



AUGUSTA UNIVERSITY
MEDICAL COLLEGE
OF GEORGIA

Department of Physiology

PHYSIOLOGY INSIDER

*Vessel to Astrocyte
Cover Photo Credit:
Dr. Jessica Filosa Research Lab*

Second Edition, 2018



Message from the Chair

I am pleased to report that the Department of Physiology at the Medical College of Georgia (MCG) at Augusta University had another great year. We are currently ranked 26 out of 81 on the National Institutes of Health (NIH) Blue Ridge Institute for Medical Research. We were ranked 39 last year, so this is an incredible achievement by our faculty, postdoctoral fellows, and students.

Our faculty continues to be active in international societies, scientific committees and editorial boards and have outstanding research programs. Our postdoctoral fellows and students are also contributing as highly productive members of the department, and this reflects favorably on the mentorship by our faculty.

Below is an extraordinary range of academic activities that will be of interest to our readers from the past year:

Philanthropic investment grew this past year and it contributes to the greatness of our department.

Dr. Yemin Zhang is a visiting scientist in my lab from Wuhan University. She is the recipient of a Chinese State Fellowship Award from the Chinese Scholarship Council.

Congratulations and farewell to Dr. Advije Ergul who will be joining the faculty at the Medical University of South Carolina. In 2018, she became the second MCG faculty member to receive a Senior Research Career Scientist Award from the Veterans Association (VA). Advije has been with MCG for eighteen years, with her eleven-year tenure in the Department of Physiology being way too short.

In April 2018, Dr. Ruth Harris received a Regents' Professorship of the University System of Georgia. This is the highest academic recognition given by the Board of Regents and it reflects on her scholarship and numerous accomplishments. She currently serves as the elected President of the international Society for the Study of Ingestive Behavior. Congratulations, Ruth.

Dr. Jennifer Sullivan received two prestigious awards this year: the Mid-Career Award for Research Excellence from the Council on Hypertension from the American Heart Association (AHA) and the John Laragh Research Award from the American Journal of Hypertension (AJH). The AHA award recognizes a mid-career investigator active in hypertension or cardiovascular research. Candidates include PhDs and/or MDs who are still within 10 years after their first faculty appointment, as of the award application date. The AJH award honors an exemplary investigator in hypertension research under the age of 45.

Finally, I am privileged to share with you that I was honored by the Council on Hypertension of the AHA this year with the Excellence Award for Hypertension Research. This award, sponsored by Novartis, was initiated in 1966 and honors excellence in research and discoveries in the field of hypertension. Recipients are selected based on their impact on the field of hypertension throughout their career.

I am truly delighted to serve as chair of this department and to champion our history and future.

R. Clinton Webb, PhD
Herbert S. Kupperman Chair in Cardiovascular Disease
Regents' Professor and Chairperson



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PHYSIOLOGY at the Medical College of Georgia #26 in National Institutes of Health (NIH) Funding

#10 in Research Dollars per Faculty — Association of Chairs of Departments of Physiology 2017 Survey

NIH Funding

- 1 P01 Grant
- 11 R01 Grants
- 1 K99/R00 Grant

- 1 VA Senior Research Career Scientist Award
- 2 VA Merit Awards
- 12 Other Grants

American Heart Association Funding

- 1 Established Investigator Award
- 1 Career Development Award
- 4 Grants-in-Aid
- 2 Scientist Development Grants

97

Published Papers by Primary Faculty in 2017

15 Primary Faculty

4 Regents' Professors

6 Research Faculty

12 Postdoctoral Fellows

18 Graduate Students



11 Joint Faculty

2 Visiting Faculty

3 MCG/UGA Partnership Faculty

3 Medical Residents

11 Summer Students

Department Spotlights

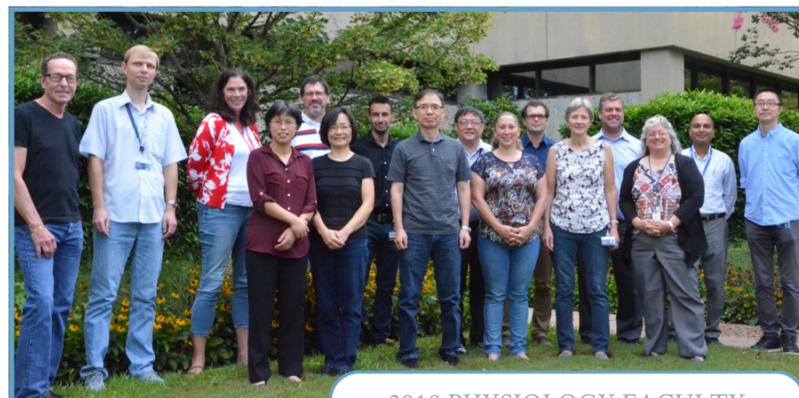
Drs. Wendy Bollag, Mike Brands, Anthony Payne, and Mong-Heng Wang received 2017 Medical College of Georgia (MCG) Exemplary Teaching Awards.

Dr. Wendy Bollag received an Institutional Service Award from MCG. Dr. Bollag was invited (and accepted the invitation) to become a Senior Editor for the Journal of Endocrinology and the Journal of Molecular Endocrinology. Dr. Bollag was honored as a World Famous Visiting Scientist to Jiangnan University in China. Dr. Bollag's Pilot Study Research Program application entitled "Effects of Monomethylfumarate, a Nrf2 Activator, on Bone Formation and Bone Mass" was awarded.

Dr. Weiguo Li was awarded a National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) Diabetic Complications Consortium Pilot and Feasibility grant.

Dr. Rawipan Uaratanawong, a visiting scholar in Dr. Wendy Bollag's laboratory, won a travel award to the Southern Translational Education and Research Conference in Augusta, Georgia that was held in September 2017.

Dr. Hongyi Zhou was granted a Career Development Award from the American Heart Association for his project "Neddylation in Adipose Tissue Development and Obesity."



2018 PHYSIOLOGY FACULTY

Back Row: Drs. Clinton Webb, Mykola Mamenko, Jennifer Sullivan, Michael Brands, Istvan Czikora, Mong-Heng Wang, Zsolt Bagi, Paul O'Connor, Vivek Choudhary, Weiguo Li

Front Row: Drs. Weiqin Chen, Hakjoo Lee, Yisang Yoon, Fernanda Priviero, Ruth Harris, Wendy Bollag

Not Pictured: Drs. Adviye Ergul, Jessica Filosa, Anthony Payne, David Stepp, Hongyi Zhou

Faculty Promotions



Dr. Weiqin Chen
Associate Professor



Dr. Ruth Harris
Regents' Professor



Dr. Jennifer Sullivan
Professor

Welcome New Faculty!



Dr. Zsolt Bagi
Associate Professor
Faculty



Dr. Istvan Czikora
Assistant Research Scientist
Research Faculty



Dr. Weiguo Li
Assistant Research Scientist
Research Faculty



Dr. Fernanda Priviero
Assistant Research Scientist
Research Faculty



Dr. Aaron Roseberry
Assistant Professor
Georgia State University
Adjunct Faculty



Dr. LaShon Sturgis
Assistant Professor
Affiliated Faculty



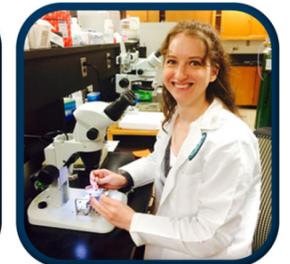
Dr. Hongyi Zhou
Assistant Research Scientist
Research Faculty

Alumni Spotlights

Dr. Virendra Mahesh, Professor and Chair Emeritus, was recently awarded the President's Award, the highest award given by Augusta University.

Dr. Brett Mitchell, a former Graduate Student, was selected as the 2018 Distinguished Alumnus from The Graduate School. Dr. Mitchell is an Associate Professor of Physiology at Texas A&M University.

Dr. Margaret Zimmerman, a former Graduate Student, was recently promoted to Research Instructor at Tulane University and was accepted into the Louisiana Clinical and Translational Science Center Roadmap Scholars Program which focuses on moving translational researchers into clinical science.



**"I didn't want to just know names of things.
I remember really wanting to know how it all worked."**

Dr. Elizabeth Blackburn
Winner of the 2009 Nobel Prize
for Physiology or Medicine

Current Academic and Professional Positions of Department Alumni

Amy Banes-Berceli, PhD: Recently promoted to Associate Dean of the College of Arts and Sciences at Oakland University.

Trevor Hardigan, MD/PhD: Neurosurgery Resident at Mt. Sinai Hospital in New York City.

Takayuki Matsumoto, PhD: Recently promoted to Associate Professor at Hoshi University in Tokyo, Japan.

Cameron McCarthy, PhD: Postdoctoral Fellow at the University of Toledo College of Medicine and Life Sciences.

Ashlee Tipton, PhD: Scientific Review Officer at the National Center for Complementary and Integrative Health.

Rebecca Ward, PhD: Scientific Writer at Massachusetts General Hospital.

Camilla Wenceslau, PhD: Assistant Professor at the University of Toledo College of Medicine and Life Sciences.

Brandi Wynne, PhD: Assistant Professor at Emory University School of Medicine.

Recent Postdoctoral Awardees

Joshua Butcher—Dr. David Stepp

- 2018 Caroline Tum Suden Award

Ellen Gillis—Dr. Jennifer Sullivan

- American Heart Association Postdoctoral Fellowship

Amel Komic—Dr. Clinton Webb

- 2018 American Physiological Society -Cardiovascular Section Research Recognition Award

Cameron McCarthy—Dr. Webb

- American Heart Association Postdoctoral Fellowship
- 2018 American Physiological Society -Cardiovascular Section Research Recognition Award

Patricia Martinez-Quinones—

Dr. Webb

- First Place for the William H. Moretz Surgical Society Douglas A. Rives, MD Resident Research Award
- National Hispanic Medical Association Resident of the Year Award
- 2018 Shock Conference Diversity Enhancement Award

Physiology Postdoctoral Fellows In the News



"Drug may quell deadly immune response when trauma spills the contents of our cells' powerhouses"

<https://medicalxpress.com/news/2018-06-drug-quell-deadly-immune-response.html>

Postdoc and Medical Resident News



Back Row: Hongzhuan Xuan, Yasir Abdul, Amel Komic, Juan Ramiro Diaz, Ellen Gillis, Cheng Xu

Front Row: Riyaz Mohamed, Yemin Zhang, Nicole Klee, Jaine McKenzie

Not Pictured: Fabiano Calmasini, Ki Jung Kim, Patricia Martinez-Quinones (through June 2018), Cameron McCarthy, Camilla Wenceslau

Each summer since 2010, the Physiology Postdoctoral Fellows (PPF) have organized the Physiology Summer Seminar Program which was coordinated this year by the acting PPF Chair, Ellen Gillis. PPF members and graduate students presented their recent data to an open audience formed by members of the Department of Physiology and outside guests.

Physiology postdoctoral fellowships in the past five years:

Mohammed Abdelsaid, PhD (2012-2016):

American Heart Association Postdoctoral Fellowship
American Heart Association Scientist Development Grant

Joshua Butcher, PhD (2017-2019):

American Heart Association Postdoctoral Fellowship

Ellen Gillis, PhD (2018-2020):

American Heart Association Postdoctoral Fellowship

Cameron McCarthy (2018-2020):

American Heart Association Postdoctoral Fellowship

Jennifer Thompson, PhD (2013-2017):

American Heart Association Postdoctoral Fellowship, National Institutes of Health Pathway to Independence Award (K99/R00)

Camilla Wenceslau, PhD (2013-2018):

American Heart Association Postdoctoral Fellowship, National Institutes of Health Pathway to Independence Award (K99/R00)

Graduate Program News



First Row (standing): Yue Pan, Yanna Tian, Mahmoud Abdelbary

Middle Row: Lindsey Ramirez, Sarah Ray, Elinor Mannon, Kasey Belanger, Casey Derella, Marissa Seamon, LaDonya Jackson

Third Row: Olufunke Arishe, Lia Taylor, Patricia Martinez-Quinones (July 2018-)

Not Pictured: Stephanie Christianson, Ryan Crislip, Alec Davila, Khushboo Sahay, Rebecca Ward

The Department of Physiology graduate students were honored to host Dr. Lisa Cassis from the University of Kentucky as our fifteenth Virendra B. Mahesh Lectureship guest speaker. Dr. Cassis is an exemplary scholar and leader in the field of cardiovascular and metabolic disease with an impressive research and mentoring portfolio. During her visit, Dr. Cassis delivered a thought-provoking and timely lecture entitled "Mechanisms of Vascular Disease: Focus on Sexual Dimorphism." She also met with several faculty members across the campus, as well as our students, all of whom were excited to gain her unique perspective, insight, and career advice.

Welcome our newest graduate students to the labs!

We are excited to promote the academic success and professional development of this diverse set of students who have quite early on proven to be a bright, passionate, and dedicated group of young scientists.

- Olufunke Arishe—Dr. Clinton Webb
- Kasey Belanger—Dr. Jennifer Sullivan
- Alec Davila—Dr. Zsolt Bagi
- Casey Derella—Dr. Ryan Harris
- Elinor Mannon—Dr. Paul O'Connor
- Patricia Martinez-Quinones, MD—Dr. Webb
- Lindsey Ramirez—Dr. Sullivan
- Sarah Ray—Dr. O'Connor
- Yanna Tian—Dr. Bagi

Recent Grad Student Awardees

Mahmoud Abdelbary—

Dr. Jennifer Sullivan

- Graduate Research Day Award Winner

Alec Davila (MD/PhD student)—

Dr. Zsolt Bagi

- American Heart Association Predoctoral Fellowship
- NIH F31 Fellowship

LaDonya Jackson—

Dr. Adviy Ergul

- Georgia Clinical and Translation Science Alliance TL1 Predoctoral Fellowship

Patricia Martinez-Quinones—

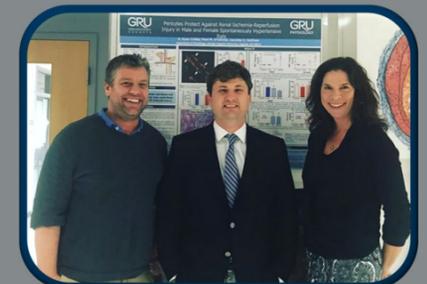
Dr. Clinton Webb

- First place M. Gage Ochsner Resident Paper Competition, Committee on Trauma Georgia Chapter of the American College of Surgeons

Congratulations to our recent graduates!



Drs. Rebecca Ward and Trevor Hardigan with mentor Dr. Ergul.



Dr. Ryan Crislip with mentors Drs. O'Connor and Sullivan.

Physiology Trainees received 13 travel awards in the past year.

Research Spotlights

Drinking baking soda could be an inexpensive, safe way to combat autoimmune disease



We tested the hypothesis that oral NaHCO_3 intake stimulates splenic anti-inflammatory pathways. Following oral NaHCO_3 loading, macrophage polarization was shifted from predominantly M1 (inflammatory) to M2 (regulatory) phenotypes in the spleen and kidneys of rats, and in the blood of human subjects. Surprisingly, we found that gentle manipulation to visualize the spleen at midline during surgical laparotomy (sham splenectomy) was sufficient to abolish the response and resulted in hypertrophy/hyperplasia of the capsular mesothelial cells. Thin collagenous connections lined by mesothelial cells were found to connect to the capsular mesothelium. Mesothelial cells in these connections stained positive for the pan-neuronal marker PGP9.5 and acetylcholine esterase and contained many ultrastructural elements which visually resembled neuronal structures, including synaptic ribbons (the presence of which was confirmed by immunohistochemistry). Both disruption of these fragile connections or transection of the vagal nerves below the diaphragm, resulted in loss of capsular mesothelial acetylcholine esterase staining and a significant reduction in splenic mass, which was not additive. Our data are important as they indicate that oral NaHCO_3 activates the cholinergic anti-inflammatory pathway and provides evidence that the signals that mediate this response are transmitted to the spleen via a novel neuronal like function of mesothelial cells.

Ray SC, Baban B, Tucker MA, Seaton AJ, Chang KC, Mannon EC, Sun J, Patel B, Wilson K, Musall JB, Ocasio H, Irsik D, Filosa JA, Sullivan JC, Marshall B, Harris RA, O'Connor PM. Oral NaHCO_3 activates the splenic anti-inflammatory pathway; evidence vagal signals are transmitted via mesothelial cells. *J Immunol*. 2018 May 15;200(10):3568-3586. doi: 10.4049/jimmunol.1701605. Epub 2018 Apr 16.

Dr. Filosa's lab explores how high blood pressure hurts cognition



While much effort has been devoted to the understanding of mechanisms linked to activity-evoked changes in cerebral blood flow (CBF) namely, functional hyperemia and neurovascular coupling, less is understood about the processes controlling basal CBF and resting neuronal activity. Considering that chronic brain hypoperfusion contributes to cognitive impairments our group is interested in studying the cellular mechanisms by which changes in steady-state vascular tone, and thus, perfusion, affect resting neuronal function. Our central hypothesis is that constitutive mechanisms defining physiology vasculo-glial-neuronal coupling are impaired in disease.

"Untreated hypertension can lead to cognitive impairment but exactly how it happens, we don't really know," Dr. Jessica Filosa says. "We need to understand the window of change or shift in function in all these different cells. What exactly is happening, in what order, and how fast?"

Read more Physiology News

Scan this QR code or visit online at

www.augusta.edu/mcg/phy/phys_news.php



Research funded by the National Institutes of Health

In the News

National Heart, Lung, and Blood Institute Research Program Project Grant—Drs. Brands, Ergul, O'Connor, Sullivan, and Webb

- "The vicious cycle of hypertension and cell death" (Research Features)
<https://researchfeatures.com/2017/11/30/hypertension-cell-death/>

Dr. Zsolt Bagi

- "Augusta University researchers using grant to study premature aging of blood vessels" (Augusta Chronicle)
<http://www.augustachronicle.com/news/2018-02-11/au-researchers-using-grant-study-premature-aging-blood-vessels>

Dr. Advije Ergul

- "Compound improves stroke outcome by reducing lingering inflammation" (ScienceDaily)
<https://www.sciencedaily.com/releases/2018/04/180420090346.htm>

Dr. Jessica Filosa

- "Scientists explore how high blood pressure hurts cognition" (EurekAlert!)
https://www.eurekalert.org/pub_releases/2018-06/mcog-seh062518.php

Dr. Paul O'Connor

- "The Key to Recovery in Your Fridge" (Men's Journal, Sept. 2018, Vol 27, No. 9, page 111)
- "Could a Daily Dose of Baking Soda Combat Autoimmune Disease?" (ReachMD)
<https://reachmd.com/programs/clinicians-roundtable/could-a-daily-dose-of-baking-soda-combat-autoimmune-disease/10261/>
- "Rheumatoid Arthritis Symptoms, Causes: Baking Soda Reduces Inflammation, Study Finds" (International Business Times)
<https://www.ibtimes.com/rheumatoid-arthritis-symptoms-causes-baking-soda-reduces-inflammation-study-finds-2676299>

This press release was reported in over ten countries and had over 40 million online impressions at time of printing.

Drs. Patricia Martinez-Quinones and Camilla Wenceslau

- "Drug may quell deadly immune response when trauma spills the contents of our cells' powerhouses" (ScienMag)
<https://scienmag.com/drug-may-quell-deadly-immune-response-when-trauma-spills-the-contents-of-our-cells-powerhouses/>

Dr. Jennifer Sullivan

- "Sullivan selected for two national scientific honors" (EurekAlert!)
https://www.eurekalert.org/pub_releases/2018-06/mcog-ssf061218.php
- "High oxidative stress hampers males' production of powerful blood vessel dilator" (Medical Xpress)
<https://medicalxpress.com/news/2018-08-high-oxidative-stress-hampers-males.html>

Dr. Clinton Webb

- "Doctors explain how inflammation is the body's response to injury" (WJBF NewsChannel 6 ABC)
https://www.wjbf.com/news/jennie_20180305061217631/1009234640



DR. R. CLINTON WEBB
CHAIR, DEPT. OF PHYSIOLOGY, MGC AT AU





PhUn Week

Trainees in the Department of Physiology at the Medical College of Georgia at Augusta University participated in the American Physiological Society's annual *Physiology Understanding (PhUn) Week*. This year's event took place at A. R. Johnson Health Science and Engineering Magnet School in Augusta, Georgia. The event was split into four interactive sections, including a lung experiment, heart rate activity, antacid experiment, and laparoscopy surgery demonstration. In the lung section, students performed an experiment to measure their lung volume. In the antacid activity, students tested various over-the-counter antacid treatments to determine their relative efficacy in neutralizing acid.

In the heart rate activity, students first learned about heart rate, how to measure their own heart rates, and how it changes under different conditions. Finally, in the laparoscopy demonstration, two general surgery residents brought three laparoscopy practice set-ups to show the students how laparoscopic surgery is performed. Students were then able to try the equipment themselves.

A total of 114 students participated, divided into four rotating groups of approximately 25-30 students. Overall, student participation and enthusiasm was high throughout the day. Furthermore, the event was well received by the principal and the lead teacher, and the Department of Physiology trainees have been asked to return next year for PhUn Week.



Mini-Symposium

Our second annual Mini-Symposium was another success. Dr. Mykola Mamenko coordinated the two-day event, themed "Immune system and inflammation as modulators of physiological function in health and disease." The Department of Physiology strives to expand its research partnerships and enrich educational experiences. To reinforce this mission, the department established an annual mini-symposium in 2016. The scope of the event is defined by our faculty members based on its impact, innovation, and complementarity to the lines of scientific inquiry currently being pursued in the department.

The mini-symposium seeks to bring renowned experts in a given field of interest to Augusta, Georgia stimulating interactions with local researchers. The speakers this year were: Drs. Peter Doris (University of Tennessee Health Science Center at Houston), Suneil Koliwad (University of California), and David Mattson (Medical College of Wisconsin).

Our trainees benefit from this remarkable opportunity to share their findings, express concerns and receive feedback from established investigators at the poster session and in a less formal atmosphere during lunch with invited speakers. Importantly, the addressed issues extend far beyond the research in the laboratory. Career progress advice, life hacks, and experiences from the leaders in the field can be invaluable and, quite literally, life changing. The two-day forum culminates with an oral session, combining featured talks from the invited experts and presentations by local faculty with extensive discussions. The event is popular among the professionals throughout the Medical College of Georgia. Attendees from other universities are not uncommon and always welcome. Overall, the mini-symposium is an excellent educational and scientific platform that engages students, postdocs, faculty, and world-class invited speakers, fostering interdisciplinary communication and collaborations.



Community Spirit

For the past 18 winter holiday seasons, our staff has donated toys for patients at the Children's Hospital of Georgia at Augusta University.

Champions of the first JagMag Magazine Challenge by donating the most magazines from any one department at Augusta University to support a positive patient experience.

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www.instagram.com/augustafizzology.



Foundation/Endowment Giving



GIVE
AUGUSTA UNIVERSITY

Physiology Graduate Student and Postdoctoral Fellow Endowment Fund

In addition to existing endowments, the Department of Physiology created a new strategic initiative in 2017. Specifically, we established a Graduate and Postdoctoral Training Endowment Fund with the goal of enhancing graduate student and postdoctoral training in the department. Awards from the endowment will be aimed at supporting travel to present at meetings, purchasing research supplies, or providing short-term bridge funding for completion of a dissertation. Successful implementation of this endowment will provide continuity of educational and research goals of the department.

The endowment was initiated with a \$10,000 donation, and we are hoping to reach the \$50,000 mark required to establish permanent endowment status by 2022. ***We are asking for your help in reaching that goal.***

This endowment is the first of its kind at the Medical College of Georgia (MCG). We expect that it will help ensure continuing success of MCG Physiology trainees and keep the Department of Physiology at the forefront of discovery for years to come. In uncertain times like these, philanthropy and gifts have become integral to all levels of education and we hope that you will join us in supporting future generations of biomedical PhD and MD-PhD scientists in our department.

If you are interested in making a gift to the Department of Physiology at MCG at Augusta University, please go to our website (www.augusta.edu/mcg/phy/phys_gift.php) for more information on our Endowment Funds.



Thank you for considering a contribution to this or one of our other endowments.

2017-2018 PHYSIOLOGY DONORS

Allergy Partners

Lois Ellison

***Augusta University
Retirees Association***

Stella Goulopoulou

Roni and Wendy Bollag

Ruth Harris

Mike and Kelley Brands

Kara MacVean

Darrell W. Brann

Brett M. Mitchell

Aisha Cobbs

Yisang Yoon

Chenghao Yu

Cathy Davidson

Clinton and Nancy Webb

Adviye Ergul

Cameron McCarthy and

Camilla Wenceslau

***Consider a gift to the
Department of Physiology***

Physiology Graduate Student and
Postdoctoral Fellow Endowment Fund
Endocrinology Fund

Greenblatt Lectureship

Herbert S. Kupperman Endowed Chair

Lois Ellison Lectureship

Mahesh Lectureship and Graduate Award

Thomas Muldoon Lectureship

W. F. Hamilton Memorial Fund

***For more information on these funds or
to make a contribution please visit us at
www.augusta.edu/mcg/phy/phys_gift.php***

thank you