



DEPARTMENT OF PHYSIOLOGY

DEPARTMENT OF PHYSIOLOGY WELCOMES DR. NIKHLESH SINGH AS TENURE TRACK ASSISTANT PROFESSOR



The Department of Physiology recently welcomed Dr. Nikhlesh Singh in his new role as Tenure Track Assistant Professor in Physiology. Dr. Singh received his Doctor of Veterinary Medicine (DVM) from the College of Veterinary Science at G.B. Pant University of Agriculture and Technology in Pantnagar, India. He earned his PhD from the National Dairy Research Institute (Indian Council of Agricultural Research) in Karnal, India. He subsequently served as postdoctoral fellow in the lab of Dr. Gadiparthi Rao at UTHSC from 2008-2010 and was previously instructor and non-tenure track Assistant Professor of Physiology until July 2019, when he joined the Physiology faculty as Tenure Track Assistant Professor. His current research

focuses on understanding the pathophysiology of various vascular diseases such as restenosis, atherosclerosis, and proliferative retinopathy. Dr. Singh's lab is located in Johnson 503.

DR. SINGH AWARDED \$1.9 MILLION FROM NIH

Dr. Nikhlesh Singh, Tenure Track Assistant Professor of Physiology, has been awarded a \$1.9 million R01 grant from the National Institutes of Health (NIH) to investigate inflammatory responses in the eye that can lead to vision loss. Dr. Singh will use his NIH funding to study the pathological mechanisms that regulate inflammatory responses in patients with retinal neovascularization, which occurs when new blood vessels grow on the surface of the retina. The goal of his research will be to develop targeted therapies to preserve patients' retinal health. Dr. Singh's project, entitled "Cellular Mechanisms of Pathological Retinal Neovascularization," has been funded for five years through the NIH's National Eye Institute (NEI). To find out more about Dr. Singh's grant funding, please visit grantome.com/grant/NIH/R01-EY029709-01A1. To learn more about Dr. Singh's research, please contact him at nsingh2@uthsc.edu.



DEPARTMENT OF PHYSIOLOGY FACULTY

Zhongjie Sun, MD, PhD, FAHA

Professor and Chair
Thomas A. Gerwin Chair of Excellence
in Physiology

Adebowale Adebisi, PhD

Associate Professor

Julio Cordero-Morales, PhD

Associate Professor

Ioannis Dragatsis, PhD

Professor

Zheng Fan, PhD

Professor

Polly Hofmann, PhD

Professor
Senior Executive Associate Dean,
College of Medicine

Jonathan H. Jaggar, PhD

Maury W. Bronstein Professor

Salvatore Mancarella, PhD

Assistant Professor

Helena Parfenova, PhD

Professor

Kaushik Parthasarathi, PhD

Associate Professor

Gadiparthi N. Rao, PhD

George and Elizabeth Malloy Professor

Radhakrishna Rao, PhD

Professor

Donald B. Thomason, PhD

Professor
Dean, College of Graduate Health Sciences

Gabor J. Tigyi, MD, PhD

Van Vleet Professor

Valeria Vásquez, PhD

Assistant Professor

PHYSIOLOGY FACULTY INVITED TO SERVE ON NIH STUDY SECTIONS

Several Physiology faculty members have been invited to serve on NIH Study Sections or Review Panels. Dr. Adebawale Adebisi has been invited to serve as a standing member of the NIH Hypertension and Microcirculation (HM) study section for the next five years (2019-2025). The HM Study Section reviews applications involving basic and applied aspects of cardiovascular regulation with focus on the physiology of blood pressure regulation, the pathogenesis of hypertension, and microcirculation. Dr. Adebisi has served as an ad hoc member of this same study section since 2015. Dr. Valeria Vásquez will be serving on a T32 Review Panel from the NIH/NINDS (National Institute of Neurological Disorders and Stroke) starting in October 2019. The mission of the NINDS is to seek fundamental knowledge about the brain and nervous system and to use that knowledge to reduce the burden of neurological disease. Dr. Julio Cordero-Morales recently served on the NIH Biochemistry and Biophysics of Membranes (BBM) Study Section. The BBM

Study Section reviews research applications concerned with all biochemical and biophysical aspects of membrane structure and function, and with their constituent protein and lipid components. Emphasis is on the molecular details of processes that occur on or within membranes. Areas include use of biochemical and biophysical techniques to understand the structure and function of membranes and membrane-proteins. For more information about these study sections and review panels, please visit ninds.nih.gov/About-NINDS (NINDS), public.csr.nih.gov/StudySections/DBIB/BCMB/BBM (BBM), and public.csr.nih.gov/StudySections/DTCS/VH/HM (HM).



DR. VALERIA VÁSQUEZ TO PRESENT TALKS IN CINCINNATI, CLEVELAND, AND PROVO

Dr. Valeria Vásquez has a very busy upcoming speaking and conference schedule! In July, she presented a poster and chaired a session at the Ion Channel Regulation



Conference: Molecules to Disease, part of the FASEB Science Research Conference series, The FASEB SRC was convened in Lisbon, Portugal. She has also been invited to give a talk at the 2019 South East Lipid Research Conference in Cincinnati, Ohio. This conference will be held September 11-13, and Dr. Vásquez will be presenting as part of the Membrane Proteins and Lipids section. Dr. Vásquez will also be speaking at Case Western Reserve University's Department of Physiology and Biophysics in September, and she will be giving a talk at the University of Utah's Department of Biochemistry in November. For more information about the South East Lipid Research Conference, please visitselrc.org/.

F1000 Faculty of 1000

ARTICLE PUBLISHED BY ADEBIYI LAB RECEIVES SPECIAL SIGNIFICANCE TO THE FIELD RECOMMENDATION

An article recently published in Clinical Science by members of the Adebisi Lab was recommended by F1000Prime as having special significance in the field. F1000Prime identifies and recommends important articles in biology and medical research publications. Articles are selected by a peer-nominated global 'Faculty' of the world's leading scientists and clinicians who then rate them and explain their importance. From the numerical ratings awarded, we have created a unique system for quantifying the importance of individual articles. Faculty members and article recommendations are organized into over 40 Faculties (subjects), which are further subdivided into over 300 Sections.

The article, entitled "Pharmacological inhibition of TRPV4 channels protects against ischemia-reperfusion-induced renal insufficiency in neonatal pigs," appeared in the May 15, 2019, issue of Clinical Science, which offers multi-disciplinary coverage and clinical perspectives to advance human health by translating molecular bioscience and experimental research into medical insights. The article also made it to Clinical Sciences' Editor's Choice list. The full article cite is Soni H, Peixoto-Neves D, Olushoga M, Adebisi A. Pharmacological inhibition of TRPV4 channels protects against ischemia - reperfusion-induced renal insufficiency in neonatal pigs. 2019. Clin Sci 133,9,1-17.

DR. JULIO CORDERO-MORALES SELECTED TO PRESENT AT FASEB SCIENCE RESEARCH CONFERENCE

Dr. Julio Cordero-Morales, Associate Professor of Physiology, recently presented a talk at the Ion Channel Regulation Conference: Molecules to Disease, part of the FASEB Science Research Conference series. The conference, held from July 7-12, 2019, in Lisbon, Portugal, brought together an interdisciplinary group of scientists from academic and industry backgrounds who study and conduct research on ion channel regulation, from molecular biophysics to cellular and integrative physiology levels. Dr. Cordero-Morales's talk was entitled "Omega-3 Fatty Acids Modulate TRPV4 Function Through Plasma Membrane Remodeling."

The main themes of this scientific meeting were: to explore molecular biophysics of ion channel structure, function, and regulation by intracellular signaling molecules; to examine emerging research and technologies that advance the capacity to manipulate ion channels to regulate physiology; and to focus on the roles of ion channels in diseases such as cystic fibrosis and chronic pain, and as targets for innovative therapies. Dr. Cordero-Morales received his PhD in Molecular Physiology and Biological Physics from the University of Virginia and was a postdoctoral fellow in the lab of Dr. David Julius at the University of California at San Francisco before joining the UTHSC as Assistant Professor of Physiology in 2014. For more information about the FASEB SRC meeting, please visit src.faseb.org/ion-channel. To learn more about Dr. Cordero-Morales's research, please contact him at jcordero@uthsc.edu.



The Ion Channel
Regulation Conference:
Molecules to Disease

July 7-12, 2019
Lisbon, Portugal



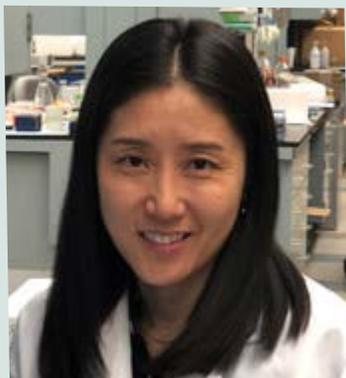
DR. VALERIA VÁSQUEZ AWARDED \$1.6 MILLION FROM NIH

Dr. Valeria Vásquez, Assistant Professor of Physiology, has been awarded a \$1.6 million R01 grant from the National Institutes of Health (NIH) to investigate how mechanosensitive ion channels function is controlled by



bioactive lipids. Her lab is particularly interested on identifying membrane lipids that regulate channel function in vivo and the mechanism by which they interact to increase mechano-dependent function. Dr. Vásquez's project, entitled "Regulation of mechanosensitive ion channels by membrane lipids," has been funded for five years through the National Institute of General Medical Sciences (NIGMS).

Dr. Vásquez received her PhD in Molecular Physiology and Biological Physics from the University of Virginia while working in the lab of Dr. Eduardo Perozo. Dr. Vásquez did her postdoctoral training in the lab of Dr. Miriam B. Goodman at Stanford University where she worked with the mechano-electrical transduction channel complex present in *C. elegans* touch receptor neurons. Dr. Vásquez joined the University of Tennessee Health Science Center as Assistant Professor in the Department of Physiology in March 2014, and her current research focuses on understanding the functional and structural basis of mechano-dependent gating of the ion channels responsible for touch, pain, and proprioception. To learn more about Dr. Vásquez's work, please contact her at vvasquez@uthsc.edu.



THE DEPARTMENT OF PHYSIOLOGY WELCOMES DR. JUNGSOO LEE AS RESEARCH ASSOCIATE IN VÁSQUEZ LAB

Dr. Jungsoo Lee recently joined the Vásquez Lab as Research Associate. Dr. Lee received her PhD in 2005 from Gwangju Institute of Science and Technology in Gwangju, Republic of Korea, and did postdoctoral work at the Earnest Gallo Clinic and Research Center at the University of California at San Francisco from 2005-2010.

TWO MEMBERS OF THE VÁSQUEZ LAB PRESENT CONFERENCE POSTERS AND TALKS

Two members of the Vásquez lab recently presented posters and talks at national and international conferences. Dr. Jonathan Millet, postdoctoral fellow in the Vásquez lab, presented a poster at the 22nd International *C. elegans* Conference, held at the University of Los Angeles in Los Angeles, California, from June 20-24, 2019.



International
C. elegans Conference

Dr. Millet's poster was entitled "C. elegans Piezo mechanosensitive channel, pezo-1, modulates muscular contraction during pharyngeal pumping." As Dr. Millet explains, mechanosensitive ion channels play crucial roles in a great number of physiological processes including somatosensation, proprioception, and neural differentiation. In recent years, Piezo proteins have been discovered as a novel class of mechanosensitive channels. Considering their widespread expression *in vivo*, it seems as these proteins could have a large area of biological functions that are yet to be uncovered. To understand the biological functions of Piezo channels *in situ*, we are characterizing pezo-1, the only known ortholog of the Piezo channel family in *Caenorhabditis elegans*. Using a combination of fluorescent reporters, we found that pezo-1 is widely expressed in the worm's pharynx including, but not limited to, muscles, gland cells, support cells and the extrapharyngeal nervous system. Using a new microfluidic-based technology by NemaMatrix, we analyzed various parameters of the pharyngeal pumping contraction. This allowed us to identify several discrete but reliable features of the pharyngeal pumping muscular contraction that are affected in absence of functional PEZO-1 (Pump duration, Amplitude, etc.). Due to the novelty of the technology, we have further characterized mutants known to affect pharyngeal pumping [*avr-15(ad1051)*, *eat-4(ad572)*...] and found that some of these pharyngeal pumping features could be mediated by the M3 neurons pair while others could be explained by extrapharyngeal neurons previously proposed to have redundant function. To learn more about this conference, please visit conferences.genetics-gsa.org/celegans/2019/index. To find out more about Dr. Millet's work with the Vásquez lab, please contact him at jmillet1@uthsc.edu.

Mr. Luis O. Romero, Research Coordinator II in the Vásquez lab, presented a talk and a poster at the Mechanics of Membrane Transport Gordon Research Conference at Colby-Sawyer College in New London, New Hampshire.



Gordon Research
Conferences
Frontiers of Science

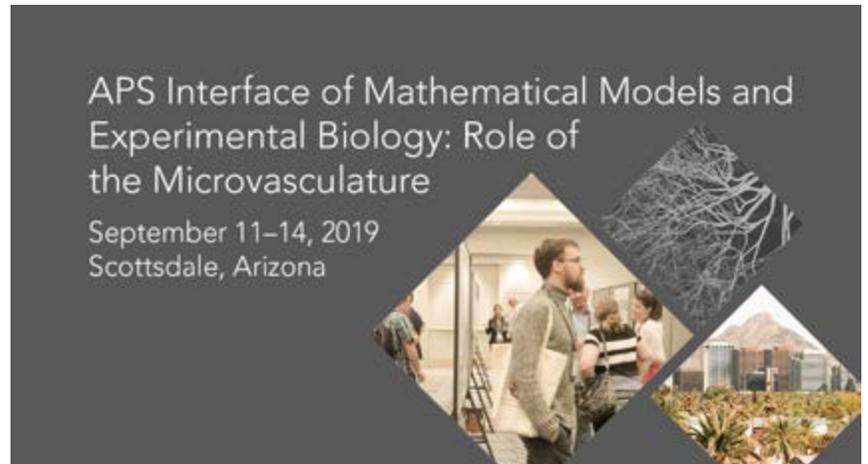
Mr. Romero's talk was entitled "Dietary Fatty Acids Fine-Tune Piezo1 Mechanical Response." The Gordon Research Seminar on Mechanisms of Membrane Transport is a unique forum for graduate students, post-docs, and other scientists with comparable levels of experience and education to present and exchange new data and cutting edge ideas. The core focus of the meeting is on novel approaches to structural biology, electrophysiology and biophysics in order to understand the transport of ions, small molecules, lipids and peptides across membranes. In particular, the meeting focused on membrane protein dynamics and regulation of transport with allosteric modulators and lipids. The main objective of the meeting was to link the structure and function of membrane transport to provide an overall picture of the biological and pathobiological processes these transporters are involved in, such as neurological and metabolic disorders. The seminar included a Q&A session with experienced scientists, to provide essential guidance for young scientists in their career ambitions, whether in academia or industry. Mr. Romero joined the Vásquez lab in May 2017. For more information about the Gordon Research Seminar, please visit grc.org/mechanisms-of-membrane-transport-grs-conference/2019/. To learn more about Mr. Romero's research, please contact him at jromerog@uthsc.edu.



DR. ADEBOWALE ADEBIYI

INVITED TO SPEAK AT APS ROLE OF THE MICROVASCULATURE CONFERENCE

Dr. Adebowale Adebisi, Associate Professor of Physiology, has been invited to speak at the American Physiological Society's inaugural Interface of Mathematical Models and Experimental Biology: Role of the Microvasculature conference which will be held from September 11-14, 2019, in Scottsdale, Arizona. This conference will focus on how investigators integrate mathematical models with experimental approaches in an effort to understand the roles of microcirculation and hemodynamics in a variety of organs. Microcirculation topics – broadly applicable to organ function and dysfunction in general—will include blood flow in microvascular networks, oxygen transport and diffusion, and acute and long-term regulation of blood flow. To learn more about the conference, please visit the-aps.org/meetings-awards/meetings/mathmodels?SSO=Y.



For more information about Dr. Adebisi's research, please contact him at aadebiyi@uthsc.edu.

DR. ANBERITHA MATTHEWS

INVITED TO PARTICIPATE IN NMRI ANNUAL WORKSHOP

Dr. Anberitha Matthews, PhD, former postdoctoral fellow in Dr. Adebisi's lab, participated in the Network of Minority Health Research Investigators (NMRI) 17th Annual Workshop which was held April 24-26, 2019, in Bethesda, Maryland. Attendance to this annual workshop is through a selective process and is granted only to promising minority investigators. The NMRI was established by the Office of Minority Health Research Coordination of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) of the National Institutes of Health (NIH). The NMRI serves to encourage and facilitate participation of members of underrepresented

racial and ethnic minority groups in biomedical research, and to foster and enhance the potential of the underrepresented minority investigators choosing a biomedical research career.

The purpose of the annual NMRI workshop is to assist junior minority faculty in developing the necessary skills to deal with many of the scientific and administrative problems and issues they will face in academic medicine, and to help pair them with mentors that will provide ongoing career advice. To learn more about the NMRI, please visit nmri.niddk.nih.gov. For more information about Dr. Anberitha Matthews's research, please contact her at anberitha@gmail.com.

Network of Minority Health Research Investigators

Annual Workshop

April 24-26, 2019

Bethesda, MD



NEWS ABOUT NASH

On July 12, 2019, Dr. Zhongjie Sun, Professor and Chair of the Department of Physiology, met with Dr. Scott Strome, Dean of the College of Medicine, and Dr. Kennard Brown, Executive Vice Chancellor and Chief Operations Officer for UTHSC, to tour and view the progress of the Nash Building renovations. Dr. Sun, Dean Strome, and Dr. Brown were joined by Physiology faculty including Dr. Jonathan Jaggar, Dr. Don Thomason, and Dr. Salvatore Mancarella, as well as Physiology support staff Cicely Hicks, Akiah Jones, and Dr.

Nathan Tipton. Progress is well-underway with the renovations and a “mock-up” area is being created so that faculty and staff can see an example of what the other areas and floors of the Nash Building will eventually look like once renovations are completed. The timetable for the renovations is expected to last another 18 months. Drs. Sun, Jaggar, Thomason, and Mancarella all expressed pleasure and excitement at the progress of the renovations and are looking forward to having the Department of Physiology “return home” to Nash.



DR. JONATHAN JAGGAR

ORGANIZES FASEB SCIENCE RESEARCH CONFERENCE ON SMOOTH MUSCLE

Dr. Jonathan Jaggar, Maury W. Bronstein Professor of Physiology, organized the FASEB Science Research Conference on Smooth Muscle held July 14-19, 2019, in West Palm Beach, Florida. This FASEB SRC is regarded as the premier forum in smooth muscle biology and attracted internationally recognized leaders in a number of fields.

The main themes of the Smooth Muscle Conference were to explore physiological signaling and functions of smooth muscle cells, to examine pathological alterations in smooth muscle function that lead to disease, and to develop novel approaches to target signaling networks in smooth muscle cells to alleviate diseases.

The conference featured nine oral sessions, two poster sessions, a career development workshop, and a "Meet the Experts" session, along with an opening keynote lecture from Dr. John G. McCarron from the University of Strathclyde in Scotland. The conference welcomed 90 participants, with 34 speakers and nine short talks. Speakers from UTHSC included Dr. Georgi Petkov, Chair of the Department of Pharmaceutical Sciences, Dr. Dennis Leo from the Department of Physiology, and Dr. Charles Mackay from the Department of Physiology. Dr. Jaggar's co-organizer for the Smooth Muscle Conference was Dr. Maria Gomez, Professor of Physiology in the Department of Clinical Sciences and Director of the Lund University Diabetes Center in Lund, Sweden. For more information about this FASEB SRC, please visit <https://src.faseb.org/smooth-muscle>. To learn more about Dr. Jaggar's research on smooth muscle cells, please contact him at jjaggar@uthsc.edu.



The Smooth Muscle Conference
July 14-19, 2019 | West Palm Beach, Florida

LUIS O. ROMERO

AWARDED TRAVEL FELLOWSHIP TO ATTEND SGP/SOBLA ANNUAL MEETING

Mr. Luis O. Romero, Research Coordinator II in Dr. Valeria Vásquez's lab, was recently awarded a fellowship that will cover the cost of his travels to attend the Society of General Physiologists (SGP) 73rd Annual Symposium and the Society of Latin American Biophysicists (SOBLA) Annual Meeting. This joint meeting, which is focused on "Structural Basis of Electrical Signaling in the Nervous System and Heart," will be held from September 4-7, 2019, in Valparaiso, Chile. Mr. Romero's fellowship was awarded through the SGP, which grants half and full registration cost fellowships to Latin American students or postdocs performing their training in the US or in Latin American countries. Mr. Romero was awarded full registration.

The SGP/SOBLA 2019 symposium will bring together experts in different key areas (from structure to physiology) who, by combining multidisciplinary approaches, have elucidated molecular, cellular, and integrative physiology of channels/transporters in a variety of animal models that are relevant to physiology and disease. The symposium will serve as an important platform to foster new scientific collaboration between scientists from the USA and Latin America, who will have the opportunity to exchange professional and cultural experiences that help to create a better and trusted global scientific community. For more information about the SGP/SOBLA Annual Meeting, please visit hsobla2019.com/. To learn more about Mr. Romero's research, please contact him at jromerog@uthsc.edu.



**Sociedad de Biofísicos
Latino Americanos**



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