DEPARTMENT OF BIOLOGICAL SCIENCES

2025-2026

SMU | DEDMAN COLLEGE OF HUMANITIES & SCIENCES

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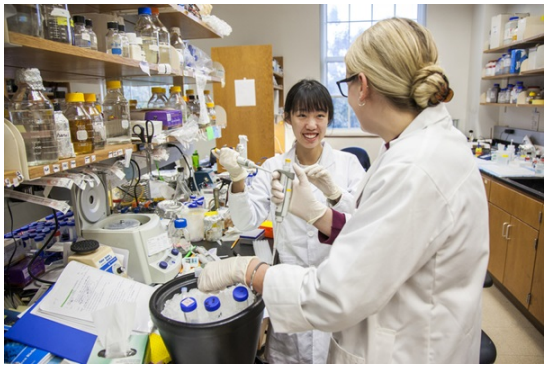
INTRODUCTION

The Department of Biological Sciences and its faculty provide insight into how life and physical sciences intersect and prepares students to pursue advanced degrees or a career in a variety of scientific fields. Students receive top notch, interdisciplinary academics and the opportunity to participate in hands-on research in a variety of subjects including cancer, immunity and aging, neuroscience, and infectious diseases, among many others. The department is located in the 68,000 square foot Dedman Life Sciences Building, which contains state-of-the-art laboratories, research facilities, lecture halls, and conference rooms.



Website

https://www.smu.edu/Dedman/Academics/Departments/Biological-Sciences

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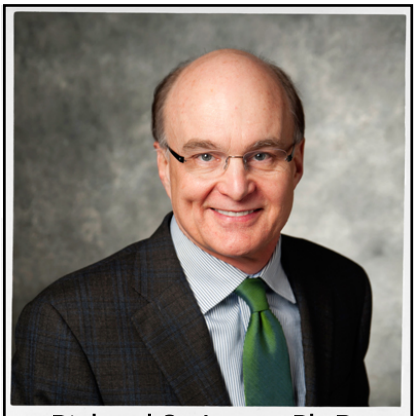
MESSAGE FROM THE CHAIR



Richard S. Jones, Ph.D.
Professor and Chair

Recent decades have witnessed breathtaking advances in the biological sciences. It has become clear that the expression and function of genes depends not only on the genomic blueprint, but also on transient and inherited chemical modifications of the genome. The complete sequencing of the human genome as part of the human genome project has made it possible to conduct a comprehensive analysis of these epigenetic modifications and understand their role in biological systems, a goal of the human epigenome project. Also ongoing is the human proteome project that seeks to identify and study the properties of all proteins produced by the human genome. Together, information from these projects will enhance understanding of human biology at the molecular level and provide information on the molecular underpinnings of diseases long considered intractable. Therapies and cures for these complex diseases will then be possible. Research on embryonic, adult, and induced pluripotent stem cells holds the potential for pioneering approaches to tissue regeneration and treatment of disease. The recently commenced "BRAIN" initiative will enable researchers to produce dynamic pictures of the brain that show real time interactions between individual brain cells and complex neural circuits. Much needed information on the complex links between brain function and behavior, and dysfunction in these links in psychological and psychiatric disorders such as autism, schizophrenia, and depression, will become available. The troubling development of antibiotic resistant strains of pathogens is driving the development of novel approaches to the treatment of bacterial infections. Powerful computational and bioinformatics approaches are permitting the analysis of data on a scale once thought impossible, and are playing an increasingly important role in all facets of biological research. Indeed, it is an exciting time to pursue a career in the biological and biomedical sciences.

A central mission of our department is to train students to develop the skills necessary to drive the current revolution in the biomedical sciences. We strive to fulfill this mission in a nurturing, supportive, and intellectually stimulating environment. The department is under expansion, with plans to recruit four new faculty in the next several years. Current faculty conduct research in the areas of genetics and developmental biology, biochemical structures and functions, epigenetics, gene regulation at the levels of transcription and RNA processing, infectious diseases, neurodegeneration, and epilepsy. Graduate students have the opportunity to take courses in a variety of specialty areas reflecting the research interests of our faculty. Graduate degrees (M.A., M.S. and Ph.D.) are awarded in Molecular and Cell Biology. An important priority for the department is undergraduate education. The undergraduate curriculum provides rigorous didactic and laboratory-based training for students seeking admission to professional or graduate schools as well as those who seek jobs upon obtaining their B.S. or B.A. degree. Exceptional opportunities are available for undergraduate students to participate in faculty research alongside graduate students and postdoctoral fellows. Like their graduate peers, undergraduates are encouraged to present their research results at national and regional conferences and publish their work in peer-reviewed scientific journals.

Check out our Twitter site (@SMUBiology) for updates on current activities and accomplishments by members of our department. Please feel free to contact us if you have any questions or to schedule a visit to our department.

NEWS & NOTEWORTHY

- **Zahra Sadri** (pictured) and **Nicole Pinzon Hoyos**, PhD students in the **Brewster lab**, won first place and runner-up, respectively, in the 3-Minute Thesis (3MT) competition at SMU. Zahra was later selected as a 3MT Finalist during the Annual Meeting of the Conference of Southern Graduate Schools.

- **Yinglu Tang**, a PhD student in the **Wu lab**, was awarded an SMU O'Donnell Data Science and Research Computing Institute Graduate Fellowship for 2024-25.

- **Dr. Man Si**, a postdoc in the **Glasscock lab**, was awarded the 2025 Cranefield Postdoctoral Award by the Society of General Physiologists for her research article entitled "Epilepsy-associated Kv1.1 channel subunits regulate intrinsic cardiac pacemaking in mice" in the *Journal of General Physiology*.

- SMU achieved Carnegie Research One (R1) classification as one of the nation's top public and private research institutions.

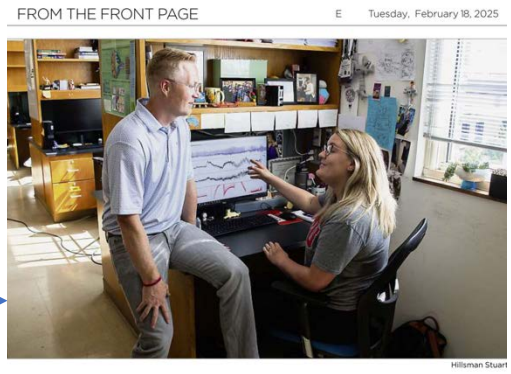
- **Alex D'Brot** was awarded promotion to Senior Lecturer and **Dr. Eva Oberdörster** was awarded promotion to Senior Lecturer II.

- **Dr. Robert Harrod** is serving on the Organizing Committee for the 22nd International Conference on Human Retrovirology: HTLV and Related Viruses to be held June 3-6, 2026 in Philadelphia, PA.

- **Dr. Rachel Wright** taught a new course in Aquatic Biology of the American Southwest at SMU in Taos, New Mexico. Her classroom and lab are pictured here.

- **Dr. Katie Schretter** joined the department as an Assistant Professor (starting January 1, 2026) after completing a postdoc at the Howard Hughes Medical Institute in Maryland.

- **Ayesha Alkofahi**, a PhD student in the **Glasscock lab**, won for best graduate student poster in biology at the annual SMU Research & Innovation Week Research Symposium.



- **Dr. Kelsey Paulhus-Halvorson**, a postdoc and recent PhD graduate in the **Glasscock lab**, published a study on the role of corticolimbic brain circuits in sudden death in epilepsy that was highlighted in a front-page article in the Dallas Morning News.

- Dr. Roozbeh Kiani (New York University) was selected by the PhD students to give the Spring 2025 keynote lecture for the annual departmental seminar series. He was hosted by **Zahra Sadri (Brewster lab)** and gave a talk entitled "Representational geometry of perceptual decision in the frontoparietal cortex." The PhD students and Dr. Brewster treated him to some Texas BBQ at Oak'd.

- **Regina Moreno Vera**, a recent SMU biology graduate (BA '25) and member of the **Glasscock lab**, was awarded a 2025 BRIDGE Summer Internship by the American Epilepsy Society. Regina also won best undergraduate poster at the 2025 SMU Research and Innovation Week Research Symposium and was a featured speaker at the 2025 Honors Convocation.

- The department held its second annual lab and office door Christmas decoration contest, which was won by the **Wylie lab**. Below are the various contest entries.

RECENT PUBLICATIONS BY BIOLOGICAL SCIENCES

Sex-specific proteomic analysis of epileptic brain tissues from Pten knockout mice and human refractory epilepsy.
Li Y, Sadri Z, Narvaiz DA, Blandin KJ, Aryal UK, Lugo JN, Poolos NP, Brewster AL.
Experimental Neurology. 2025; in press.

Bursts of brain erosion: seizures and age-dependent neurological vulnerability.
Cresto N, Givalois L, Badaut J, Janvier A, Genin A, Audinat E, Brewster AL, Marchi N.
Trends in Molecular Medicine. 2025; 31(6):535-547.

From General Anesthetic to Designer Antiepileptic: Propofol's Mechanism of Action Reveals Hope for Precision Treatment of HCN1-Related Epilepsy.
Glasscock E.
Epilepsy Currents. 2025; online ahead of print.

Drug-resistant epilepsy associated with peripheral complement decreases and sex-specific cytokine imbalances: a pilot study.
Pinzon-Hoyos N, Li Y, McGee M, Poolos NP, Marchi N, Brewster AL.
Scientific Reports. 2025;15(1):5096.

The 40S ribosomal subunit recycling complex modulates mitochondrial dynamics and endoplasmic reticulum - mitochondria tethering at mitochondrial fission/fusion hotspots.
Tahmasebinia F, Tang Y, Tang R, Zhang Y, Bonderer W, de Oliveira M, Laboret B, Chen S, Jian R, Jiang L, Snyder M, Chen CH, Shen Y, Liu Q, Liu B, Wu Z.
Nature Communications. 2025;16(1):1021.

Seizures and premature death in mice with targeted Kv1.1 deficiency in corticolimbic circuits.
Paulhus K, Glasscock E.
Brain Communications. 2025; 7(1):fcae444.

Sex-specific differences in mortality and neurocardiac interactions in the Kv1.1 knockout mouse model of sudden unexpected death in epilepsy (SUDEP).
Paulhus K, Kumar P, Kneale K, Hutson TN, Gautier-Hall NM, Shiau DS, Watts M, Trosclair K, Dhaibar HA, Dominic P, Iasemidis L, Glasscock E.
The Journal of Physiology. 2025; online ahead of print.

Not All Seizures Are Created Equal: The Sex Factor in Epilepsy.
Sadri Z, Brewster AL.
Epilepsy Currents. 2025; 25(2):136-138.

Acute depletion of complement C3 with cobra venom factor attenuates memory deficits induced by status epilepticus.
Schartz ND, Li Y, Sommer AL, Brewster AL.
Epilepsia Open. 2024; 9(6):2173-2185.

A bacterial expression cloning screen reveals single-stranded DNA-binding proteins as potent desicco-protectants.
Hibshman JD, Clark-Hachtel CM, Bloom KS, Goldstein B.
Cell Reports. 2024; 43(11):114956.

Protocol for fluorescent live-cell staining of tardigrades.
Harry CJ, Hibshman JD, Damatac A 2nd, Davidson PL, Estermann MA, Flores-Flores M, Holmes CM, Lázaro J, Legere EA, Leyhr J, Thendral SB, Vincent BA, Goldstein B.
STAR Protocols. 2024; 5(3):103232.

Human iPSC-derived microglia sense and dampen hyperexcitability of cortical neurons carrying the epilepsy-associated *SCN2A*-L1342P mutation.
Que Z, Olivero-Acosta MI, Robinson M, Chen I, Zhang J, … Wang M, Cui N, Mandal P, Chen X, Deming B, Halurkar M, Zhao Y, Rochet JC, Xu R, Brewster AL, Wu LJ, Yuan C, Skarnes WC, Yang Y.
Journal of Neuroscience. 2024; 45(3):e2027232024.

Adapt or Die: Seizures Weaken Chemosensory Responses of Retrotrapezoid Nucleus Neurons to Hypercapnia.
Glasscock E.
Epilepsy Currents. 2024; 24(5):367-369.

Exploring the association of disease-modifying therapies for multiple sclerosis and BTK inhibitors with epilepsy.
Shirani A, Saez-Calveras N, Antel JP, Yaqubi M, Moore W, Brewster AL, Stuve O.
Therapeutic Advances in Neurological Disorders. 2024; 17:17562864241276204.

Epilepsy-associated Kv1.1 channel subunits regulate intrinsic cardiac pacemaking in mice.
Si M, Darvish A, Paulhus K, Kumar P, Hamilton KA, Glasscock E.
Journal of General Physiology. 2024; 156(9): e202413578.

Pericytes and Microglia: Neurovascular and Immune Regulatory Cells in Seizure Disorders.
Marchi N, Brewster AL.
In: Noebels JL, Avoli M, Rogawski MA, Vezzani A, Delgado-Escueta AV, editors. *Jasper's Basic Mechanisms of the Epilepsies*. 5th edition. New York: Oxford University Press; 2024. Chapter 29.

Compositions and methods for treating cancer by inhibiting mitochondrial stress-induced protein carboxyl-terminal alanine and threonine tailing.
Wu Z, Zhang B, Cai T, Lu R.
United States Patent Application (US63/676,513).

The HTLV-1 latency-maintenance factor p30^{II} induces the phosphorylation and hypoxia-independent mitochondrial targeting of TIGAR analogous to tyrosine kinase receptor-signaling and suppresses oncogene-induced oxidative toxicity.
Harrod R, Bowley T, Malu A, Adams NM, Savage J, Saberi M, VanderHagen M, Alame R, Keating M, Yates C.
Journal of Antivirals & Antiretrovirals. 2024; 16(3):313.

BIOLOGICAL SCIENCES FACULTY

Bianca Batista

Senior Lecturer

EDUCATION & TRAINING:
BS in Biology, Texas A&M University
Ph.D. in Cell and Molecular Biology, University of Texas, Austin
Postdoctoral, New York University

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ABOUT:
Dr. Batista teaches undergraduate Cell Biology (BIOL 3350), Microbiology Lecture (BIOL 3370), Microbiology Lab (BIOL 3170), Essentials of Biology (BIOL 1300), and Biochemistry Lab (BIOL 5110). She is the faculty advisor for the SMU chapter of Alpha Epsilon Delta, an honor society for students wishing to pursue careers in medicine, dentistry, osteopathic medicine, optometry, podiatry, veterinary medicine, and other allied health professions. Dr. Batista is also a member of the Health Professions Recommendation Committee (HPRC) which meets each spring to interview students applying to medical and dental schools.

Amy Brewster

Associate Professor

EDUCATION & TRAINING:

B.S. in General Biological Sciences, University of Puerto Rico
Ph.D. in Biol. Sci., Anatomy & Neurobiology, Univ. of California, Irvine
Postdoctoral Scholar, Baylor College of Medicine

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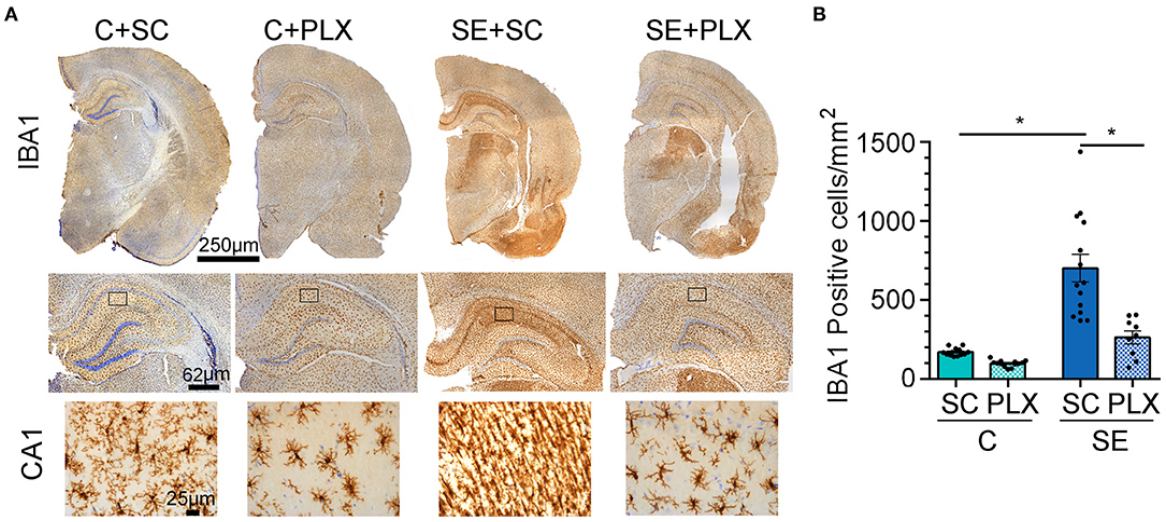
ABOUT:

Epilepsy is a neurological disorder characterized by the occurrence of spontaneous recurrent seizures. In addition, epilepsy is highly co-morbid with cognitive and behavioral deficits along with catastrophic consequences such as sudden unexpected death. Unfortunately, anti-epileptic medications do not suppress seizures in one-third of the epileptic population. Therefore, our research goal is to identify potential therapeutic targets for the prevention, treatment, and control of this neurological disorder. Through our scientific discoveries we seek to help stop seizures and improve cognitive outcomes in those affected by severe epilepsy.

Our research goal is to identify whether neuro-immune interactions contribute to the construction of hyperexcitable neuronal networks that may promote seizures and cognitive deficits in epilepsy. We seek to determine the role that microglial inflammatory and phagocytic signaling mediated by the classical complement cascade (C1q-C3), Triggering receptors expressed on myeloid cells (Trem2), Colony stimulating factor 1 receptor (CSFR1), and the mechanistic target of Rapamycin (mTOR), play in pathological synaptodendritic remodeling, seizures, and cognitive deficits in experimental models of epilepsy.



Alejandro D'Brot

Senior Lecturer

EDUCATION & TRAINING:

B.S. in Biology, Texas Christian University
Ph.D. in Genetics, Development & Disease, UT Southwestern
Postdoctoral, UT Southwestern

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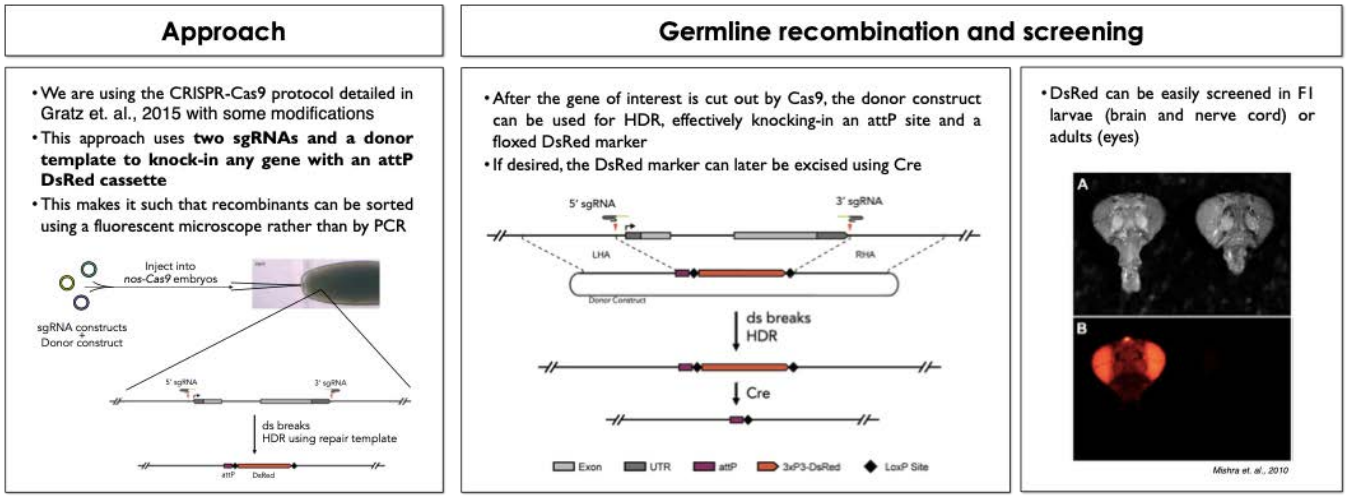
ABOUT:

Dr. D'Brot teaches the following undergraduate courses: Essentials of Biology (BIOL 1300); Introduction to Biology II (BIOL 1302); Gene Editing Lab (BIOL 4380); and Biochemistry Lab (BIOL 5110). He is interested in developing project-based lab courses that provide avenues for undergrads to engage in publishable scientific research (CUREs). He is also continuing to develop the Gene Editing lab course, in which students use CRISPR-Cas9 gene editing technology to generate new alleles in model organisms that can be used by the research community. The Gene Editing lab course aims to crowd-source the generation of attP-DsRed knock-in alleles for the Drosophila research community. In the lab, students learn to design and clone the CRISPR components required to replace specific genes in the sgRNA and attP-DsRed donor constructs, set up fly crosses and screen F1 progeny for RFP expression.



Edward Glasscock

Professor

Director of Graduate Studies

EDUCATION & TRAINING:

B.S. in Chemical Engineering, University of Texas, Austin
Ph.D. in Molecular & Cell Biology, University of California, Berkeley
Postdoctoral, Baylor College of Medicine

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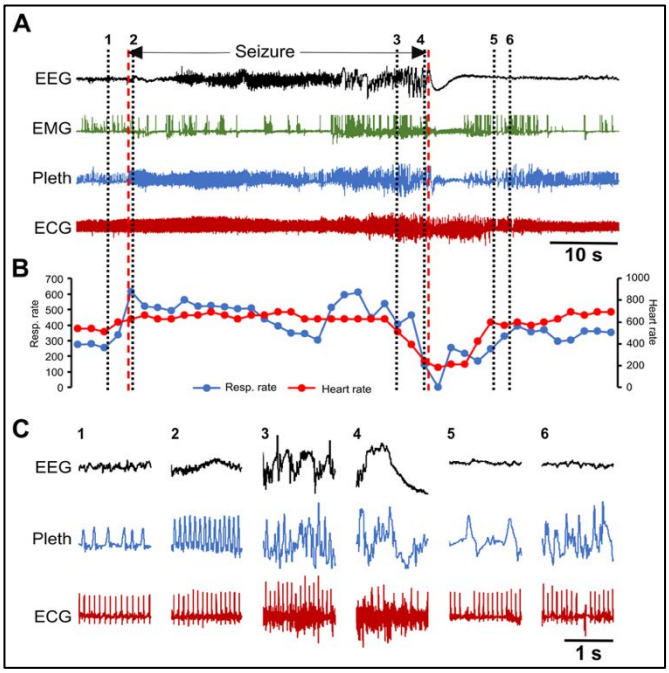
ABOUT:

Dr. Glasscock leads the Cardiorespiratory Neurogenetics Laboratory, which is focused on understanding the genes and mechanisms underlying epilepsy and sudden unexpected death in epilepsy (SUDEP). Epilepsy is the 4th most common neurological disorder affecting about 1 in 26 Americans during their lifetime. Epilepsy is characterized by the presence of recurrent unprovoked seizures due to abnormal electrical activity in the brain. Genetics and heredity play an important role in the development of epilepsy. One of the goals of the lab is to identify the genes and combinations of genes that determine whether an individual will develop epilepsy.

People with epilepsy have an increased risk of dying suddenly for unknown reasons. These deaths are classified as sudden unexpected death in epilepsy (SUDEP) and represent the leading cause of epilepsy-related mortality. The exact causes of SUDEP are poorly understood, but the leading explanation is that seizures evoke respiratory failure or cardiac arrhythmias that culminate in death. One of the focuses of the lab is to better understand how epilepsy can alter the brain's control of cardiorespiratory function increasing the risk of SUDEP. In addition, we are striving to develop new therapeutics to prevent SUDEP and better biomarkers to predict those with high risk. To explore these research questions, we study genetic mouse models of epilepsy, utilizing a wide array of in vivo, ex vivo, and in vitro electrophysiological techniques, as well as pharmacological, histological, and molecular approaches.



Robert Harrod

Professor

EDUCATION & TRAINING:
B.S. in Microbiology, Louisiana Tech University
Ph.D. in Molecular & Cellular Biology, University of Maryland
Postdoctoral, National Institutes of Health and USUHS/NMC

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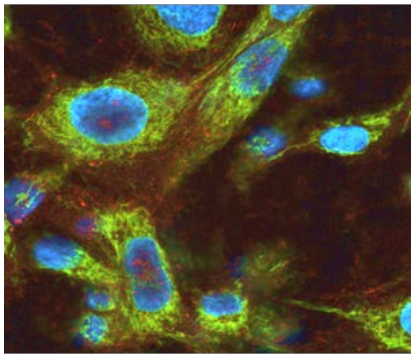
ABOUT:
The Harrod lab is studying how certain transforming viruses cause cancers in humans. It is estimated approximately 15-20% of human cancers are caused by oncogenic viruses, yet the molecular etiology by which infectious agents deregulate host cellular growth/proliferative pathways to promote the establishment and progression of neoplastic disease is not completely understood. Our research is primarily focused toward advancing our understanding of the molecular biological and biochemical events underlying carcinogenesis by the human T-cell leukemia virus type-1 (HTLV-1) and high-risk subtype human papillomaviruses (HPVs).

The HTLV-1 is a complex oncoretrovirus that infects and transforms CD4+ T-lymphocytes and causes adult T-cell leukemia/lymphoma (ATLL) – an aggressive and often-fatal hematological malignancy that is highly resistant to most anticancer treatments. At present, there are 10-20 million HTLV-1-infected individuals worldwide, with most clustered in the tropical endemic regions of Southeast Asia (i.e., Japan, Taiwan, Malaysia, and the Philippines), the Middle East, Northern and Central Africa, Central and South America, Australo-Melanesia, and certain islands of the Caribbean. In the United States, Florida and Hawaii have the highest incidences of HTLV-1-related diseases. Recent evidence also suggests HTLV-1 may be a re-emerging health threat in some global regions, such as Australia. The high-risk subtype HPVs are causally linked with cervical cancers and head-and-neck carcinomas which often have poor clinical outcomes and high mortality rates. Our research has demonstrated that the HTLV-1 and high-risk subtype HPVs encode proteins that cooperate with cellular oncogenes, including c-Myc, through molecular interactions with transcriptional coactivators and the differential modulation of p53-regulated pro-survival signals to promote cellular immortalization/transformation in vitro and tumorigenesis in in vivo xenograft models of HTLV-1-induced T-cell lymphoma and HPV-induced carcinomas. Importantly, these studies have revealed several key players which are essential for the survival of virus-infected tumor cells, as determined through siRNA-knockdown experiments, and may be candidates for the translational design of targeted therapeutics. My laboratory's research is supported by grant funding from the National Cancer Institute/National Institutes of Health.



Jon Hibshman

Assistant Professor

EDUCATION & TRAINING:

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Ph.D. in Genetics and Genomics, Duke University
Postdoctoral, University of North Carolina, Chapel Hill

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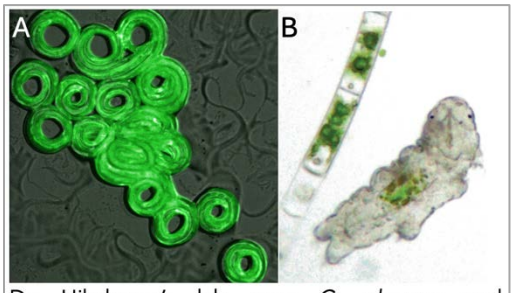
ABOUT:

Dr. Hibshman's lab seeks to understand how some cells and organisms can survive extreme stress. By exploring biology at the limits of life we aim to both uncover the fascinating biological mechanisms that give rise to extreme stress tolerance and to discover protectants that can be repurposed for biomedical applications. The lab is particularly focused on the extreme stress of desiccation.

When dehydrated, the components of cells – DNA, proteins, and membranes – are prone to damage and degradation. Yet, some exceptional animals including tardigrades and nematodes can survive the near complete absence of intracellular water. Such organisms, collectively referred to as anhydrobiotes, must have exceptional mechanisms of cellular protection to ensure stability and survival. Many of the stresses of drying, such as disrupted proteostasis and DNA damage, are extreme versions of stresses associated with human diseases and aging. Thus, understanding the molecular mechanisms that desiccation-tolerant organisms employ for survival will reveal fundamental principles of cell stress resistance with implications for aging and rejuvenation. Protectants could also prove useful for biomedical applications like the storage of sensitive biological materials, such as cells, tissues, organs, proteins, and vaccines. Research in the lab is highly interdisciplinary, using a combination of genetic, cell biological, molecular, and biochemical approaches.



Dr. Hibshman's lab uses *C. elegans* and tardigrades as animal models to understand mechanisms of extreme stress tolerance. A) The nematode *C. elegans* highly expresses a desiccation response protein (LEA-1, shown in green) when dried. B) *H. exemplaris* is one species of tardigrade studied in the lab.

Richard S. Jones

Professor and Chair

EDUCATION & TRAINING:

B.S. in Biology, University of Missouri
Ph.D. in Biology, Wesleyan University
Postdoctoral, Harvard University

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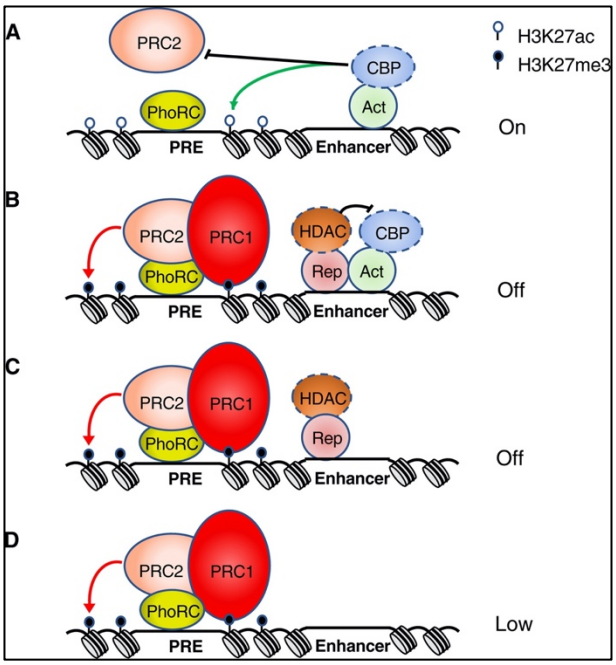
ABOUT:

The Jones lab studies the mechanisms by which a group of evolutionarily conserved epigenetic regulators, called the Polycomb-group (PcG), maintain the transcriptional silence of genes. PcG proteins play critical roles in regulating normal development in essentially all metazoans, functioning in largely similar ways in organisms ranging from mammals, insects, and even plants. The primary targets of PcG-mediated transcriptional repression are regulators of development and/or cell cycle progression. Among PcG targets are lineage-specific genes in embryonic and adult stem cells, and pluripotency genes when embryonic stem cells are induced to differentiate. Misexpression of human PcG proteins contributes to a wide range of cancers. Repression of pluripotency genes and the oncogenic effects of misregulated PcG proteins both involve de novo repression of target genes.



Our current focus is to define the molecular and biochemical mechanisms by which PcG-mediated gene silencing is initially established and to shed light on this important, but poorly understood, epigenetic phenomenon. In pursuit of this goal, the Jones lab uses a combination of genetic, immunological, biochemical and transgenic experimental approaches. Due to the high degree of conservation of PcG proteins, we are able to take advantage of the experimental tools available with the *Drosophila melanogaster* (fruit fly) model system with confidence that our findings will also provide insight into the mechanisms by which PcG proteins contribute to mammalian development and oncogenesis.

Ongoing projects include identifying proteins that are associated with a PcG target gene and dissecting their respective contributions to the establishment of transcriptional silencing.

Eva Oberdorster

Senior Lecturer II

Director of Undergraduate Studies

EDUCATION & TRAINING:

B.S. in Biology, Binghamton University (SUNY)
Ph.D. in Integrated Toxicology and Zoology, Duke University
Postdoctoral, Tulane University Center for Bioenvironmental Research

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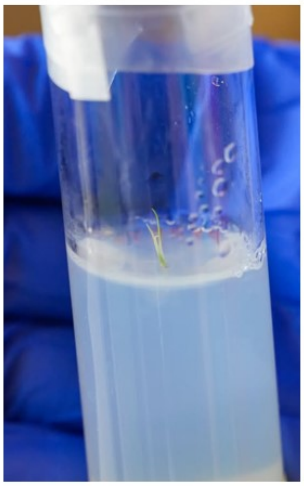
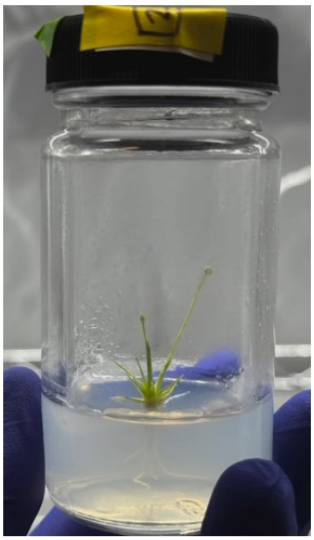
ABOUT:

Dr. Oberdorster is interested in co-curricular development and integrating technology into the classroom. This has led to over 70 DNA barcodes of native Texas species published on GenBank with undergraduate students as co-authors. Dr. O also uses her family's nearly 200-acre ranch to study native flora and fauna with students from SMU in the Biology Department as well as Environmental and Civil Engineering. Some of this research is in collaboration with the Botanical Research Institute of Texas, where two populations of an endangered plant are being studied to ensure survival of this species.

Dr. O has taught numerous lecture and laboratory courses to undergraduates, and currently teaches the Anatomy & Physiology lecture/lab sequence, as well as a Senior Seminar on Bioethics. In addition, to her teaching interest, she is also an active member of the Society of Toxicology and American Association of Zoos and Aquaria. She has previous experience as an Assistant Professor of Biochemical Ecotoxicology and Molecular Toxicology at Clemson University in the Department of Environmental Toxicology and has held Adjunct appointments at Duke University and Baylor University.





dwarf pipeworts → collect seeds, grow in lab → transplant to wild

Catherine Schretter

Assistant Professor *(incoming January 2026)*

EDUCATION & TRAINING:

B.A. in Neuroscience, University of Virgina
Ph.D. in Biology and Bioengineering, California Institute of Technology
Postdoctoral, Janelia Research Campus, Howard Hughes Medical Institute

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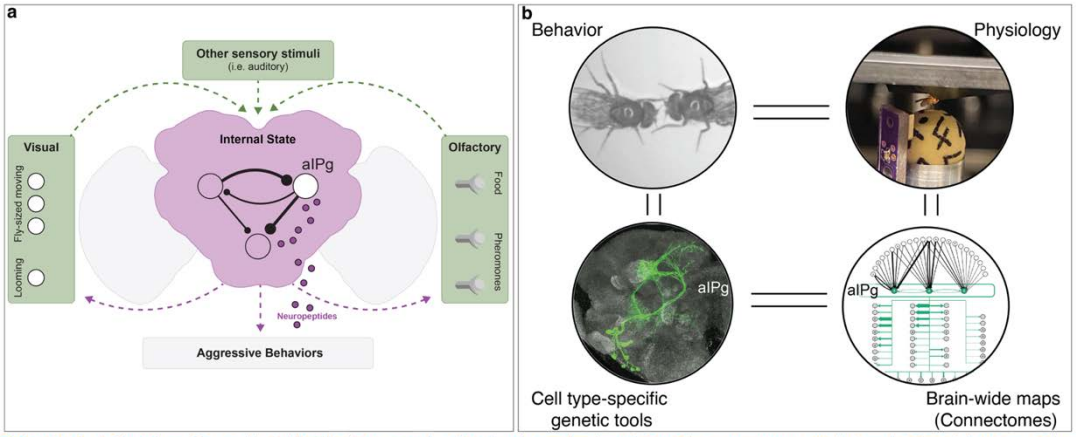
Website: www.schretterlab.org

ABOUT:

The primary goal of the Schretter lab is to elucidate the neuronal and molecular mechanisms that regulate social interactions. Social interactions, including fights for food, mates, and territories, are pervasive across species. Maladaptive aggressive displays are not only costly for ecosystems but have also been linked with human neurological disorders, including post-traumatic stress disorder and Alzheimer's Disease. To limit the risks associated with aggression, animals must tightly regulate when and how they fight based on the current environment and internal factors. Yet, much remains unknown about how these external and internal factors are integrated in the brain, as well as how these mechanisms vary across individuals and sexes.

The fruit fly, *Drosophila melanogaster*, is a highly tractable model for both cell type-specific and brain-wide dissections of these mechanisms due to recent advances in genetic tools, wiring diagrams of the brain (connectomes), and machine learning tools for behavioral analysis. The lab will utilize the genetic, physiological, connectomic, and machine learning tools pioneered in Dr. Schretter's postdoctoral work for investigating a neuronal circuit underlying an understudied social behavior - female aggression - in cellular detail. This work will allow us to develop models for how the brain flexibly regulates social behavior in response to changing environments and goals. We will also pursue questions with broader implications for aging and neuropsychiatric disorders.



Schretter Lab Overview. Our goal is to identify the neuronal and molecular mechanisms integrating sensory cues and internal states during aggression as shown in **(a)**. To accomplish this, we use a comprehensive genetic, physiological, and behavioral toolkit developed in the fruit fly, *Drosophila melanogaster*, depicited in **(b)**. The lab will continue to study one neuronal subset, aIPg, that was found to promote persistent aggressive internal states in female flies (Schretter et al., *eLife* 2020; Chiu,..., Schretter, *eLife* 2023) and modulate visual processing (Schretter et al., *Nature* 2025).

Bethany Smith

Lecturer

EDUCATION & TRAINING:

B.S. in Biochemistry and Genetics, Texas A&M University, College Station
Ph.D. in Genetics, Development & Disease, UT Southwestern

CONTACT:

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Email: bksmith@smu.edu

ABOUT:

Dr. Smith teaches Molecular Biology lab (BIOL 3222) as well as Biology for Liberal Arts Majors (BIOL 1300). She has also taught Mammalian Physiology during her time as a Visiting Lecturer at Texas Christian University. Dr. Smith seeks to create a learning environment where students ask scientific questions and learn the practical ways in which to answer them.

Pia Vogel

Professor

EDUCATION & TRAINING:

M.S. in Chemistry, Technical University in Kaiserslautern, Germany
Ph.D. in Biochemistry, Technical University in Kaiserslautern, Germany
Dr. habil. in Biochemistry, Technical University in Kaiserslautern, Germany
Postdoctoral, State University of New York Medical School (Syracuse)

CONTACT:

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Lab: DLSB 221
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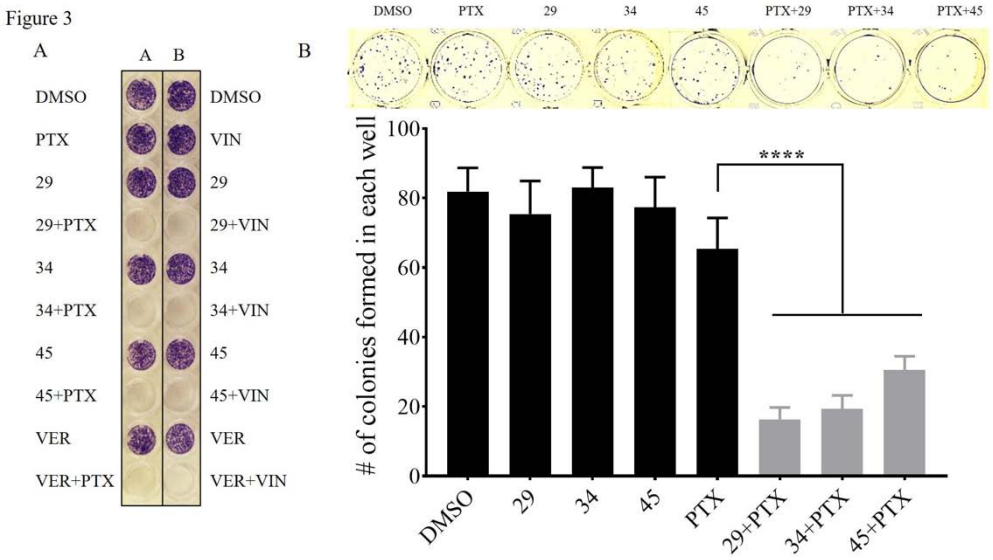
ABOUT:

The main goal of the Vogel lab is to find ways to combat chemotherapy resistance in cancer that is caused by high expression levels of membrane proteins that actively pump chemotherapeutics out of cancer cells, making therapy ineffective. Using a combination of human cell culture as well as biochemical and biophysical evaluation, our lab is assessing the efficacy of experimental compounds, previously discovered in computational high throughput searches, in re-sensitizing therapy resistant cancer cells to therapy. To pave the way for potential future clinical applications of these experimental compounds, physiologically relevant cancer cell lines are developed for evaluation of efficacy and potential toxicity. The mechanism of inhibiting the pump proteins is evaluated by biochemical and biophysical methods using physiologically relevant human membrane protein preparations.



Rachel Wright

Lecturer

EDUCATION & TRAINING:
B.S. in Cell and Molecular Biology, University of Texas, Austin
Ph.D. in Cell and Molecular Biology, University of Texas, Austin
Postdoctoral, Harvard Medical School
Postdoctoral, Boston University

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Email: wrightrm@smu.edu

ABOUT:
Dr. Wright has taught courses in genetics, genomics, physiology, and pedagogy at the University of Texas at Austin, Simmons University, Harvard University, and Smith College. Her research uses genomic tools to ask how coral reef organisms respond to environmental stress. Dr. Wright strives to create authentic research experiences in the classroom by integrating elements of experimental design and quantitative analysis.

Zhihao Wu

Assistant Professor

EDUCATION & TRAINING:

B.S. in Biology, Tsinghua University, China
Ph.D. in Molecular Genetics, Tsinghua University, China
Postdoctoral, Stanford School of Medicine

CONTACT:

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Lab: DLSB 217
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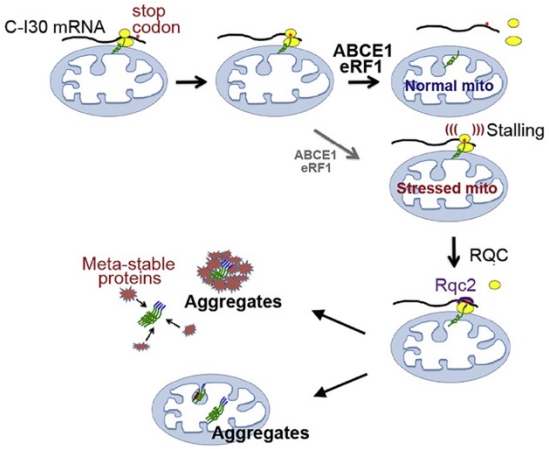
ABOUT:

The long-term goal of research in the Wu lab is to uncover the fundamental mechanism of age-related neurological diseases. Our current focus is to investigate the role of cellular quality control systems in the pathogenesis of these disorders. We try to link ribosome-associated translation quality control, macromolecule quality control, and organelle (mitochondrial) quality control into a continuum of the cellular quality control system. It will enhance our understanding of proteostasis failure induced by aberrant translation products in mitochondrial dysfunction in neurodegenerative diseases. Our mission also includes identifying the potential novel biomarkers and therapeutic strategies in the process of investigating the perturbation of QC factors in the disease conditions. Our lab primarily uses fruit fly (*Drosophila melanogaster*) as the experimental system, because of the availability of sophisticated genetic tools, and also various mammalian systems such as cultured neurons and mice models to test the conservation of the players and principles we uncover from the *Drosophila* studies. Our lab also actively collaborates with the industrial partners (e.g., ModeGene and Merck) on the projects of dissecting the molecular mechanisms of human ageing. The ultimate goal of our research is to elongate the healthy lifespan of humans in a clinically feasible way.



Annika Wylie

Assistant Professor

EDUCATION & TRAINING:

B.S. in Molecular and Cell Biology, Texas A&M University
Ph.D. in Genes, Development, & Disease, UT Southwestern Med. Center
Postdoctoral, University of Texas Southwestern Medical Center

CONTACT:

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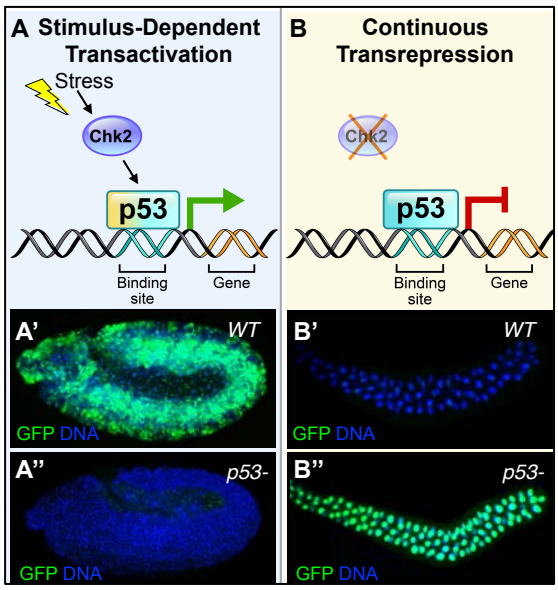
ABOUT:

The Wylie lab investigates the p53 tumor suppressor's role in transposon suppression during development and disease. The p53 gene is altered in most human cancers but its precise tumor suppression mechanism remains unclear. A prevailing model is that p53 induces target genes under stress to trigger apoptosis, cell cycle arrest, or senescence. Surprisingly, removing these functions in animals does not lead to tumors, implying unknown p53 effectors. These and related findings highlight conspicuous gaps in our understanding of p53-mediated tumor suppression.



Since p53 genes predate the need for cancer prevention, we use the *Drosophila* model to explore ancestral p53 functions, which could provide novel entry points for understanding p53 in the context of human disease. By studying the germline cells of flies, we discovered a conserved function of p53 to restrain retrotransposons, which are a class of mobile genetic elements linked to human disease. We also found patterns of unrestrained retrotransposons in p53-driven mouse and human cancers. Since transposon repression by p53 may be important for tumor suppression, we explored how p53 downregulates genes. Using a biosensor that visualizes p53 action throughout *Drosophila* development, we established that p53 also acts as a direct transcriptional repressor, operating continuously through the same canonical binding sites that specified p53 transactivation in earlier stages. Our work challenged a widely recognized model that p53 acts exclusively as a transcriptional activator and raises the possibility that p53 could suppress tumor formation by constitutively repressing target genes and restricting transposon activity. Building on these observations, future aims will leverage *Drosophila* and vertebrate model systems to elucidate how opposing p53 transcriptional outcomes are specified and determine how p53 transposon constraint may prevent tumor formation.

ADMINISTRATIVE STAFF

Mary Varela

Administrative Assistant II

CONTACT:
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ABOUT:
Mary is a Dallas native, and has been with the biology department for 32 years, and counting. She is the go-to person for the department, and provides assistance for all areas ranging from assisting students with add/drop to overseeing department financials. During her career at SMU, she has been nominated twice for the Presidential Continuing Excellence Award, was the recipient of the Faculty Senate Outstanding Staff Award (2012), the Dedman College Staff Lasting Impact Award (2017), and inducted to the 25-year club in 2014.

GRADUATE STUDENTS

INCOMING STUDENTS

Ebenezer Amakye
BS, Kwame Nkrumah UST, Ghana
MS, Univ. for Dev. Studies, Ghana
PhD student

Emily Davis
BS, High Point University
PhD student

Hania de la Fuente
BS, Texas A&M International
PhD student

Brian Emerson
BS, University of North Texas
MS student

Alison Kellom
BS, Southern Methodist University
MS student (Vogel lab)

Junho Lee
BS, Texas A&M University
MS, Southern Methodist University
MA student

Anna Lewis
BS, University of Oklahoma
PhD student

Kieran Williams
BA, Baylor University
PhD student (Hibshman lab)

Shuhuai Yang
BS, Xi'an Jiaotong-Liverpool, China
MS, University College London
PhD student

MASTER of ARTS STUDENTS

Erica Meng
BS, University of the Pacific
MA student

MASTER of SCIENCE STUDENTS

Sabrina Simien
BS, Southern Methodist University
MA student

PhD STUDENTS

Ayesha Alkofahi
BS, Jordan Univ. of Sci. and Tech.
MS, Jordan Univ. of Sci. and Tech.
Glasscock lab

Chelsea Barnes
BS, Southern Methodist University
Wylie lab

Adaeze Gbufor
BS, Int'l Univ. of Malaya-Wales
MS, Int'l Univ. of Malaya-Wales
Wu lab

Arlene Hernandez
BS, University of North Texas-Dallas
Vogel lab

Nicole Pinzon Hoyos
BS, Icesi University, Colombia
Brewster lab

Melika Saberi
BS, University of Tehran, Iran
Harrod lab

Zahra Sadri
BS, Kharazmi Univ. of Tehran, Iran
Brewster lab

Michelle Saucedo
BS, University of Texas at Dallas
Vogel lab

Julia Savage
BS, Southern Methodist University
Harrod lab

Justin Wright
BS, University of Texas at Tyler
Wylie lab

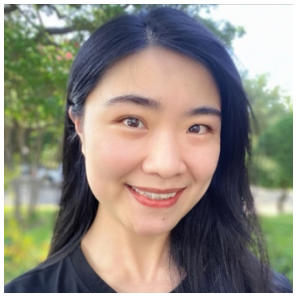
Michele Wright
BS, University of Texas at Tyler
Glasscock lab

POSTDOCTORAL FELLOWS & RESEARCH STAFF

Judith Benes
MS in Biology
Fly Lab Manager

Bailey Brown
BS, Southern Methodist University
Research Assistant, Hibshman lab

Ting Cai
MD, Shanghai Medical Univ., China
Research Assistant, Wylie lab



Yibo Li
BS, Shaanxi U. of Sci & Tech, China
MMed, South China Normal Univ.
MS, University of Texas, Dallas
Research Assistant, Brewster lab

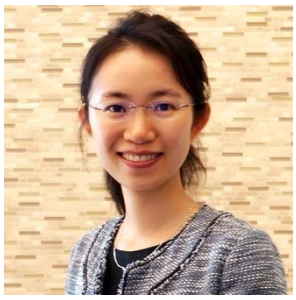
Jesiska Lowe
BS, Bangalore University, India
MS, Univ. of Colombo, Sri Lanka
PhD, Southern Methodist University
Postdoc, Wylie lab

Niharikha Mukala
BS, Andhra University
MS, Andhra University
MS, Clemson University
Research Assistant, Hibshman lab

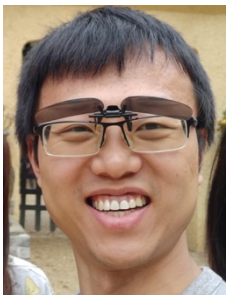
Rebekah Napier-Jameson
BS, Delta State University
MS, Stephen F. Austin University
PhD, Southern Methodist University
Postdoc, Wylie lab

Man Si
MS, Hebei Medical Univ., China
PhD, Hebei Medical Univ., China
Postdoc, Glasscock lab

Jani Udaiyappan
MS, Annamalai University, India
PhD, Annamalai University, India
Postdoc, Glasscock lab



Cindy Wang
BS, Harbin Inst. of Tech., China
Lab Manager, Wu lab



Zhirong Wang
BA, University of Utah
PhD, Georgetown University
Postdoc, Hibshman lab

Yuanna Wu
MD, Xuzhou Med. College, China
MS, Nanging University, China
PhD, Fudan University, China
Postdoc, Wu lab

Bei Zhang
MD, Nanjing Medical Univ., China
PhD, University of Texas at Dallas
Postdoc, Wu lab

Xiaomin Zheng
MD, Ningxia Medical Univ., China
PhD, Ningxia Medical Univ., China
Postdoc, Wu lab

WHERE ARE FORMER TRAINEES NOW?

Kelsey Paulhus (PhD 2024, Glasscock Lab) is a postdoctoral fellow in the Department of Pharmacology at the University of North Carolina- Chapel Hill (Dr. Juan Song Lab).

Yinglu Tang (PhD 2024, Wu Lab) is a postdoctoral fellow in the Department of Bioinformatics and Computational Biology at the University of Texas M.D. Anderson Cancer Center (Dr. Tao Wang Lab).

Canyon Calovich-Benne (PhD 2024, Norris Lab) is a postdoctoral fellow in the Department of Neuroscience at the University of Texas Southwestern Medical Center (Dr. Genevieve Konopka Lab).

William Bonderer (MS 2024, Wu Lab) is a Research Analyst at Instil Bio in Dallas, TX.

Rebekah Napier-Jameson (PhD 2023, Norris Lab) and Jesiska Lowe (PhD 2024, Vogel Lab) are postdoctoral fellows in the lab of Dr. Annika Wylie at SMU.

Morgan Taylor (PhD 2022, Norris Lab) is a postdoctoral fellow in the Department of Neuroscience at The Ohio State University (Dr. Olga Kokiko-Cochran Lab).

Xiaoyu Liang (PhD 2022, Norris Lab) is a Senior Scientist at Tome Biosciences in Watertown, MA.

Lacin Yapindi (PhD 2022, Harrod Lab) is a postdoctoral fellow in the Division of Cancer Medicine (Dr. F. Johnson Lab) at the University of Texas M.D. Anderson Cancer Center.

Nick Kurtaneck (MS 2022, Harrod Lab) is an In-House Clinical Research Associate at Medpace in Irving, TX.

Anni Kum (MS 2022, Jones Lab) is an In-House Clinical Research Associate at Medpace in Irving, TX.

Lauren (Ammerman) McCormick (PhD 2021, Wise Lab) recently accepted a position as an Assistant Professor in the Department of Biophysics at the University of Michigan starting January 2026.

Tetiana Bowley (PhD 2020, Harrod Lab) is a postdoctoral fellow at the Los Alamos National Laboratory in Los Alamos, New Mexico.

Elnaz Ghotbi (PhD 2019, Jones Lab) is a postdoctoral fellow in the Department of Dermatology (Dr. L. Le Lab) at the University of Texas Southwestern Medical Center in Dallas.

Aditi Malu (PhD 2019, Harrod Lab) is the Chief Scientific Officer at EazeBio, Inc in San Francisco, California.

James McCormick (PhD 2017, Wise Lab) is a postdoctoral fellow in the Department of Biophysics (Dr. K. Reynolds Lab) at the University of Texas Southwestern Medical Center in Dallas.

Jumana AlHaj Abed (PhD 2014, Jones Lab) is a postdoctoral fellow in the Department of Genetics (Dr. T. Wu Lab) at Harvard Medical School.

Megan Romeo (PhD 2014, Harrod Lab) is a tenured Instructor in microbiology at Richland College, Dallas County Community College District.

Shaotong Zhu (PhD 2014, Vik Lab) is a Principal Scientist at the Institute for Protein Innovation (IPI) in Boston, MA, where she leads IPI's Protein Research team.

GRADUATE PROGRAMS SUMMARY

SMU's Department of Biological Sciences offers three graduate degree programs: M.A., M.S., and Ph.D.

Advantages of graduate research at SMU:

- **Our faculty are nationally recognized for their research.** Faculty members serve on National Institutes of Health Study Section review panels and are funded by the NIH. In addition, our faculty serve as reviewers for several national and private granting agencies and have published their research in leading journals including: Nature, Science, Molecular Cell, Oncogene, Journal of Biological Chemistry, Molecular and Cellular Biology, Vaccine, Genetics, PNAS, Molecular Biology of the Cell, Methods in Enzymology and Biochemistry.

- **Modern Research Facilities.** The Biological Sciences Department is located in the Dedman Life Sciences Building, adjacent to Fondren Science Library, and the closely affiliated departments of Chemistry and Computer Science. The department has state-of-the-art equipment, including two confocal microscopes, a flow cytometer, shared cell tissue culture facilities, and qRT-PCR instrumentation.

- **Didactic lectures, scientific discourse and active research.** The MCB program places great emphasis on training independent scientists. Students are taught to cover the breadth of modern molecular biology, yet maintain adequate time to follow up on areas of more specific interest in their own research. We are a supportive, collegial environment. Frequent interactions and open lines of communication are central to the success of a research department. From the first day onward, students meet with each faculty member the first week to 'break the ice' and foster long-term, scientific relationships. Lab rotations during the first semester introduce students to the research topics and techniques employed in various labs ensuring that students make well-informed decisions as to the lab in which they will pursue their thesis project. Supportive, collegial environment. Frequent interactions and open lines of communication are central to the success of a research department. From the first day onward, students meet with each faculty member the first week to 'break the ice' and foster long-term, scientific relationships. Lab rotations during the first semester introduce students to the research topics and techniques employed in various labs ensuring that students make well-informed decisions as to the lab in which they will pursue their thesis project.

- **Financial Support.** The Department of Biological Sciences offers numerous tuition scholarships, teaching assistantships, and faculty research assistantships.

GRADUATE PROGRAM GUIDELINES & TIMELINES

A. Overview

The charge of the Graduate program is to provide a vibrant research environment in which the graduate student may participate in a meaningful research training experience leading to job opportunities in Academia and Industry. The core curriculum consists of three advanced courses in Cell Biology (BIOL 6310), Molecular Biology (BIOL 6322), and Biochemistry (BIOL 6318) and are typically taken in year one by all PhD, MS, and MA students. Beyond that more specialized courses are offered that are tailored to the individual student and may be more directly related to the student's ongoing research. Other important elements of the Graduate Curriculum include the Departmental Seminar (BIOL 6114) and the Graduate Seminar (BIOL 6120) course programs. Departmental seminars will be held regularly each semester. Speakers (graduate students, faculty and visiting scientists) will present a variety of topics of current interest in the Biological Sciences. All graduate students will be expected to participate as speakers. In addition, all MS, and PhD students will be expected to participate in the Graduate Seminar program in the first four semesters (MA students participate every semester they are enrolled in the program). Each student will take turns leading a discussion on a current research paper, while the others will be responsible for discussing the data presented in the individual Figures. In this way students will acquire the ability to critically analyze the primary literature.

Ph.D. program in Molecular and Cellular Biology

Students enrolled in doctoral graduate studies conduct dissertation research under the mentorship of expert faculty in the areas of aging, neuronal development and neuropathogenesis, epigenetics and gene regulation, structural biology, inflammation and immunity, drug resistance, cancer biology, and infectious diseases. During the first semester, students rotate through 2-3 different laboratories before choosing a faculty mentor to supervise their PhD research. All new students are advised by the Biological Sciences-Graduate Education Committee (GEC) and are required to have at least one annual meeting with their Graduate Advisory Committee to review their academic and research progress.

The Molecular and Cellular Biology PhD degree program requires approximately 4 to 5 years to complete, including:

- 60 credit hours
- Two-year full-time residency
- Passing a qualifying examination at the end of the second year
- Complete a research program
- Writing and defending a monograph (dissertation) detailing proposed research

M.S. program in Molecular and Cellular Biology

The MS in Molecular and Cellular Biology degree program is designed primarily for students who are research oriented and wish to prepare for advanced work at the doctoral level. The MS degree program requires approximately 2 years to complete, including:

- 30 credit hours, including 18 term hours at the 6000-level and BIOL 6398, 6399 (thesis)
- One-year full-time residency
- Complete a research program
- Writing and defending a monograph (thesis) detailing proposed research

M.A. program in Molecular and Cellular Biology

The MA program in Molecular and Cellular Biology program is designed for students who seek additional training in the biological sciences as a prerequisite to further study in professional schools or for individuals seeking additional training for secondary education. This program is particularly well-suited for pre-health professional undergraduates who want to use a gap year to increase their overall competitiveness by obtaining an advanced MA degree.

The MA degree program is typically completed in 12-24 months, including:

- 30 credit hours, including 12 at the 6000-level
- One-year full-time residency
- Complete a three-term-hour research project

B. Role of Ph.D. and M.S. students in faculty research programs and expectations for their work

The PhD and MS student will receive rigorous training in the molecular, biochemical and genetic methods that are the currency of the selected laboratory and that serve as the prerequisite to participate in faculty research in a meaningful way. The graduate student will not only develop the technical skills required to carry out a research project, but they will be expected to make an intellectual contribution as well, ranging from data analysis to the development of experimental strategies. The work will be carried out responsibly and in a timely manner and the end product for the PhD student, who will typically be conducting research over a 4-5 year span, will be 1-2 first author papers or manuscripts in preparation. The successful MS student, whose research spans ~2 years, should be an author on at least one paper or manuscript in preparation.

The timetable for the graduate student is as follows. In their first semester, MS and PhD students will perform research rotations lasting 6-8 weeks in at least two different labs. At the end of the first semester the student may then select a home lab or elect to participate in additional rotations during the second semester. **Once a lab has been selected, the Graduate student advisor(s) will appoint an Advisory Committee in consultation with the student.** In the case of an MS student, the committee will consist

of at least two faculty members; in the case of a PhD student, the committee will consist of at least three persons besides the advisor, including one from outside the Department. Before the end of the second semester in residence, and at least once during each additional year, a meeting of the committee and the student will take place. At the first meeting, the committee and the student will review the student's record and future professional goals, and jointly determine a full program of studies leading to the degree. At subsequent meetings, the student will report on progress towards the goal.

In addition to presenting their research progress to their individual research committees, PhD students are also expected to present their research to the department as a whole. During the **3rd year**, PhD students must deliver a brief **15-minute progress report** on their work, presented in the style of a mini-seminar to the department. This will be followed by a 5- to 10-minute question and answer session. In addition, starting in the **4th year** and continuing annually, PhD students must present a **full-length seminar** (45 to 50 minutes) on their research to the department.

For the PhD student, a **qualifying examination**, composed of a written and an oral component, will occur at the end of the 2nd year to determine admission to candidacy. The exam must be completed before the beginning of the 3rd year. If exceptional circumstances (e.g., medical conditions, maternity, etc.) hinder timely completion, the student may request to complete the exam later by submitting a written petition via email to the Director of Graduate Studies who will forward the request to the Graduate Committee for consideration.

The **written component** of the qualifying exam entails crafting a series of documents modeled after a National Institutes of Health (NIH) F31 pre-doctoral fellowship proposal, albeit with certain modifications. The format must adhere to NIH guidelines, which specify 0.5-inch margins on all sides, 11-point font for the main text (Arial, Times New Roman, or Georgia), and single-spaced lines. Written proposals must be distributed to committee members at least 2 weeks prior to the examination. The written portion comprises six parts, each outlined below with specific requirements and guidelines:

1) **Title Page** (1 page):
    - Includes project title, student name, mentor name, committee members' names, examination date, and table of contents.
2) **NIH-Style Biosketch** (5-page limit):
    - Utilize the template and examples available from the NIH website: https://grants.nih.gov/grants/forms/biosketch.htm
3) **Introduction** (≥ 5 pages, excluding references and figures):
    - Write a comprehensive literature review that offers background, context, and foundation for the project topic.
    - Citations should primarily refer to original literature sources rather than review articles.
    - References should be included at the end of the Introduction without a page limit.
    - Optional figures may be placed after the text and before the references.
4) **Specific Aims** (1 page):
    - No citations allowed.
5) **Research Strategy** (6-page limit, excluding references; must exceed 5 pages)
    - Divided into two sections: Significance and Approach.
    - Significance section (usually 1-2 pages) addresses the importance of the problem, the gap/barrier in knowledge to be addressed, strengths and weaknesses in prior research, and the potential impact of the proposed project.

- Approach section (usually 4-5 pages) outlines the overall strategy, methodology, analyses, potential problems, alternative strategies, inclusion of relevant biological variables (such as sex), and statistical considerations.
- Each Specific Aim in the Approach requires sub-sections for Rationale, Experimental Methods, Anticipated Results, Potential Pitfalls/Alternative Strategies. An Impact sub-section can also be optionally included.
- Preliminary data and supporting figures/tables are required (with explanatory legends). A minimum of 3 figures/tables are required and they should not exceed 1 page total.
- A timeline for the project aims should be provided at the end of the Approach.

6) **Bibliography** (no page limit):
    - Includes references cited in the Research Strategy

The **oral component** of the qualifying exam includes a 30-minute seminar-style PowerPoint presentation by the student, followed by a comprehensive discussion of the proposed research that typically lasts ~2 hours. During the oral exam, the committee's primary objective is to assess whether the student possesses satisfactory depth and breadth of knowledge to justify advancement to candidacy. This evaluation includes demonstrating sufficient knowledge to conduct the proposed research and mastery of essential biological concepts related to coursework.

Based on their performance, the student will receive one of the following outcomes:

- **Pass**: Indicates satisfactory proficiency across all evaluated areas, allowing progression to candidacy.
- **Conditional Pass**: Recognizes proficiency in some areas but identifies deficiencies in others. Remedial measures in specific areas are required before a Pass can be granted.
- **Unsatisfactory**: Indicates inadequate proficiency overall. In this case, the committee may recommend either retaking the exam by the end of the following semester or opting for dismissal from the PhD program, with the option to receive a terminal MA degree if MA degree requirements are fulfilled.

The student is permitted only one additional attempt to pass the exam.

At the end of every academic year, all MS and PhD students will be subjected to an **overall performance review** by a "General Graduate Review Committee." This committee will assess each student in terms of research, class performance, teaching, as well as professional and ethical behavior. This Committee will include the advisory committee, instructors, and teaching supervisors who have been involved with the student, and will provide the framework to detect any early patterns that may be problematic moving forward such as lack of progress in research, unsatisfactory academic performance, poor teaching assessments, behavioral patterns that contribute to interpersonal conflict, and violation of University policies on plagiarism and data manipulation. Unsatisfactory performance in any category will be communicated to the student, and a plan for remediation and a timeline will be developed with the student. Some infractions, such as purposeful data manipulation and cheating constitute grounds for removal from the program.

Ph.D. Degree Program Timeline (5-year plan; tentative): 60 credit hrs required

		Required Courses	Electives	Other Requirements and Milestones
YEAR 1	Fall	BIOL 6322 BIOL 6310 BIOL 6114 BIOL 6120 BIOL 6170 (Grad Res)		• Teaching assistantship • 2-3 research rotations (6-8 weeks each)
	Spring	BIOL 6318 BIOL 6114 BIOL 6120 BIOL 6170 (Grad Res)	3 credits of 6000-level coursework	• Teaching assistantship • Faculty mentor assigned • General academic performance & progress review
	Summer	BIOL 6170 (Grad Res) BIOL 8049 (Grad Full-time)		• 1st Graduate Advisory Committee meeting
YEAR 2	Fall	BIOL 6375 BIOL 6114 BIOL 6120 BIOL 6170 (Grad Res) BIOL 6370 (Grad Res)		• Teaching assistantship
	Spring	BIOL 6114 BIOL 6120 BIOL 6170 (Grad Res) BIOL 6370 (Grad Res) BIOL 6371 (Grad Res)		• Teaching assistantship • General academic performance & progress review
	Summer	BIOL 6170 (Grad Res) BIOL 8049 (Grad Full-time)		• 2nd Graduate Advisory Committee meeting • PhD Qualifying Exam passed
YEAR 3	Fall	BIOL 6270 (Grad Res) BIOL 8049 (Grad Full-time)		• Teaching assistantship
	Spring	BIOL 6370 (Grad Res) BIOL 8049 (Grad Full-time)		• Teaching assistantship • General academic performance & progress review • 15-min dept. seminar
	Summer	BIOL 6170 (Grad Res) BIOL 8049 (Grad Full-time)		• 3rd Graduate Advisory Committee meeting
YEAR 4	Fall	BIOL 6371 (Grad Res) BIOL 8049 (Grad Full-time)		• Teaching assistantship
	Spring	BIOL 6372 (Grad Res) BIOL 8049 (Grad Full-time)		• Teaching assistantship • General academic performance & progress review • 45-minute dept. seminar
	Summer	BIOL 6170 (Grad Res) BIOL 8049 (Grad Full-time)		• 4th Graduate Advisory Committee meeting
YEAR 5	Fall	BIOL 8398 (Dissertation) BIOL 6170 (Grad Res) BIOL 8049 (Grad Full-time)		• Register for graduation • Teaching Assistantship
	Spring	BIOL 8399 (Dissertation) BIOL 6270 (Grad Res) BIOL 8049 (Grad Full-time)		• Submit PhD dissertation & oral presentation/ defense of research • Teaching Assistantship • Degree requirements completed

M.S. Degree Program Timeline (2-year plan; tentative): 30 credit hrs required

		Required Courses	Electives	Other Requirements and Milestones
YEAR 1	Fall	BIOL 6322 BIOL 6310 BIOL 6114 BIOL 6120 BIOL 6170 (Grad Res)		• 2 research rotations (6-8 weeks each)
	Spring	BIOL 6318 BIOL 6114 BIOL 6120 BIOL 6170 (Grad Res)		• Faculty mentor assigned • General academic performance & progress review
	Summer	BIOL 6170 (Grad Res) BIOL 6049 (Grad Full-time)		• 1st Graduate Advisory Committee meeting
YEAR 2	Fall	BIOL 6114 BIOL 6120 BIOL 6270 (Grad Res) BIOL 6398 (Thesis)		• Register for graduation
	Spring	BIOL 6114 BIOL 6120 BIOL 6270 (Grad Res) BIOL 6399 (Thesis)		• Submit MS thesis & oral presentation/ defense of research • Degree requirements completed

M.A. Degree Program Timeline (1-year plan; tentative): 30 credit hrs required

		Required Courses	Electives	Other Requirments and Milestones
YEAR 1	Fall	BIOL 6322 BIOL 6310 BIOL 6114 BIOL 6120	7 credits of 6000-level coursework	• Register for graduation
	Spring	BIOL 6318 BIOL 6114 BIOL 6120	7 credits of 6000-level coursework	• 3 credit hours of graduate research (e.g., BIOL 6370) • Degree requirements completed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