origin of DNA replication. There are currently two major project directions underway. The first is the identification of proteins that bind to the c-myc replication origin and the mechanism by which they promote the initiation of DNA synthesis. The second is the use of the c-myc replication origin in the design and genetic engineering of human cell models of disease (myotonic dystrophy type 1, Huntington disease, spinocerebellar ataxia type 10, polycystic kidney disease) caused by the instability of short, microsatellite DNA sequences.</p> <p>My research interests and expertise have been directed to the fields of growth factor signaling, steroid receptor/coactivator signaling, and the interplay between these two signaling pathways in cancer progression and metastasis. Currently, we are focusing on the role of ERK3 signaling and FBXL16 in lung and breast cancer progression and metastasis. Below are the personnel who have worked in the lab during 2020. We have been actively performing research projects as described below.</p> <ol style="list-style-type: none"> 1. Weiwen Long, Ph.D., the Lab PI, has been training and supervising students and postdoctoral fellow on their research projects. In addition, the PI has also been conducting experiments for developing new research projects in the lab. 2. Marion Morel, Postdoctoral Fellow, has been working on the role of FBXL16 in regulating the stability of oncoproteins in cancers, including ERK3, c-myc and ERK3. 3. Amanda Kaye Myers, a BMS Ph.D. student, has been working on a project about the role of ERK3 in regulating phospho-lipid signaling. 4. Krushangi Shah, a BMS Ph.D. student, has been working on a project about the role of FBXL16 in ER+ breast cancer. 5. Nicole Walters, a BMB Master student, has been working on the role of FBW7 in regulating ERK3 protein stability.
Markey, Michael Research Associate Professor,	<p>My research also involves several projects through my role as Director of the Center for Genomics Research. These include collaborative proposals and projects with several other laboratories and small businesses.</p>

Name and Academic Position	Research Interests
Director of the Center for Genomics Research	Current projects include genotyping of human specimens to understand the role of germline variation in athletic performance and response to physical training, and determining the role of genotype and microRNA expression on susceptibility to motion sickness. Another external project looks at epigenetic changes on the RNA of honeybees. We are also undertaking a survey of MDM4 splice variation in human skin and melanomas.
Paietta, John Associate Professor	A newly developing area of research in my laboratory is the identification and study of novel gene control elements termed riboswitches. In particular, we are examining the regulation of eukaryotic gene expression by riboswitches. Riboswitches, which are non-coding RNAs that selectively bind target molecules and alter gene expression levels by a variety of mechanisms, offer new opportunities for a variety of medical and biotechnology applications. In addition, we are continuing our work on the molecular genetic study of fungal sulfur metabolism. Our work involves the study of a complex control network of regulatory proteins that sense the level of sulfur and direct subsequent cellular responses.
Ren, Hongmei Assistant Professor	Dr. Ren's research interests focus on lipid metabolism, its association with autophagic clearance of mitochondria (mitophagy) and homeostasis, and its effects on cardiac and skeletal muscle function. Dysfunctional mitophagy contributes to a number of human metabolic diseases, including aging, neurodegenerative disease, diabetes, obesity, cardiovascular disease, and cancer. Discovering pathways controlling clearance of damaged mitochondria is critical for developing treatments for these diseases. Dr. Ren's laboratory recently discovered that lipin1, which catalyzes the penultimate step in triglyceride synthesis, is critical for mitophagy. Her current study is exploring the role of dysfunctional mitochondrial clearance associated with lipin1 deficiency in skeletal muscle physiology and pathology.
Reo, Nicholas	In general, my research interest is focused in the development and application of nuclear magnetic resonance (NMR)-based metabolomics in biomedical research. Several projects strive to develop this technology as a tool to: (1) assess tissue function/dysfunction; (2) detect exposure to chemical toxicants and assess related health effects; and (3) diagnose health status and disorders of the intestinal tract. Metabolite profiles

<u>Name and Academic Position</u>	<u>Research Interests</u>
	from blood serum, urine, fecal extracts, or tissue extracts are measured by NMR spectroscopy and correlated with other biological/biochemical indices. Multivariate data analyses and bioinformatics tools are used to help visualize, analyze, and interpret complex data, and relate or correlate this information to disease processes or toxicity.
Schmidt, Michael Assistant Professor	Miami University, Oxford, OH May 2012 Ph.D. Chemistry and Biochemistry (Ann Hagerman, advisor) Dissertation Title: "Tannins in Natural Soil Systems" Edinboro University, Edinboro, PA May 2007 B.S. Biochemistry

4 Teaching

Baccalaureate

Dr. Campbell **Spring 2020**

BMB 1010: Topics in Biochemistry, .5 credit hours, 6 students, total contact hours (lecture hours, non-contact hours), Seminar.

BMB 2100: Introduction to Biochemistry, 2 credit hours, 10 students, 29 total contact hours (23 lecture hours, 6 non-contact hours), Classroom course, Course Director: Chad Campbell, taught all "lectures" mostly in the active learning style to introduce the fundamental concepts of Biochemistry. Also created and graded all assessments in the course.

BMB 3900: Scientific Communications, 2 credit hours, 11 students, 27 total contact hours (26 lecture hours, 1 non-contact hours), Classroom course, Course Director: Chad Campbell, my role in this course was to facilitate the improvement of scientific writing through many drafts and revisions of a standard IMRaD style journal article. In addition, students learned about scientific grant proposals, alternative science writing genres and various scientific article reading strategies.

BMB 4210: Biochemistry and Molecular Biology II, 3 credit hours, 69 students, 20 total contact hours (16 lecture hours, 4 non-contact hours), Team taught, Classroom course, Course Director: Dr. Chad Campbell, it was my responsibility to teach 16 lectures about

general metabolism and Carbohydrate Metabolism and run two review sessions and generate two exams and a portion of the Final exam. The final was not personally proctored as the course had shifted online. As the course director it was also my responsibility to work with other faculty to ensure course needs were met as we shifted online.

Fall 2020

BMB 1000: Freshman Seminar, .5 credit hours, 17 students, total contact hours (lecture hours, non-contact hours), Seminar.

BMB 2000: Careers in BMB, 1 credit hour, 4 students, total contact hours (lecture hours, non-contact hours), Seminar.

BMB 3850: Biochemistry Laboratory, 3 credit hours, 11 students, total contact hours (lecture hours, non-contact hours), Team taught, Classroom/Lab.

BMB 3990: Undergraduate Teaching Assistant, 1.52 credit hours, 6 students, total contact hours (lecture hours, non-contact hours), Seminar.

BMB 4100: Senior Reflection, 1 credit hour, 11 students, 16 total contact hours (14 lecture hours, 2 non-contact hours), Classroom course, Course Director: Chad Campbell, the purpose of this course is for BMB students to finalize their learning centered portfolios, generate career documents towards the application to a job or higher education degree, to evaluate the BMB program and produce and present a final senior project. I facilitated all the above objectives with one on one mentoring with each student.

BMB 4210: Biochemistry and Molecular Biology I, 3 credit hours, 60 students, 43 total contact hours (38 lecture hours, 5 non-contact hours), Team taught, Classroom course, Course Director: Dr. Chad Campbell, it was my responsibility to cover all "lectures" in the course. I also generated four in class assessments on those lectures all of which I proctored. This course has been completely adapted to the active learning approach all of which was generated by myself. This included the incorporation of online homework and in class activities These activities ranged from pre-prepared workbook assignments, clicker sessions and self-prepared classroom activities. This version of the course was taught completely online with the help of 6 LAs which helped facilitate the group learning activities in an online environment.

Dr. Cho

Spring 2020

BMB 1010: Topics in Biochemistry and Molecular Biology, .5 credit hours, 6 students, 0 total contact hours (0 lecture hours, 0 non-contact hours), Classroom course, Course Director: Chad Campbell, I shadowed Dr. Chad Campbell for this course.

Dr. Campbell and I occasionally met outside of the classroom to discuss about how to run the class.

Fall 2020

BMB 4020/6020: Research Perspectives in Biochemistry and Molecular Biology, 3 credit hours, 16 students, total contact hours (lecture hours, non-contact hours), Team taught, Online.

Dr. Craig

BMB 3850: Biochemistry Laboratory, 3 credit hours, 3 students, total contact hours (lecture hours, non-contact hours), Team taught, Laboratory.

Dr. Kadakia**Fall 2020**

BMB 2000: Career Planning in BMB, 1 credit hour, 4 students, total contact hours (lecture hours, non-contact hours), Team taught, Online.

BMB 6020: Research Perspectives, 3 credit hours, 4 students, total contact hours (lecture hours, non-contact hours), Team taught, Online.

BMS 9950: Non-Dissertation Research, 4 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

BMS 9990: Dissertation Research, 8 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

Dr. Leffak**Spring 2020**

BMB 4000: Biochemistry and Molecular Biology Seminar, 1 credit hour, 14 students, total contact hours (lecture hours, non-contact hours), Seminar.

Dr. Long**Fall 2020**

BMB 4020: Research Perspectives, 3 credit hours, 6 students, total contact hours (lecture hours, non-contact hours), Team taught, Online.

Dr. Markey**Spring 2020**

BMB 4990: Undergraduate Research, 2 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

Fall 2020

BMB 3850: Biochemistry Laboratory, 3 credit hours, 11 students, total contact hours (lecture hours, non-contact hours), Team taught, Laboratory.

BMB 4020: Research Perspectives, 1 credit hour, 10 students, 1 total contact hours (1 lecture hour, 0 non-contact hours), Team taught, Classroom course, Course Director: John Paietta, Taught section about my research.

Dr. Paietta

Spring 2020

BMB 7600: Molecular Biology of the Nucleus, 3 credit hours, 8 students, 8 total contact hours (6 lecture hours, 2 non-contact hours), Team taught, Classroom course, Course Director: M. Leffak, Taught section on non-coding RNAs (for example, RNA switches) and various aspects of gene regulation.

Dr. Paliy

Spring 2020

BMB 4400: Human Microbiome, 3 credit hours, 6 students, 42 total contact hours (39 lecture hours, 3 non-contact hours), Classroom course, Course Director: Oleg Paliy, New elective course on human microbiota
The class was cross-listed with BMB 7010.

Fall 2020

BMB 4000: BMB seminar, 1 credit hour, 14 students, total contact hours (lecture hours, non-contact hours), Seminar.

Dr. Ren

Spring 2020

BIO 4950 01: Senior Honors Research, 13 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

BMB 4450: Medical Biochemistry, 3 credit hours, 15 students, 9 total contact hours (6 lecture hours, 3 non-contact hours), Team taught, Classroom course, Course Director: Michael Schmidt, I taught muscle disorders and heart disease.

Fall 2020

BMB 4990: Undergraduate research, 115 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

Dr. Schmidt

Spring 2020

BMB 4001: Fundamentals of Biochemistry, 3 credit hours, 19 students, 48 total contact hours (40 lecture hours, 8 non-contact hours), Classroom course, Course Director: Michael Schmidt, I was the course director and taught the entire course.

BMB 4450: Medical Biochemistry, 3 credit hours, 15 students, 24 total contact hours (21 lecture hours, 3 non-contact hours), Team taught, Classroom course, Course Director: Michael Schmidt, I was the course director.

Summer 2020

BMB 4001: Fundamentals of Biochemistry A, 3 credit hours, 17 students, 42 total contact hours (40 lecture hours, 2 non-contact hours), Classroom course, Course Director: Michael Schmidt, I was the course director and taught the entire course.

BMB 4001: Fundamentals of Biochemistry B, 3 credit hours, 17 students, 42 total contact hours (40 lecture hours, 2 non-contact hours), Classroom course, Course Director: Michael Schmidt, I was the course director and taught the entire course.

Fall 2020

BMB 3850: Biochem Lab, 3 credit hours, 11 students, total contact hours (lecture hours, non-contact hours), Team taught, Laboratory.

BMB 4001: Fundamentals of Biochemistry, 3 credit hours, 33 students, 48 total contact hours (40 lecture hours, 8 non-contact hours), Classroom course, Course Director: Michael Schmidt, I was the course director and taught the entire course.

Graduate students, including thesis supervision

Dr. Cho

Spring 2020

BMB 7520: Molecular Biochemistry II, 3 credit hours, 22 students, total contact hours (lecture hours, non-contact hours), Team taught, Online.

BMS 9950: Non-Dissertation Research, 2 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

BMS 9970: Laboratory Rotation II, 2 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

Fall 2020

BMB 7530: Molecular Signaling, 3 credit hours, 11 students, total contact hours (lecture hours, non-contact hours), Team taught, Online.

BMS 9950.02: Non-dissertation research, 2 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

Dr. Craig

BMB 3850: Biochemistry Laboratory, 3 credit hours, 3 students, total contact hours (lecture hours, non-contact hours), Team taught, Laboratory.

BMB 8000: BMB Brown Bag Series, 1 credit hour, 15 students, total contact hours (lecture hours, non-contact hours), Seminar.

Dr. Kadakia

Spring 2020

BMS 9990: Dissertation Research, 11 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

BMS 9990: Dissertation Research, 5 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

Summer 2020

BMS 9950: Non-Dissertation Research, 6 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

BMS 9990: Dissertation Research, 6 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

BMS 9990: Dissertation Research, 1 credit hour, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

Fall 2020

BMB 6020: Research Perspectives, 3 credit hours, 4 students, total contact hours (lecture hours, non-contact hours), Team taught, Online.

BMS 9950: Non-Dissertation Research, 4 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

BMS 9990: Dissertation Research, 8 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

Dr. Leffak

Spring 2020

BMB 9000: Biochemistry and Molecular Biology Seminar, 1 credit hour, 14 students, total contact hours (lecture hours, non-contact hours), Seminar.

BMB/BMS 7030: Research Ethics, .5 credit hours, 8 students, 8 total contact hours (8 lecture hours, 0 non-contact hours), Classroom course, Course Director: Leffak, teacher.

BMB/BMS 7600: Molecular Biology of the Nucleus, 3 credit hours, 8 students, 14 total contact hours (6 lecture hours, 8 non-contact hours), Team taught, Classroom course, Course Director: Michael Leffak, course organizer.

BMB 8990: Biochemistry Research, 1 credit hour, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

BMS 9950 01: Non-dissertation Research, 2 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

BMS 9950 05: Non-dissertation Research, 5 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

BMS 9970: Laboratory Rotation II, 1 credit hour, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

Dr. Long

Spring 2020

BMB/BMS 7600: Molecular Biology of the nucleus, 3 credit hours, 8 students, 10 total contact hours (8 lecture hours, 2 non-contact hours), Team taught, Classroom course, Course Director: Michael Leffak, My lectures were focused on posttranslational regulation of transcription factors.

BMB 8990: Biochemistry Research, .5 credit hours, 6 students, total contact hours (lecture hours, non-contact hours), Laboratory.

BMS 9990: Dissertation Research, 5 credit hours, 13 students, total contact hours (lecture hours, non-contact hours), Laboratory.

Fall 2020

BMB 6020: Research Perspectives, 3 credit hours, 4 students, total contact hours (lecture hours, non-contact hours), Team taught, Online.

BMB 7530: Molecular Signaling, 3 credit hours, 11 students total contact hours (lecture hours non-contact hours), Team taught, Online.

BMB 8990: Biochemistry Research, 1 credit hour, 3 students, total contact hours (lecture hours, non-contact hours), Laboratory.

BMS 9990: Dissertation Research, 5 credit hours, 10 students, total contact hours (lecture hours, non-contact hours), Laboratory.

Dr. Markey

Spring 2020

BMB 7600: Molecular Biology of the Nucleus, 3 credit hours, 8 students, 24 total contact hours (13.5 lecture hours, 10.5 non-contact hours), Team taught, Classroom course, Course Director: Michael Leffak, taught 9 lectures, facilitated 7 student discussions on grant proposals.

BMB 8990: Biochemistry Research, 5 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

Fall 2020

BMB 6020: Research Perspectives, 1 credit hour, 5 students, 1 total contact hours (1 lecture hour, 0 non-contact hours), Team taught, Classroom course, Course Director: John Paietta, Taught section about my research.

Dr. Paietta

Spring 2020

BMB 3030: Research Ethics, 1 credit hour, 11 students, 16 total contact hours (14 lecture hours, 2 non-contact hours), Classroom course, Course Director: John Paietta,

Course director and instructor. Instructor for all 14 weeks of course. Partial conversion of course to online due to pandemic.

BMB 4230: Biochemistry II, 3 credit hours, 61 students, 13 total contact hours (10 lecture hours, 3 non-contact hours), Team taught, Classroom course, Course Director: Chad Campbell, Course director. Taught section primarily on protein metabolism, amino acid metabolism, one-carbon metabolism, aromatic amino acids and biogenic amines, heme synthesis and bilirubin. Converted to online teaching for my section due to pandemic.

BMB 4450: Medical Biochemistry, 3 credit hours, 15 students, 16 total contact hours (12 lecture hours, 4 non-contact hours), Team taught, Classroom course, Course Director: Michael Schmidt, Taught section on Nitrogen metabolism, nitrogen metabolism disorders, DNA repair, DNA replication, transcription and translation, DNA repair disorders, recombinant DNA in medicine. Converted to online teaching due to pandemic.

BMB 7600: Molecular Biology of the Nucleus, 3 credit hours, 8 students, 8 total contact hours (6 lecture hours, 2 non-contact hours), Team taught, Classroom course, Course Director: M. Leffak, Taught section on non-coding RNAs (for example, RNA switches) and various aspects of gene regulation.

Fall 2020

BMB 4020: Research Perspectives, 1 credit hour, 8 students, 2 total contact hours (1 lecture hour, 1 non-contact hours), Team taught, Classroom course, Course Director: Presented 1 session. Discussed research with students.

Dr. Paliy

Spring 2020

BMB 4400: Human Microbiome, 3 credit hours, 6 students, 42 total contact hours (39 lecture hours, 3 non-contact hours), Classroom course, Course Director: Oleg Paliy, New elective course on human microbiota
The class was cross-listed with BMB 7010.

BMB 7010: Human Microbiome: graduate course, 3 credit hours, 2 students, 42 total contact hours (39 lecture hours, 3 non-contact hours), Classroom course, Course Director: Oleg Paliy, New elective course on human microbiota
The class was cross-listed with BMB 4400.

BMS 9960: Laboratory rotation I, 1 credit hour, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

BMS 9990: Dissertation research, 3 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

ES 8130: Dissertation research, 3 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

Summer 2020

BMS 9950: Non-Dissertation Research, 6 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

BMS 9990: Dissertation research, 1 credit hour, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

ES 8130: Dissertation research, 6 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

Fall 2020

BMB 4000: BMB seminar, 1 credit hour, 14 students, total contact hours (lecture hours, non-contact hours), Seminar.

BMB 6020: Research Perspectives, 1 credit hour, 2 students, total contact hours (lecture hours, non-contact hours), Team taught, Laboratory.

BMB 7530: Molecular Signaling, 3 credit hours, 7 students, 7 total contact hours (6 lecture hours, 1 non-contact hours), Team taught, Classroom course, Course Director: Weiwen Long, taught a section of the class focused on the microbial signaling
The class was cross-listed with BMS 9910-04.

BMB 9000: Advanced seminar, 1 credit hour, 6 students, total contact hours (lecture hours, non-contact hours), Seminar.

BMS 9900: Advanced seminar, 1 credit hour, 4 students, total contact hours (lecture hours, non-contact hours), Seminar.

BMS 9910: Molecular Signaling, 3 credit hours, 4 students, 7 total contact hours (6 lecture hours, 1 non-contact hours), Team taught, Classroom course, Course Director: Weiwen Long, taught a section of the class focused on the microbial signaling
The class was cross-listed with BMB 7530.

BMS 9950: Non-Dissertation Research, 1 credit hour, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

BMS 9990: Dissertation research, 3 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

Dr. Ren

Spring 2020

BIO 4950 01: Senior Honors Research, 13 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

BMB 4450: Medical Biochemistry, 3 credit hours, 15 students, 9 total contact hours (6 lecture hours, 3 non-contact hours), Team taught, Classroom course, Course Director: Michael Schmidt, I taught muscle disorders and heart disease.

BMB 7660 01: Molecular Bio of the Nucleus, 3 credit hours, 8 students, 3 total contact hours (3 lecture hours, 0 non-contact hours), Team taught, Classroom course, Course Director: Michael Leffak, I taught transcriptional regulation of brown adipocyte development and function.

BMB 9900: Biochemistry Seminar, 1 credit hour, 10 students, total contact hours (lecture hours, non-contact hours), Seminar.

BMS 9990 04: Dissertation Research, 115 credit hours, 2 students, total contact hours (lecture hours, non-contact hours), Laboratory.

Fall 2020

BMB 4990: Undergraduate research, 115 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

BMB 7530: Molecular Signaling, 3 credit hours, 11 students, 9.5 total contact hours (8 lecture hours, 1.5 non-contact hours), Team taught, Classroom course, Course Director: I am the course coordinator, I taught all the second messengers and lipid-mediated cell signaling.

BMB 8990: Biochemistry research, 515 credit hours, 1 student, total contact hours (lecture hours, non-contact hours), Laboratory.

BMS 9990 02/08: Dissertation Research, 115 credit hours, 2 students, total contact hours (lecture hours, non-contact hours), Laboratory.

Dr. Schmidt

Spring 2020

BMB 4001: Fundamentals of Biochemistry, 3 credit hours, 19 students, 48 total contact hours (40 lecture hours, 8 non-contact hours), Classroom course, Course Director: Michael Schmidt, I was the course director and taught the entire course.

BMB 4450: Medical Biochemistry, 3 credit hours, 15 students, 24 total contact hours (21 lecture hours, 3 non-contact hours), Team taught, Classroom course, Course Director: Michael Schmidt, I was the course director.

BMB 7520: Molecular Biochem II, 3 credit hours, 21 students, 22 total contact hours (16 lecture hours, 6 non-contact hours), Team taught, Classroom course, Course Director: Nick Reo, I taught 16 lectures in this course.

Summer 2020

BMB 4001: Fundamentals of Biochemistry A, 3 credit hours, 17 students, 42 total contact hours (40 lecture hours, 2 non-contact hours), Classroom course, Course Director: Michael Schmidt, I was the course director and taught the entire course.

BMB 4001: Fundamentals of Biochemistry B, 3 credit hours, 17 students, 42 total contact hours (40 lecture hours, 2 non-contact hours), Classroom course, Course Director: Michael Schmidt, I was the course director and taught the entire course.

Fall 2020

BMB 3850: Biochem Lab, 3 credit hours, 11 students, total contact hours (lecture hours, non-contact hours), Team taught, Laboratory.

BMB 4001: Fundamentals of Biochemistry, 3 credit hours, 33 students, 48 total contact hours (40 lecture hours, 8 non-contact hours), Classroom course, Course Director: Michael Schmidt, I was the course director and taught the entire course.

BMB 7500: Molecular Biochemistry 1, 3 credit hours, 26 students, 23 total contact hours (19 lecture hours, 4 non-contact hours), Team taught, Classroom course, Course Director: Michael Leffak, I taught the first half of this course. Covering the introductory information along with the material about proteins and enzymes.

Medical education

Dr. Markey

Fall 2020

SMD 8110: Origins, 9 credit hours, 129 students, 12 total contact hours (9 lecture hours, 3 non-contact hours), Team taught, Classroom course, Course Director: John Paietta, Taught Peer Instruction and Team Based Learning sessions on cancer.

SMD 8210: Beginning to End, 12 credit hours, 6 students, 20 total contact hours (20 lecture hours, 0 non-contact hours), Classroom course, Course Director: Irina Overman, Taught a section of medical students through Wright.

SMD 8230: Balance Control and Repair, 12 credit hours, 129 students, 3 total contact hours (3 lecture hours, 0 non-contact hours), Team taught, Classroom course, Course Director: Mark Rich, Bethany Harper, and Paul Koles, Taught Team Based Learning session on cancer.

Dr. Paietta

Fall 2020

SMD 8170: Origins, 7 credit hours, 120 students, 56 total contact hours (26 lecture hours, 30 non-contact hours), Team taught, Classroom course, Course Director: John Paietta, Module (course) co-director. Involved in the synthesis, organization and implementation of this module as part of the new curriculum in BSOM. Ran peer instruction sessions on amino acid metabolism, heme synthesis, jaundice, nucleotide metabolism, DNA structure, DNA replication, RNA structure, transcription, gene regulation, protein synthesis, DNA repair/mutation, genome rearrangements,

recombinant DNA and clinical molecular genetics. Assisted with Team-based Learning (TBL) sessions involving cases in nucleotide metabolism, DNA replication and repair, and amino acid metabolism. In addition, my course director/instructor duties (review sessions, exam construction, targeted individual, TBL assistance, and group help sessions) continued from July 27 to the final Dec. 18, 2020 (and through the final exam retake Jan. 4, 2020.).

Dr. Schmidt
Spring 2020

Wright First Year, credit hours, 8 students, 25 total contact hours (24 lecture hours, 1 non-contact hours), Team taught, Classroom course, Course Director: Amanda Bell, I was trained and conducted Wright sessions.

Fall 2020

WQC 8102.2019: Origins 1, credit hours, 120 students, 28 total contact hours (22 lecture hours, 6 non-contact hours), Team taught, Classroom course, Course Director: John Paietta, I was responsible for just over 1/3 of the PI material.

Wright Year 2, credit hours, 8 students, 28 total contact hours (26 lecture hours, 2 non-contact hours), Team taught, Classroom course, Course Director: N/A, I was a facilitator for year 2 students.

Graduate student thesis supervisor

Dr. Cho

BMS, Thesis Committee Member, PhD Proposal meeting for Amjad Aljagthmi.
BMS, Thesis Committee Director, PhD Preliminary Exam for Kristen Rehl

Dr. Craig

BMB, MS Committee Member, Abdullah Salem S Alatawi
BMB, MS Committee Member, Nicole Walters

Dr. Kadakia

BMB, MS Committee Member, John Trombley
BMB, PhD Committee Member, Krushangi Shaw
BMS, Thesis Committee Director, Mentor for PhD student, Akshay Hira
BMS, Thesis Committee Director, Mentor for PhD student, Amjad Aljagthmi
BMS, Thesis Committee Director, Mentor for PhD student, Amjad Aljagthmi
BMS, Thesis Committee Director, Mentor for PhD student, Amjad Aljagthmi
BMS, Thesis Committee Director, Mentor for PhD student, Andrew Stacy
BMS, Co-advisor for PhD student, Prithy Martis
BMS, Mentor for PhD student Bryan Mayville

Dr. Leffak

Student Research Committee, Sara Seibert
Student Research Committee, Alex Compean
Student Research Committee, Amanda Myers

Student Research Committee, Clayton Alex-Buckner
Student Research Committee, Daniel Miranda
Student Research Committee, Jama Abdulrahman
Student Research Committee, Jeff Ringiesn
Student Research Committee, John Trombley
Student Research Committee, Melissa Ward
Student Research Committee, Sankhadip Bhadra
Student Research Committee, William Cvammen

Dr. Long

Student Research Committee, As a research committee member for the following graduate students:

Stacy, Andrew J., Ph.D. student, BMB
Amjad Aljagthmi, Ph.D. student, BMB
Prithy Martis, BMS Ph.D. student,
Langni Liu, Ph.D. Student, Pharmacology and Toxicology
Christopher A. Waker, BMS PhD student, NCBP
Melissa J. Ward, BMS PhD student, Biology
Rujuta Yashodhan Gadgil, PhD student, BMB
Jananie Rockwood, PhD student, BCBP
Abdulrahman Jama, PhD student, BMB
Abdullah Ali Alshudukhi, PhD student, BMB.
Akshay Hira, PhD student, BMB
Abdullah Alatawi, MS. student, BMB
Sandhya Sattiraju, MS. student, BMB
Rajsi Thaker, MS. student, BMB
Alexander Compean, MS. student, BMB

Dr. Markey

BMB, Thesis Committee Member, Andrew Browder M.S. Committee
BMB, Thesis Committee Member, French Damewood M.S. Committee
BMB, Thesis Committee Member, Sandhya Sattiraju M.S. Committee
BMB, Thesis Committee, Nicole Waters M.S. Committee
BMS, Thesis Committee Member, Akshay Hira Ph.D. Committee
BMS, Thesis Committee Member, Alex Gordon PhD Committee
BMS, Thesis Committee Member, Andrew Stacy PhD Committee
BMS, Thesis Committee Member, Clayton Alex-Bruckner Ph.D. Committee
BMS, Thesis Committee Member, John Miller Ph.D. Committee
BMS, Thesis Committee Member, Langni Liu PhD Committee
BMS, Thesis Committee Member, Prithy Martis PhD Committee
BMS, Thesis Committee Member, Resha Shrestha Ph.D. Committee
BMS, Thesis Committee Member, SoonJye Kho Ph.D. Committee
BMS, Thesis Committee Member, Venicia Hawach Ph.D. Committee
BMS, Thesis Committee, William Cvammen Ph.D. Committee
BMS, Alex Gordon PhD committee

Dr. Paietta

Student Research Committee, Student Research Committee for Sumudu Rajakaruna (Ph.D. student)

Dr. Paliy

Student Research Committee, Thesis Committee Member, BMS representative on BMS PhD committee for Xiu-Huan Yap

Student Research Committee, Thesis Committee Member, Committee member for BMS PhD student: Angela Campo

Student Research Committee, Thesis Committee Member, Committee member for BMS PhD student: Sara Seibert

Dr. Ren

Student Research Committee, Member in Amanda Kaye Myers's PhD Dissertation Committee

Student Research Committee, Member in Ishita Haider's PhD Dissertation Committee

Student Research Committee, Member in Jananie Rockwood's PhD Dissertation Committee

Student Research Committee, Member in Krushangi Nirav Shah's PhD Dissertation Committee

Student Research Committee, Mentor in Rajsi Yogeshkumar Thaker's Master's Dissertation Committee

Student Research Committee, Mentor in Rebecca Reese's Honors program

Student Research Committee, Mentor in Abdullah A. Alshudukhi's PhD Dissertation Committee

Student Research Committee, Mentor in Sandhya R. Sattiraju's Master's Dissertation Committee

5

Scholarly Activity

Funded grants**Extramural (Active)****Dr. Craig**

Office of Naval Research, Precision High-Intensity Training through Epigenetics (PHITE), P.I. Dr. Timothy Broderick, (9/1/2016 to 8/31/2021) Total \$242026, Direct Current Year \$163531, Indirect Current Year \$78495, Total cost for entire grant period \$1425008, 16.5% salary for Dr. Craig.

University of Alabama, Birmingham, REACT Laboratory Methods/Specimen Processing Scholar Award, P.I. P.I. Marcos Bamman, (7/1/2020 to 6/30/2021) Total \$56070, Direct Current Year \$39373, Indirect Current Year \$16697, Total cost for entire grant period \$141815, 20% salary for Dr. Craig.

Dr. Kadakia

NIH National Rehabilitation Research Resource to Enhance Clinical Trials, REACT, Identification of miRNA biomarkers of medical rehabilitation in 3 rehabilitation clinical trials focused on: (i) Parkinson's Disease; (ii) end-stage osteoarthritis and total joint arthroplasty rehabilitation; and (iii) neuromuscular aging, P.I. Marcos Bamman, (07/01/2020 to 06/30/2021) Total \$56090, Direct Current Year \$39393, Indirect Current Year \$16697, Total cost for entire grant period \$141815, 5% salary for Dr. Kadakia.

Office of Naval Research-Multi University Research Investigation (MURI), Precision High Intensity Training through Epigenetics, P.I. Dr. Timothy Broderick, (9/1/2016 to 8/13/2021) Total \$244026, Direct Current Year \$165531, Indirect Current Year \$78495, Total cost for entire grant period \$1425008, 14% salary for Dr. Kadakia.

Dr. Leffak

NIGMS, Mechanisms of Replication-Dependent Microsatellite Instability in Human Disease, P.I. Ira Michael Leffak, (9/9/2017 to 8/31/2021) Total \$99000, Direct Current Year \$66000, Indirect Current Year \$33000, Total cost for entire grant period \$1200000, 20% salary for Dr. Leffak.

Dr. Long

NCI 1R01CA193264-05, ERK3 Kinase Signaling in Lung Cancer, P.I. Weiwen Long, (06/01/2020 to 5/31/2021), Total \$338550, Direct Current Year \$228750, Indirect Current Year \$109800, Total cost for entire grant period \$1692750, 25% salary for Dr. Long.

Dr. Markey

Department of Defense, Precision High Intensity Training through Epigenetics (PHITE), P.I. Timothy Broderick, (06/01/2016 to 05/31/2021) Total \$1538485.48, Direct Current Year \$1402489, Indirect Current Year \$135996.48, 10% salary for Dr. Markey.

Central State University, Third-generation direct sequencing of mRNA in Bee, P.I. Hongmei Li-Byarlay, (8/19/2020 to 12/31/2020) Total \$2580, Direct Current Year \$2580, Indirect Current Year \$0, Total cost for entire grant period \$2580.

Dr. Paliy

U Wisconsin - Milwaukee RGI, Understanding and enhancing rhizobium-cereal interactions, P.I. Dr Gyaneshwar Prasad, (04/26/2018 to 06/30/2020) Total \$10000, Direct Current Year \$10000, Indirect Current Year \$0, Total cost for entire grant period \$30000, 11% salary for Dr. Paliy.

Internal - Active

Dr. Ren

WSU, Women in Science Giving Circle Award, P.I. Principle Investigator: Hongmei Ren, (10/1/2020 to 9/30/2021) Total \$5000, Direct Current Year \$5000, Indirect Current Year \$0, Total cost for entire grant period \$5000.

Internal – Not Funded

Dr. Markey

Wright State University Faculty Senate, Genomics in Real Time (GREAT) Lab: Real-time DNA sequencing to engage high school students in biochemistry and molecular biology, P.I. Michael Markey, Submitted 3/12/2020, Requested Total \$7400, Direct \$7400, Indirect \$0 (Not Funded).

Extramural - Not Funded

Dr. Craig

NIH, Role of Δ Np63 α and TIP60 in SCC progression and chemoresistance, P.I. Madhavi Kadakia, Submitted 03/04/2020, Requested Total \$1875000, Direct \$1250000, Indirect \$625000 (Not Funded).

Dr. Kadakia

NIH, Role of DeltaNp63 alpha and TIP60 and in SCC progression and chemoresistance, P.I. Madhavi Kadakia, Submitted 3/4/2020, Requested Total \$1875000, Direct \$1250000, Indirect \$625000 (Not Funded).

Dr. Leffak

NIH, Replication-dependent microsatellite instability, P.I. Ira Leffak, Submitted 5/1/2020, Requested Total \$5188260, Direct \$2807590, Indirect \$2380670 (Not Funded).

Dr. Markey

Melanoma Research Alliance, Isoform analysis of MDM4 expression in melanoma to inform therapy design, P.I. Michael Markey, Submitted 11/18/2019, Requested Total \$99827, Direct \$99827, Indirect \$0 (Not Funded).

Dr. Paliy

NIH NIDDK, Ketogenic diets, resistant starch, and gut microbiota: mechanisms and interplay, P.I. Oleg Paliy, Submitted 02/05/2020, Requested Total \$2457000, Direct \$1927749, Indirect \$529251 (Not Funded).

NASA, Pulsed Electrochemical Generation of Biocidal Silver, P.I. Dr. Brian Skinn, Submitted 03/20/2020, Requested Total \$55457, Direct \$36971, Indirect \$18486 (Not Funded).

Dr. Ren

DoD grant, Develop and Demonstrate an Advanced Combat Wound Care Technology that Prevents Sepsis from Infected Traumatized Tissue, P.I. Brain Skin, Submitted 6/25/2021, Requested Total \$17000, Direct \$17000, Indirect \$0 (Not Funded).

Muscular Dystrophy Association, Lipin1 gene delivery improves dystrophic muscle pathology and function", P.I. Principle Investigator: Hongmei Ren, Submitted 1/24/2020, Requested Total \$300000, Direct \$272727, Indirect \$27273 (Not Funded).

Extramural – Pending

Dr. Cho

NIH NIGMS, Phosphatidylinositol 4-phosphate at the Golgi Complex: New Roles in Lipid Transport and K-Ras Signaling, P.I. Kwang-jin Cho, Submitted 06/04/2020, Requested Total \$2139479, Direct \$1544885, Indirect \$594594 (Pending).

Dr. Craig

Department of Defense (DoD), AFRL Biotechnology Community of Practice Internship Program in Partnership with Wright State University, P.I. Madhavi Kadakia, Submitted 12/15/2020, Requested Total \$1999950, Direct \$1333300, Indirect \$666650 (Pending).

NIH, Role of Δ Np63 α and TIP60 and in SCC progression and chemoresistance, P.I. Madhavi Kadakia, Submitted 10/02/2020, Requested Total \$1875000, Direct \$1250000, Indirect \$625000 (Pending).

Dr. Kadakia

Department of Defense (DoD), AFRL Biotechnology Community of Practice Internship Program in Partnership with Wright State University, P.I. Saber Hussain, Submitted 12/15/2020, Requested Total \$1999950, Direct \$1333300, Indirect \$666650 (Pending).

NIH, Role of DeltaNp63 alpha and TIP60 and in SCC progression and chemoresistance, P.I. Madhavi Kadakia, Submitted 10/2/2020, Requested Total \$1875000, Direct \$1250000, Indirect \$625000 (Pending).

Dr. Long

Dept. of the Army -- USAMRAA/DOD CDMRP Breast Cancer Research Program Breakthrough Award Level 1, FBXL16 as a novel factor in promoting endocrine therapy resistance and metastasis of ER+ breast cancer, P.I. Weiwen Long, Ph.D., 3 calendar months, Submitted 09/22/2020, Requested Total \$675000, Direct \$450000, Indirect \$225000 (Pending).

National Cancer Institute, Role of Δ Np63 α and TIP60 in Skin SCC Progression and Chemoresistance, P.I. Weiwen Long, Submitted 10/05/2020, Requested Total \$1875006, Direct \$1250000, Indirect \$625006 (Pending).

Dr. Markey

NSF, Biology Integration Institute: Rules of Integrative Sociogenomics and Ecology in Bees (RISE-Bee) Institute, P.I. Hongmei Li-Byarlay, Submitted 12/14/2020, Requested Total \$30000, Direct \$20000, Indirect \$10000 (Pending).

NSF, Defining a Temporal Map of RNA Splicing Throughout Malignant Transformation in Melanoma, P.I. Michael Markey, Submitted 9/23/2020, Requested Total \$343918, Direct \$229279, Indirect \$114639 (Pending).

National Institute of Arthritis & Musculoskeletal & Skin Diseases/NIH/DHH, Mutagenic DNA Replication in Geriatric Human Skin, P.I. Michael Kemp, Submitted 7/6/2020, Requested Total \$2101683, Direct \$1517170, Indirect \$584513 (Pending).

Dr. Paliy

World Learning Fulbright Program, Application for Fulbright Specialist status, P.I. Oleg Paliy, Submitted 08/01/2020, Requested Total \$0, Direct \$0, Indirect \$0 (Pending).

DoD PRMRP, Diet influences gut microbial interactions and bioactivity of metal nanomaterials, P.I. Dr. Karen Mummy, Submitted 9/1/2020, Requested Total \$898904, Direct \$623881, Indirect \$275023 (Pending).

Dr. Ren

DoD grant, Lipin1 Improves Dystrophic Pathology and Muscle Function, P.I. Principle Investigator: Hongmei Ren, Submitted 12/1/2020, Requested Total \$525000, Direct \$350000, Indirect \$175000 (Pending).

NIH R01, The Role of Lipin1 in Myofiber Stability and Integrity, P.I. Principle Investigator: Hongmei Ren, Submitted 5/11/2020, Requested Total \$1875000, Direct \$1250000, Indirect \$625000 (Pending).

Publications in refereed journals

Dr. Cho

C.M. Garrido, K.M. Henkels, K.M. Rehl, H. Liang, Y. Zhou, J. U. Gutterman, and K-J. Cho, 'Avicin G is a potent sphingomyelinase inhibitor and blocks oncogenic K- and H-Ras signaling', Scientific Reports, 10, 9120, 2020.

S.E. Kovar, C. Fourman, C. Kinstedt, B. Williams, C. Morris, K-J Cho, and D. M. Ketcha, 'Chalcones bearing a 3,4,5-trimethoxyphenyl motif are capable of selectively inhibiting oncogenic K-Ras signaling', Bioorg Med Chem Lett., 30, 127144, 2020.

J. L. Symons, K.-J. Cho, J. T. Chang, G. Du, M. N. Waxham, J. F. Hancock, I. Levental, K. R. Levental, 'Lipidomic atlas of mammalian cell membranes reveals hierarchical variation induced by culture conditions, subcellular membranes, and cell lineages', Soft Matter.

Dr. Craig

M.P Craig, S. Rajakaruna, O. Paliy, M. Sajjad, S. Madhavan, N. Reddy, J. Zhang, M. Bottomley, S. Agrawal and M.P. Kadakia, 'Differential MicroRNA Signatures in the Pathogenesis of Barrett's Esophagus', *Clinical and Translational Gastroenterology*, 1, e00125, 2020.

Dr. Kadakia

M.P. Craig, S. Rajakaruna, O. Paliy, M. Sujad, S. Madhavan, N. Reddy, J. Zhang, M. Bottomley, S. Agrawal and M.P. Kadakia, 'Differential MicroRNA Signatures in the Pathogenesis of Barrett's Esophagus', *Clinical and Translational Gastroenterology*, 11, e00125, 2020.

Dr. Leffak

Gadgil, Rider, S.D., Lewis, T., Barthelemy, J., and Leffak, M., 'Analysis of Trinucleotide Repeat Stability by Integration at a Chromosomal Ectopic Site.', *Methods in Molecular Biology*, 2056, 121-136, 2020.

Gadgil, R. Y., Romer, E. J., Goodman, C. C., Rider, S. D., Jr., Damewood, F. J. Barthelemy, J. R., Shin-Ya, K., Hanenberg, H., Leffak, M., 'Replication stress at microsatellites causes DNA double-strand breaks and break-induced replication', *J Biol Chem*, 295, 15378-15397, 2020.

Dr. Long

Elkhadragy L, Alsaran H, Long W., 'The C-Terminus Tail Regulates ERK3 Kinase Activity and Its Ability in Promoting Cancer Cell Migration and Invasion', *Int J Mol Sci*, 21, 4044-4058, 2020.

Morel M, Shah KN, Long W., 'The F-box protein FBXL16 up-regulates the stability of C-MYC oncoprotein by antagonizing the activity of the F-box protein FBW7', *J Biol Chem*, 295, 7970-7980, 2020.

Dr. Paliy

S. Pérez-Burillo, S. Rajakaruna, O. Paliy, S. Pastoriza, J.Á. Rufián-Henares, 'Bioactivity of food melanoidins is mediated by gut microbiota', *Food Chemistry*, 316, e126309, 2020.

M.P. Craig, S. Rajakaruna, O. Paliy, M. Sajjad, S. Madhavan, N. Reddy, J. Zhang, M. Bottomley, S. Agrawal, M.P. Kadakia, 'Differential MicroRNA Signatures in the Pathogenesis of Barrett's Esophagus', *Clin Transl Gastroenterol*, 11(1), e00125, 2020.

Dr. Ren

Sattiraju SR, Jama A, Alshudukhi AA, Townsend NE, Miranda DR, Reese RR, Voss AA, Ren H., 'Loss of membrane integrity drives myofiber death in lipin1-deficient skeletal muscle. ', *Physiological Reports*., 8, e14620, 2020.

Miranda DR, Reed E, Jama A, Bottomley M, Ren H, Rich MM, Voss AA. , 'Mechanisms of altered skeletal muscle action potentials in the R6/2 mouse model of Huntington's disease.', Am J Physiol Cell Physiol., 319, C218-C232., 2020.

In Press

Dr. Kadakia

ES Alshammari, AA Aljagthmi, AJ Stacy, M Bottomley, HN Shamma, MP Kadakia and W Long, 'ERK3 is transcriptionally upregulated by Δ Np63 α and mediates the role of Δ Np63 α in suppressing cell migration in Non-Melanoma Skin Cancers', BMC Cancer.

Dr. Markey

Dufour JS, Reiter A, Cox C, Weston EB, Markey M, Turner A, Le P, Aurand AM, Simmons S, Altman L, Mageswaran P, Davis K, Huber D, Bhattacharya A, Marras W, 'Motion sickness decreases low back function and changes gene expression of military air crew', Aerospace Medicine and Human Performance.

Submitted

Spandau DF, Chen R, Wargo J, Rohan C, Southern D, Zhang A, Loesch M, Weyerbacher J, Tholpady S, Lewis D, Kuhar MJ, Tsai KY, Kemp MG, Markey M, Cates E, Williams A, Knisely C, Bashir S, Gabbard R, Hoopes R, Travers JB., 'Evidence that wounding can prevent non-melanoma skin cancer in aged ski', New England Journal of Medicine (NEJM).

Significant presentations

Posters and Platform Presentations

Dr. Craig

M.P. Craig, J. Zhang, A. Hira, and M. Kadakia, MicroRNA Biomarker of the response to moderate and high intensity exercise regimen, BMB Brown Bag, WSU - (Platform).

Dr. Kadakia

MP Craig, J Zhang, A Hira, , T Broderick and MP Kadakia, MicroRNA Biomarkers of the Response to Moderate and High Intensity Exercise Regimen, Brown Bag Seminar, Department of Biochemistry and Molecular Biology, Wright State University 9/8/2020 - 9/8/2020 (Platform).

A Hira, AJ Stacy, J Zhang, MP Craig and MP Kadakia, TIP60 Regulation of Δ Np63 α is Associated with Cisplatin Resistance, BMB Brown Bag seminar, Wright State University 2/18/2020 - 2/18/2020 (Platform).

Amjad Aljagthmi and MP Kadakia, Δ Np63 α suppresses cell invasion by modulating Rac1 activity, BMS Seminar Series, Wright State University 10/5/2020 - 10/5/2020 (Platform).

Amjad Aljagthmi and MP Kadakia, Δ Np63 α suppresses cell invasion by modulating Rac1 activity, Weisman Award Travel Award Nominee Presentation, Wright State University 2/11/2020 - 2/11/2020 (Platform).

Dr. Leffak

Rujuta Gadgil, R., Barthelemy, J., Rider, D., Damewood, F.J., Leffak, M., Replication-dependent Microsatellite Breaks Cause Break-Induced Replication, Genomic Stability and DNA Repair e-symposium, Keystone Colorado 9/21/2020 - 9/23/2020 (Poster).

Dr. Long

Marion Morel and Weiwen Long, The F-box protein FBXL16 upregulates the stability of c-myc oncoprotein by antagonizing FBW7 function, Webinar presentation, ASBMB annual meeting 2020, Webinar 06-06-2020 - 06-06-2020 (Platform).

Dr. Markey

M Markey, Next generation sequencing and other technologies at the WSU Center for Genomics Research, Festival of Flight - Wright Brothers Day, Dayton, OH 10/5/2020 - 10/5/2020 (Recorded Video).

M Markey, The Markey Lab, BMB MS Student Introductions, Online 8/20/2020 - 8/20/2020 (Platform).

Dr. Paliy

S. Rajakaruna, S. Perez-Burillo, J.A. Rufian-Henares, and O. Paliy, Bioactivity of food melanoidins is mediated by human gut microbiota, Miami Winter Symposium - Molecular Mechanisms Linking the Microbiome and Human Health, Miami, FL 1/26/2020 - 1/29/2020 (Poster).

Invited Lectures

Dr. Long

Identifying new therapeutic targets in cancers: From protein kinase ERK3 to F-Box protein FBXL16, BMB department Seminar series, Wright State University, Wright State University, Dayton, Ohio, 02-27-2020.

Dr. Ren

Lipin1 is critical for muscle development and function, Purdue University Fort Wayne by Dr. Mohammad Qasim, Purdue University Fort Wayne, 10/9/2020.

Consultantships

Dr. Markey

Dayton Children's Hospital

Discussions with Paul Psychogios, M.D., Dayton Children's Hospital's new chief of Medical Genetics regarding costs and benefits of clinical whole genome sequencing.

Spectral Energies, LLC
SBIR discussions with Tushar Goswami (employee) and Sivaram Gogineni (President)
March-May 2020.

Dr. Paliy

Faraday Technologies
Consulted on the use of in vitro gut simulator system to test biocidal effects of ionic silver for NASA applications

6

Summary of Service Activities

Student Advising

Graduate Student (Ph.D. Student) - Thesis/Dissertation Co-Director

Dr. Cho

Kristen Rehl, Faculty role: Thesis/Dissertation Director, This student did not graduate this year.

Resha Shrestha, Faculty role: Lab Rotation Director, 1 Semester in lab rotation,

Dr. Kadakia

Akshay Hira, Faculty role: Thesis/Dissertation Director, This student did not graduate this year.

Amjad Aljagthmi, Faculty role: Thesis/Dissertation Director, This student did not graduate this year.

Andrew Stacy, Faculty role: Thesis/Dissertation Director, This student did not graduate this year.

Dr. Leffak

Venicia Alhawach, Faculty role: Thesis/Dissertation Director, This student did not graduate this year.

Dr. Long

Amanda Myers, Faculty role: Thesis/Dissertation Director, This student did not graduate this year.

Krushangi Shah, Faculty role: Thesis/Dissertation Director, This student did not graduate this year.

Dr. Paliy

Alex Gordon, Faculty role: Thesis/Dissertation Director, This student did not graduate this year.

Resha Shrestha, Faculty role: Thesis/Dissertation Director, This student did not graduate this year.

Sumudu Rajakaruna, Faculty role: Thesis/Dissertation Director, This student did not graduate this year.

Dr. Ren

Abdullah A. Alshudukhi, Faculty role: Thesis/Dissertation Director, This student did not graduate this year.

Abdulrahman Jama, Faculty role: Thesis/Dissertation Director, This student did not graduate this year.

Graduate Student (M. S. Student) - Thesis/Dissertation Director**Dr. Leffak**

French Damewood, Faculty role: Thesis/Dissertation Director, This student did not graduate this year.

Dr. Long

Nicole Waters, Faculty role: Thesis/Dissertation Director, This student did not graduate this year.

Dr. Markey

Abdullah Alatwi, Faculty role: Thesis/Dissertation Director, This student did not graduate this year.

Dr. Paliy

Kourtney Sprague, Faculty role: Thesis/Dissertation Director, This student did not graduate this year.

Dr. Ren

Alexandra Brown, Faculty role: Thesis/Dissertation Director, This student did not graduate this year.

Rajsi Yogeshkumar Thaker, Faculty role: Thesis/Dissertation Director, This student did not graduate this year.

Sandhya Ramani Sattiraju, Faculty role: Thesis/Dissertation Director, Thesis Title: Apoptosis and necrosis drive muscle fiber loss in lipin1-deficient skeletal muscle, This student graduated this year. They are now Work as a research assistant in Cincinnati Children's hospital,

Committee Membership/Officer

BMB Committee Service

Dr. Campbell

BMB, Undergraduate Program Director
BMB, 4+1 committee
BMB, BMB Curriculum Committee - Chair (Fall)
BMB, BMB Undergraduate Oversight Committee
BMB, Departmental Honors Committee
BMB, Program Assessment Committee
BMB, Weisman Travel Award Committee

Dr. Cho

BMB, Admission Committee for BMB Master's Program

Dr. Leffak

BMB, BMB Program Review Committee

Dr. Long

Director of BMB MS program since August 2020.

Dr. Markey

BMB, Graduate Education Committee

Dr. Paietta

BMB, BMB Curriculum Committee
BMB, BMB M.S. Program Director

Dr. Paliy

BMB, GEC Committee

Dr. Ren

BMB, Master's student recruitment committee

Dr. Schmidt

BMB, Departmental Curriculum Committee

BSOM Committee Service

Dr. Kadakia

BSOM, Associate Dean of Research

Dr. Leffak

BSOM, Thesis Committee, Jeffrey Travers PTX Chair Review Committee
BSOM, BSOM Executive Committee

Dr. Paietta

BSOM, Faculty Curriculum Committee
BSOM, Foundations of Clinical Medicine (pandemic weekly) Committee
BSOM, Foundations of Clinical Medicine Administrative Committee
BSOM, Foundations of Clinical Medicine Curricular Innovations Committee
BSOM, Origins Steering Committee

Dr. Schmidt

BSOM, Center for Teaching and Learning Faculty Advisory Board
BSOM, Graduate Curriculum Committee

Science and Math Committee Service**Dr. Campbell**

Science and Math, ASK Scholarship Committee
Science and Math, College of Science and Math Undergraduate Curriculum Committee
- Chair (Fall)
Science and Math, Retention Committee: Gateway Courses

Dr. Leffak

Science and Math, COSM Program Review Committee
Science and Math, COSM Scholarship Committee
Science and Math, IASM Program Committee

Dr. Paietta

Science and Math, COSM Program Review
Science and Math, COSM Retention Committee. FYS group.
Science and Math, COSM Steering Committee

Dr. Ren

Science and Math, COSM Petition Committee Member

BMS Committee Service**Dr. Cho**

BMS, Thesis Committee Director, PhD Preliminary Exam for Kristen Rehl

Dr. Kadakia

BMS, Thesis Committee Director, Mentor for PhD student, Akshay Hira
BMS, Thesis Committee Director, Mentor for PhD student, Amjad Aljagthmi
BMS, Thesis Committee Director, Mentor for PhD student, Amjad Aljagthmi
BMS, Thesis Committee Director, Mentor for PhD student, Amjad Aljagthmi
BMS, Thesis Committee Director, Mentor for PhD student, Andrew Stacy
BMS, Co-advisor for PhD student, Prithy Martis
BMS, Mentor for PhD student Bryan Mayville

Dr. Leffak

BMS, BMS Admissions Committee
BMS, BMS APC

Dr. Long

BMS, BMS Academic policies committee, elected. Started in September 2020
BMS, BMS curriculum committee, elected. Ended in August, 2020

Dr. Markey

BMS, BMS Admissions Committee
BMS, BMS Nominating Committee

Dr. Paliy

BMS, BMS Curriculum committee

Dr. Ren

BMS, Thesis Committee Member, Nominating Committee

Wright State University Committee Service

Dr. Kadakia

Wright State University, Campus Research Steering Committee, member
Wright State University, Chair, Covid Research Task Force
Wright State University, COVID Research Sub-committee / Campus Reopen Steering Committee, member

Dr. Leffak

Wright State University, Madhavi Kadakia BMB Chair Review Committee

Dr. Long

Wright State University, IACUC member

Dr. Markey

Wright State University, BMB Chair 5-Year Review Committee (Chair)
Director, Wright State University Center for Genomics Research

Dr. Paliy

Wright State University, WSU Institutional Biosafety committee

Other Committee Service

Dr. Campbell

Sinclair Biotech Advisory Board

Dr. Kadakia

Board member for Dayton Veterans Affairs Research Foundation, Dayton, OH
Board of Directors, Association of Medical and Graduate Departments of Biochemistry (AMGDB)

Symposia

Dr. Campbell

Annual SABER (Society for the Advancement of Biology Education Research) Meeting, 7/10/2020 - 7/31/2020, Virtual Symposium. ()

Dr. Markey

Remote Teaching Virtual Summit, 8/12/2020 - 8/13/2020, Online. (Invited Participant)

Grant and Manuscript Review

Grant Proposal, As study section member

Dr. Long, Tumor Progression and Metastasis (TPM) study section, NIH/NCI (9)

Journal Manuscript, Ad Hoc Reviewer

Dr. Campbell, Cell Biology Education (CBE) Lifesciences (4)

Dr. Cho, Archiv der Pharmazie (1)

Dr. Cho, Cancers (1)

Dr. Cho, International Journal of Molecular Sciences (1)

Dr. Cho, Scientific Reports (1)

Dr. Craig, Nucleic Acids Research (1)

Dr. Kadakia, Nucleic Acids Research (1)

Dr. Leffak, Molecular and Cellular Biology (2)

Dr. Leffak, Nucleic Acids Research (4)

Dr. Long, Cancer Letters (2)

Dr. Long, Cancers (1)

Dr. Long, Experimental and Therapeutic Medicine (2)

Dr. Long, Gut (1)

Dr. Long, Journal of Cellular Physiology (2)

Dr. Long, Oncogene (1)

Dr. Long, Plos Genetics (2)

Dr. Markey, Cytogenetics and Genome Research (1)

Dr. Markey, Gene (1)

Dr. Markey, International Journal of Molecular Science (1)

Dr. Markey, Materials (1)

Dr. Paliy, BMC Microbiology (1)

Dr. Paliy, ISME Communications (1)

Dr. Paliy, Microbiome (1)

Dr. Paliy, Molecular Ecology (1)

Dr. Paliy, PeerJ (2)

Dr. Paliy, Scientific Reports (1)

Dr. Ren, International Journal of Immunopathology and Pharmacology (1)

Dr. Ren, Journal of Cancer Biology & Treatment (1)

Journal Manuscript, As member of editorial board

Dr. Leffak, JBC (15)

Dr. Leffak, Scientific Reports (1)

Dr. Paliy, EC Microbiology (1)

Other, Ad Hoc Reviewer

Dr. Campbell, Society for Advancement of Biology Education Research (SABER)
Abstract reviewer (5)

Other, Other

Dr. Campbell, Pacific Crest - Publisher of Foundations of Biochemistry workbook by Minderhout and Loertscher (1)

Personnel**M. S. Student****Dr. Cho**

Parisa Sadrpour, Faculty role: Lab Rotation Director, 1 Quarter in lab rotation,

Research Associate**Dr. Kadakia**

Jin Zhang, Full Time Research Associate, Research Associate

Post Doctorate**Dr. Leffak**

S. Dean Rider, Part Time (87.5%) Research Assistant Professor

Dr. Long

Marion Morel, Full Time

Technician**Dr. Cho**

Karen Henkels, Full Time

Undergraduate**Dr. Kadakia**

Austin Schroeder, Lab participation: 15, This student is a STEM student. Did not complete any undergraduate research.

Megan King, Lab participation: This student is . Did not complete any undergraduate research.

Nabaa Hmood, Lab participation: 5, This student is a STEM student. Did not complete any undergraduate research.

Sara Gundru, Lab participation: 4, This student is . Did not complete any undergraduate research.

Dr. Leffak

Matilyn Shanahan, Part Time (15%) undergraduate student, undergraduate student

Nathen Zavada, Part Time (15%) undergraduate student, undergraduate student

Dr. Markey

Marissa Routt, Lab participation: 1, This student is both an Honors student and a STEM student. Did not complete any undergraduate research.

Dr. Ren

Elise M Hill, Lab participation: 10 hrs/week for 16 weeks, This student is a STEM student. Did not complete any undergraduate research.

Rebecca Reese, Lab participation: 12 hrs/week for 16 weeks, This student is an Honors student. Did not complete any undergraduate research.

Visiting Researcher

Dr. Leffak

David Hitch

Volunteer

Dr. Markey

Karleigh Kessler, Part Time (30%) Volunteer, Volunteer

7

Patient Care Summary

[If applicable. Include number of ambulatory visits, hospitalizations, surgeries, new techniques or programs developed; new collaborations.]

Not applicable.

8

Honors and awards [Faculty or staff]

Awards

Dr. Campbell

Online Teaching Fellow
received by Dr. Campbell.

Dr. Paliy

World Learning Fulbright Specialist
received by Dr. Paliy.

Dr. Ren

Wright State University Women in Science Giving Circle Faculty Awards
received by Dr. Ren.

Special Interest Programs

Dr. Campbell

CTL Online Teaching and Learning Community
March 27th through April 28th
This program is located at WSU.

9

Hosted events [CME, etc.]

Not applicable.

10

Other information

[Other information that represents your department's contribution to the academic mission of the Boonshoft School of Medicine.]

Not applicable.