

K. Austin Davis, M.S.

PhD Candidate

Cerebral & Cardiovascular Physiology Laboratory
Department of Physiology & Anatomy
University of North Texas Health Science Center

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Education

PhD, Biomedical Science with a specialty in Integrative Physiology August 2020 – Present

Cerebral & Cardiovascular Physiology Laboratory, Department of Physiology & Anatomy,
Graduate School of Biomedical Sciences, University of North Texas Health Science Center, Ft. Worth, TX

MS, Biology (Thesis Track) January 2017 – December 2018

Department of Biological Sciences, Tarleton State University, Stephenville, TX

Post-Baccalaureate (Undergraduate Biology Leveling) May 2016 – December 2016

Department of Biological Sciences, Tarleton State University, Stephenville, TX

BS, Kinesiology August 2012 - May 2016

Department of Kinesiology, Tarleton State University, Stephenville, TX

Research Experience

PhD Student October 2020 – Present

Cerebral and Cardiovascular Physiology Laboratory (PI: Caroline A. Rickards, PhD)
Department of Physiology & Anatomy, University of North Texas Health Science Center

- Dissertation Projects:
 - Assessment of Sympathetic Activity and Neurovascular Transduction during Pulsatile Perfusion Therapy and Simulated Hemorrhage
 - Development of a Method to Induce Hemodynamic Oscillations via Limb Cuffs.
 - Protection of Peripheral Perfusion with Limb Cuff Pulsatile Perfusion Therapy During Limb Ischemia
- Other Collaborative Projects:
 - Safety of High frequency, Low Amplitude Vibration on the Neck - A Pilot Study”
 - Evaluation of novel sensors for assessment of cardiovascular status during simulated hemorrhage: A pilot study”
 - Assessment of Cerebral Perfusion with Pulsatile Perfusion Therapy after Hemorrhage in Swine and Murine Models
 - PPT Phase II: A Novel Approach for Improving Cerebral Tissue Blood Flow and Oxygenation.
 - Hemodynamic Mechanisms Linking Aortic Arch Stiffness with Brain Insult in Older Adults (collaboration with the Institute for Translational Research, UNTHSC; Dr. Kevin King, Dr. Sid O’Bryant, Dr. Leigh Johnson)
 - Sympathetic Nervous System Response to Resistance Breathing During Simulated Hemorrhage in Humans

Masters Student

January 2017 – December 2018

Animal Physiology Laboratory (PI: Max G. Sanderford, PhD)
Department of Biological Sciences, Tarleton State University

- Thesis Projects
 - The role of angiotensin II during serial hemorrhage in a freshwater channel catfish
 - Evidence of a functional Renin-Angiotensin System in freshwater catfish

Laboratory Manager and Statistician (Entomology)

February 2020 – December 2020

Supervisor: Dr. Sonja Swiger, Texas A&M AgriLife Extension Center

- Responsibilities:
 - Analyze data using appropriate statistical testing.
 - Assist with experimental design and facilitation of industry funded insect studies.
 - Coordinate functions of student workers
 - Maintain insect colonies.

Teaching Experience

University of North Texas Health Science Center

Graduate Teaching assistant

August 2020 – Current

Graduate School of Biomedical Sciences

- BMSC 5304-DL: Physiology, MS in Medical Science Program [online]

Tarleton State University

Graduate Lecturer & Adjunct Instructor

January 2017 – August 2020

Department of Biological Sciences, Tarleton State University

- Course development and instruction of (in-person and virtual):
 - BIOL 1406: General Biology I
 - BIOL 1407: General Biology II
- Lab Instruction of (in-person and virtual):
 - BIOL 2401: Anatomy and Physiology I
 - BIOL 2402: Anatomy and Physiology II

Supplemental Instructor III

January 2016 – December 2018

Academic Resource Center Coordinator, Tarleton State University

- Facilitate interactive study sessions for Anatomy & Physiology and General Chemistry courses
- Supervise and mentor supplemental instructors
- Design and facilitate monthly trainings for new and returning supplemental instructors

Grants and Fellowships

- **05/23 – 4/25** American Heart Association (AHA) Predoctoral Fellowship (23PRE1018469)
- **05/22 – 4/23** NIH-T32 Predoctoral Fellowship, Neurobiology of Aging & Alzheimer's Disease Training Program, University of North Texas Health Science Center (T32 AG020494)
- **Application 8/22** F31 Ruth L. Kirschstein National Research Service Award (NRSA) Individual Predoctoral Fellowship (Not funded)

Manuscripts

- **Davis KA**, Bhuiyan N, BJ McIntyre, Rickards CA. (2024) Induced Blood Flow Oscillations at 0.1 Hz Protects Oxygenation of Severely Ischemic Tissue. **(In Revision; J Appl Physiol)**
- BJ McIntyre, Bhuiyan N, **Davis KA**, Rickards CA. (2024) Impact of Common Carotid Arterial Stiffness on the Amplitude of Cerebral Blood Flow Oscillations and Cerebral Oxygenation **(In Preparation)**
- **Davis KA**, Sprick JD, Kay VL, Rickards CA. (2024) Sympathetic Response to Resistance Breathing During Simulated Hemorrhage in Humans. **(In Preparation)**
- Anderson GK, **Davis K.**, Bhuiyan N, Rusy R, Rosenberg AJ, Rickards CA. 2023. Effect of Oscillatory Hemodynamics on the Cardiovascular Response to Simulated Hemorrhage with Isocapnia. *Journal of Applied Physiology*.
- **Davis, K.**, Sanderford, M. Functional characterization of the renin-angiotensin system in the channel catfish, *Ictalurus punctatus*". Tarleton State University, ProQuest Dissertations Publishing, 2018.
- Hunt, J., **Davis, K.**, Sanderford, M. Evidence of a functional renin-angiotensin system in the channel catfish, *Ictalurus punctatus*. *Texas Journal of Science*: 2018, Vol. 70, No. 1, Article 2.

Abstracts (Oral Presentations)

- **Davis KA**, Bhuiyan N, McIntyre BJ, Rickards CA. Assessment of Cerebral Autoregulation with and without Intermittent Thigh Cuff Compressions at 0.1 Hz. CARNet 2024, Quebec, Canada, October, 2024 **(Submission)**
- Dinh VQ, Farmer GE, Davis KA, Rickards CA. Pulsatile Perfusion Therapy at 0.1 Hz via Inflatable Hind Limb Cuffs Protects Cerebral Blood Flow and Improves Survival Following Severe Hemorrhage in Rats. CARNet 2024, Quebec, Canada, October, 2024 **(Submission)**
- Hudson L, **Davis KA**, Dinh VQ, Moody AW, Rickards CA. Interactions Between Carotid Arterial Stiffness, Amplitude of Cerebral Blood Flow Oscillations, and Cerebral Tissue Oxygenation During Simulated Hemorrhage in Humans. Robert J. Hardin Symposium Translational Cardiovascular Research Symposium, 2024.
- **Davis KA**, Bhuiyan N, McIntyre BJ, Rickards CA. The Effect of 0.1 Hz Blood Flow Oscillations on Microvascular Blood Flow Responses Following Severe Ischemia. Research Appreciation Day, University of North Texas Health Science Center, March 2024
- **Davis KA**, Bhuiyan N, McIntyre BJ, Rickards CA. Amplitude of Induced Blood Flow Oscillations at 0.1 Hz is Related to Greater Oxygen Extraction during Peripheral Ischemia but not Cerebral Ischemia. CARNet 2023, Taipei, Taiwan, October, 2023
- **Davis KA**, Bhuiyan N, McIntyre BJ, Rickards CA. Induced Blood Flow Oscillations at 0.1 Hz Protects Oxygenation of Severely Ischemic Tissue. APS Summit, Long Beach, California, April 2023 Physiology 38(S1))
- **Davis KA**, Bhuiyan N, McIntyre BJ, Rickards CA. Induced Blood Flow Oscillations at 0.1 Hz Protects Oxygenation of Severely Ischemic Tissue. Research Appreciation Day, University of North Texas Health Science Center, March 2023.
- **Davis KA**, Bhuiyan N, McIntyre BJ, Rickards CA. Induced Blood Flow Oscillations at 0.1 Hz Protects Oxygenation of Severely Ischemic Tissue in Men but Not Women. Women's Cardiovascular & Brain Health Symposium, University of North Texas Health Science Center, February 2023
- **Davis KA**, Sprick, J., Victoria, K., Rickards, C. Resistance Breathing and Sympathetic Nerve Activity During Simulated Hemorrhage in Humans. 2022 Experimental Biology, Philadelphia, Pennsylvania, April 3, 2022 (FASEB J 2022 36(S1))
- **Davis KA**, Sprick JD, Kay VL, Rickards CA. Resistance Breathing and Sympathetic Nerve Activity During Simulated Hemorrhage in Humans. Research Appreciation Day, University of North Texas Health Science Center, March 2022.
- **Davis KA**, Sanderford, M., "The Role of Angiotensin II during Stepwise Hemorrhage in a Freshwater Channel Catfish (*Ictalurus punctatus*)" 2018 Tarleton Student Research and Creative Activities Symposium, October 11, 2018

Abstracts (Poster Presentations)

- Moody AW, **Davis KA**, Dinh VQ, Hudson L, Rickards CA. Protection of Cerebral Tissue Oxygenation with Induced 0.1 Hz Hemodynamic Oscillations During Simulated Hemorrhage in Humans. SRIP Research Appreciation Day 2024
- **Davis KA**, Bhuiyan N, McIntyre BJ, Rickards CA. The Effect of 0.1 Hz Blood Flow Oscillations on Microvascular Blood Flow Responses Following Severe Ischemia. APS Summit, Long Beach, California, April 2024

- **Davis KA**, Bhuiyan N, McIntyre BJ, Rickards CA. The Effect of 0.1 Hz Blood Flow Oscillations on Microvascular Blood Flow Responses Following Severe Ischemia. Research Appreciation Day, University of North Texas Health Science Center, March 2024 Robert J. Hardin Symposium Translational Cardiovascular Research Symposium, 2024.
- Lal K, **Davis KA**, Anderson GK, Bhuiyan N, Rickards CA. Evaluating the Role of Arterial Stiffness on Amplitude of Cerebral Blood Flow Oscillations. AGS 2024 Virtual Annual Meeting.
- Hudson, **Davis KA**, Anderson GK, Rosenberg A., McKeefer H, Bird J, Pentz B, Byman B, Jendzjowsky N, Day T, Caroline Rickards CA. Interactions Between Carotid Arterial Stiffness, Amplitude of Cerebral Blood Flow Oscillations, and Cerebral Tissue Oxygenation During Simulated Hemorrhage in Humans. APS Summit, Long Beach, California, April 2024
- **Davis KA**, Bhuiyan N, McIntyre BJ, Rickards CA. Reactive Hyperemia in Young and Healthy Men and Women Following Ischemia with 0.1 Hz Oscillatory Blood Flow. Women's Cardiovascular & Brain Health Symposium, University of North Texas Health Science Center, February 2024
- **Davis KA**, Bhuiyan N, McIntyre BJ, Rickards CA. Induced Blood Flow Oscillations at 0.1 Hz Protects Oxygenation of Severely Ischemic Tissue. APS Summit, Long Beach, California, April 2023 (Physiology 38(S1))
- Bhuiyan N, **Davis KA**, McIntyre BJ, Rickards CA. Carotid arterial stiffness and cerebral blood flow variability in individuals with mild cognitive impairment. APS Summit, Long Beach, California, April 2023 (Physiology 38(S1))
- McIntyre BJ, **Davis KA**, Bhuiyan N, Rickards CA. Hemodynamic Responses to 0.1 Hz Oscillatory Thigh Cuff Inflations. APS Summit, Long Beach, California, April 2023 (Physiology 38(S1))
- Bhuiyan N, **Davis KA**, McIntyre BJ, Rickards CA. Carotid arterial stiffness and cerebral blood flow variability in individuals with mild cognitive impairment. Research Appreciation Day, University of North Texas Health Science Center, March 2023.
- McIntyre BJ, **Davis KA**, Bhuiyan N, Rickards CA. Hemodynamic Responses to 0.1 Hz Oscillatory Thigh Cuff Inflations. Research Appreciation Day, University of North Texas Health Science Center, March 2023. (Submitted abstract)
- Stanteen C, **Davis KA**, McIntyre BJ, Bhuiyan N, Rickards CA. Peripheral Vascular Function is Not Correlated to Subjective Sleep Quality in Young Healthy Humans. Research Appreciation Day, University of North Texas Health Science Center, March 2023.
- **Davis KA**, Bhuiyan N, McIntyre BJ, Rickards CA. Induced Blood Flow Oscillations at 0.1 Hz Protects Oxygenation of Severely Ischemic Tissue in Men but Not Women. Women's Cardiovascular & Brain Health Symposium, University of North Texas Health Science Center, February 2023.
- Bhuiyan N, **Davis KA**, McIntyre BJ, Rickards CA. Relationship Between Brachial Artery Stiffness and 0.1 Hz Blood Flow Oscillations in Young and Healthy Males and Females . Women's Cardiovascular & Brain Health Symposium, University of North Texas Health Science Center, February 2023.
- McIntyre BJ, **Davis KA**, Bhuiyan N, Rickards CA. Does sex affect the relationship between carotid artery stiffness and the magnitude of induced 0.1 hz oscillatory cerebral blood flow? Women's Cardiovascular & Brain Health Symposium, University of North Texas Health Science Center, February 2023.
- **Davis KA**, Sprick JD, Kay VL, Rickards CA. Resistance Breathing and Sympathetic Nerve Activity During Simulated Hemorrhage in Humans. Experimental Biology (EB) Meeting, Philadelphia, PA, April 2022. (FASEB J 2022 36(S1))
- **Davis KA**, Sprick JD, Kay VL, Rickards CA. Sympathetic Response to Resistance Breathing During Simulated Hemorrhage in Humans. Experimental Biology (EB) Meeting [Virtual], April 2021. (FASEB J 2021 35(S1))
- **Davis KA**, Hunt, J., Sanderford, M. "Evidence of a functional renin-angiotensin system in the channel catfish," 64th Annual Meeting of the Southwestern Association of Naturalists. Tulsa, Oklahoma, April 14, 2017

Awards, certifications, and memberships

- **April 2023** 2023 Dr. Charles (Tip) Tipton Predoctoral Research Award, APS Environmental & Exercise Physiology Section
- **March 2023** 2nd Place graduate oral presentation, Research Appreciation day UNTHSC
- **February 2023** 3rd place poster, 4th annual Women's Cardiovascular and Brain Health symposium
- **October 2022** 2022 APS Intersociety Meeting for Comparative Physiology Travel Award

- **2020 – Present** American Heart Association Membership
- **2018 – Present** American Physiological Society Membership
- **December 2018** Outstanding Graduate Student Award – Tarleton State University
- **November 2018** 2nd place at Tarleton Student Research and Creative Activities Symposium in the graduate student oral presentation category
- **May 2017** Tarleton Summer Horizons graduate student research grant
- **April 2018** Mental Health First Aid Certification, National Council for Behavioral Health
- **June 2016** Weight Loss Specialist Certified, National Association of Sports Medicine (non-expiratory)

Professional Development – Attended Conferences, Seminars, and Webinars

- **July 2024** Robert J. Hardin Translational Cardiovascular Research Symposium
- **April 2024** APS Summit 2024, Long Beach, California
- **February 2024** 6th annual Women’s Cardiovascular and Brain Health symposium
- **October 2024** 12th International Cerebral Autoregulation Research Network (CARNet) Meeting, Taipei, Taiwan
- **April 2023** APS Summit 2023, Long Beach, California
- **February 2023** 5th annual Women’s Cardiovascular and Brain Health symposium
- **October 2022** APS Intersociety Meeting for Comparative Physiology
- **April 2022** Experimental Biology 2022, Philadelphia, Pennsylvania
- **February 2022** 4th annual Women’s Cardiovascular and Brain Health symposium - UNTHSC
- **April 2021** Experimental Biology 2021 [virtual]
- **April 2021** 10th International Cerebral Autoregulation Research Network (CARNet) Meeting [virtual]
- **March 2021** 3rd annual Women’s Cardiovascular and Brain Health symposium (WCBH2021) - UNTHSC
- **2020-2021** Monthly Cerebral Blood Flow Virtual Seminars
- **2020-2021** Diversity, Equity, and Inclusion Seminars – Graduate School of Biomedical Sciences, UNTHSC
- **November 2020** “Data Collection & Analysis in Human Autonomic Research”, American Physiological Society

Invited Presentations

- **February 2024** Texas Wesleyan University, October 4th 2022, My Path to Graduate School at UNTHSC
- **November 2023** AHA Night of Celebration for Grant Awardees, Fort Worth, Texas
- **June 2023** Keynote Presentation, PHAN Retreat, Department of Physiology and Anatomy, UNTHSC
- **October 2022** Texas Wesleyan University, October 4th 2022, My Path to Graduate School at UNTHSC
- **March 2022** Tarleton State University, Tarleton Undergraduate to PhD Candidate at UNTHSC

Service

- 2023-2024 UNTHSC student Orientation Leader
- 2023-2024 PHANatics Student Organization, Vice President
- 2023-2024 UNT HSC Graduate Student Ambassador
- 2022-Present Assisted Dr. Caroline Rickards in reviewing manuscripts for Clinical Physiology and Functional Imaging (1), physiological Measurement (2), and Journal of Applied Physiology (2), Hypertension (1)

Invited Presentation

- Physiology and Anatomy Department Retreat - Keynote Speaker June 2023
- The Joint Admission Medical Program UNTHSC, June 5th 2023 – Intro to Human Research
- Tarleton State University, March 18th 2022, Tarleton Undergraduate to PhD Candidate Studying Human Physiology
- Texas Wesleyan University, October 4th 2022, My Path to Graduate School at UNT Health Science Center

Other Skills and Achievements

Certifications

- Stop the Bleed Training, Committee on Trauma, May 18th 2023
- Basic Life Support (BLS) certified, American Heart Association, November 2022
- DEXA Operator Training, GE Healthcare May 2022
- Radiation Safety Training, November 2021

Experimental and Analytical Techniques

- Microneurography for the measurement of muscle sympathetic nerve activity in human subjects
- Venipuncture for the sampling of venous blood samples in human subjects
- Lower body negative pressure (static, ramp, and oscillatory profiles)
- Continuous blood pressure monitoring with finger photoplethysmography (Finometer)
- Transcranial Doppler ultrasound for the measurement of intracranial cerebral blood velocities
- Duplex Doppler ultrasound for the measurement of vascular blood flow including diameter and velocity, and analysis via Quipu, Duc 2, and qDAT workflows
- Near-infrared spectroscopy for the monitoring of cerebral and muscle tissue oxygen saturation
- Breath-by-breath control of respiratory end-tidal gases via an end-tidal forcing system
- Measurement of arterial stiffness via peripheral artery tonometry for pulse wave velocity analyses
- Physiological data analysis using WinCPRS and Elucimed Ensemble, including advanced analytical assessment of time and frequency domain metrics
- Physiologic Data Recording and using LabChart software and PowerLab hardware