**Dr. Nathan J. Hall**

Texas Tech University

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**Education and Post Graduate Training**

Ph D, University of Florida, 2015.

Major: Psychology

Supporting Areas of Emphasis: Behavior Analysis

Dissertation Title: The Effect of Odor Pre-Exposure and Breed on Canine Detection Performance

MS, University of Florida, 2012.

Major: Psychology

Supporting Areas of Emphasis: Behavior Analysis

Dissertation Title: Training Dogs on a Novel Discrete Trials Training Procedure

BS, University of Florida, 2010.

Major: Microbiology and Cell Science

**Academic and Professional Experience**

**Associate Professor, Texas Tech University. (September 2022 - Present).**

**Assistant Professor, Texas Tech University. (June 1, 2016 - August 2022).**

**Post Doctoral Scholar, Arizona State University. (June 1, 2015 - May 30, 2016).**

**Graduate Instructor, University of Florida. (August 24, 2013 - May 1, 2015).**

**TEACHING**

**Courses Taught**

**Texas Tech University**

ANSC 3314, Companion Animal Behavior and Training, 8 courses.

ANSC 3315, Companion Animal Nutrition, 3 courses.

ANSC 3321, Human-Animal Interactions, 1 course.

ANSC 4000, Internship, 19 courses.

ANSC 4001, Special Problems in Animal Science: Animal Behavior and Veterinary Medicine in South Africa, 7 courses.

ANSC 4101, Dog Training Practicum I, 3 courses.

ANSC 4203, Dog Training Practicum II, 2 courses.

ANSC 4303, Dog Training Practicum, 3 courses.

ANSC 4307, Sensory Analysis of Foods, 4 courses.

ANSC 4408, Animal Shelter Management, 2 courses.

ANSC 5000, Professional Internship, 1 course.

ANSC 5001, Problems in Animal Science: Advanced Animal Learning, 6 courses.

ANSC 5100, Seminar: Companion Animal, 2 courses.

ANSC 5307, Research Methods in Agricultural Sciences, 1 course.

ANSC 5317, Studies in the Sensory Analysis of Foods, 4 courses.

ANSC 6000, Master’s Thesis, 14 courses.

ANSC 6001, Supervised Teaching, 10 courses.

ANSC 7000, Research, 21 courses.

ANSC 8000, Doctor’s Dissertation, 10 courses.

**Non-Credit Instruction**

Continuing Education, Texas Tech University. (January 2023 - January 2024).

Seminar, Osher Lifelong learning Institute and Double T College, 40 participants. (September 10, 2018).

Guest Lecture, Museum of Texas Tech, 60 participants. (February 2018).

**Directed Student Learning**

Christine Rudd, Dissertation Committee Chair, "Human Animal Interaction in Equine Assisted Programs," Animal & Food Sciences. (August 2022 - Present).

Sarah Kane, Dissertation Committee Chair. (August 2021 - Present).

Lauren Fernandez, Master's Thesis Committee Chair. (August 2021 - Present).

Courtney Archer, Master's Thesis Committee Member, "Pheromone influence on swine production," Animal & Food Sciences. (2020 - Present).

Ryan Thompson, Master's Thesis Committee Member, "Odor Transport in Varying Environmental Conditions," Animal & Food Sciences. (2020 - Present).

Brittany Lancaster, Dissertation Committee Member, "Effects of Pet Dogs on Children's Sleep," Psychological Studies. (August 2019 - Present).

Allison Andrukonis, Dissertation Committee Chair, "Improving Welfare for Animal Shelter Employees and Animals," Animal & Food Sciences. (August 2018 - December 2021).

Mallory DeChant, Dissertation Committee Chair, "Measuring Canine Olfactory Detection Limits," Animal & Food Sciences. (August 2018 - August 2021).

Madelyn Sanford, Master's Thesis Committee Chair, "Environmental Effects on Canine Olfaction," Animal & Food Sciences. (August 2019 - May 2021).

Eduardo Cordova, Master's Thesis Committee Chair, "Effect of Walks and Play as Enrichment in Shelter Dogs," Animal & Food Sciences. (August 2018 - May 2020).

Stephanie Soto, Master's Thesis Committee Chair, "Effect of a Commercial Probiotic and Nutrient Digestibility and Microbiome Diversity," Animal & Food Sciences. (August 2017 - August 2019).

Lingna Zhang, Dissertation Committee Member, Animal & Food Sciences. (August 2017 - June 2019).

Rachel Wyant, Master's Thesis Committee Chair, "Measuring Canine Food Demand," Animal & Food Sciences. (August 2017 - May 2019).

Kerbey Jacobs, Master's Thesis Committee Member, Animal & Food Sciences. (August 2017 - May 2019).

Edgar Aviles-Rosa, Dissertation Committee Member, Animal & Food Sciences. (August 2016 - May 2019).

Kelsea Brown, Dissertation Committee Member, Animal & Food Sciences. (August 2016 - May 2019).

Thy Nguyen, Master's Thesis Committee Member, "Novel Method for the Creation of Canine Explosive Detection Training Aids using an Olfactometer," Other (Within Texas Tech University). (December 2018).

Aaron Teixeira, Master's Non-Thesis Committee Chair, "Effect of Greeting and Departure Interactions on The Development of Separation Related Behaviors in Dogs," Animal & Food Sciences. (August 2017 - December 2018).

Yu Liang, Dissertation Committee Member, "Effects of various nutritional supplements on the development, innate immunity, and gastrointestinal health of young dairy calves," Animal & Food Sciences. (August 2018).

Glenna Pirner, Dissertation Committee Member, "Behavioral, Physiological and Neurological Influences of Pheromones and Interomones in Domestic Dogs," Animal & Food Sciences. (May 2018).

Lauren Alejandro, Master's Thesis Committee Member, "The Evaluation of Canine Training Aids Over Time on Working Dog Performance," Other (Within Texas Tech University). (May 2018).

**Teaching Awards and Honors**

Most Influential Faculty Member, Phi Beta Kapa. (May 2020).

New Faculty Award, Texas Tech Alumni Association. (May 2020).

Polished Apple Award, Texas Tech Mortar Board. (May 2019).

**RESEARCH**

**Published Intellectual Contributions**

**Abstract**

Rudd, C., Pasiuk, E. L., Schroeder, K., Anderson, N., Hall, N. (2022). *Fake It ‘til You Make It: A Preliminary Exploration of Congruence Between Physiology and Behavior in Horses During Horse-Human Interactions.*.

Rudd, C., Pasiuk, E. L., Schroeder, K., Anderson, N., Hall, N. (2022). *A psychobiological approach to promoting low-stress interactions in Equine-Assisted Services*.

Nardi, K. T., Silva, K. G. S., Favero, I. G., Hinds, J. K., Hoffmann, C. A., Soto, S. M., Hall, N., Sarturi, J. (2020). *Rumen microbiome from beef steers undergoing grain adaptation with steam-flaked corn varying in bulk density* (pp. 1). American Society of Animal Science.

**Book, Chapter in Scholarly Book-New**

Aviles Rosa, E., Gokool, V., Hall, N., DeGreeff, L. (2023). Canine Olfactometry: Tools, Techniques, and Procedures. *Olfactory Research in Dogs* (pp. 85--118). Springer International Publishing Cham.

Aviles-Rosa, E., DeChant, M., Hall, N. (2022). Training the Sensor: Impacts of Learning on Canine Detection and Performance. In DeGreef, L, Schultz, C. (Ed.), *Canines: The Original Biosensors* (pp. 381-411).

Bainbridge, D., Wewetzer, K., Omar, M., Kammeyer, P., Brandes, G., Siniscalchi, M., Quignon, P., Galibert, F., Otto, C. M., Hall, N., others (2016). *Canine Olfaction Science and Law Advances in Forensic Science, Medicine, Conservation, and Environmental Remediation*.

Hall, N., Protopopova, A., Wynne, C. D. (2016). *Canine Olfaction Science and Law Advances in Forensic Science, Medicine, Conservation, and Environmental Remediation*.

Fiset, S., Nadeau-Marchand, P., Hall, N. (2014). Cognitive Development in Gray Wolves: Development of Object Permanence and Sensorimotor Intelligence with Respect to Domestic Dogs. *Domestic Dog Cognition and Behavior* (pp. 155–174). Springer Berlin Heidelberg.

**Journal Article, Academic Journal**

DeGreeff, L. E., Katilie, C. K., Sharpes, C. E., Maughan, M. N., Gadberry, J. D., Nolan, P. L., Hall, N., Magner, B., Best, E. M., Calabrese, E., others (2024). Evaluation of non-detonable canine training aids for explosives by headspace analysis and canine testing. *Forensic Chemistry, 37*, 100553.

Kane, S., Fernandez, L., Huff, D., Tiedemann, P., Hall, N. (2024). Canine Detection of Explosives under Adverse Environmental Conditions with and without Acclimation Training. *PloSONE, 19*(2), e0297538.

Rudd, C., Pasiuk, E. L., Schroeder, K., Anderson, N., Hall, N. Psychobiological processes in horse-human interactions: a preliminary exploration of equine.. *Anthrozoos*.

Medrano, A., Cantu, A., Aviles Rosa, E., Hall, N., Maughan, M., Gadberry, J., Tiedemann, P. (2024). Chemical Characterization of Human Body Odor Headspace Components. *Separations*.

Aviles Rosa, E., Medrano, A., Cantu, A., Tiedemann, P., Maughan, M., Gadberry, J., Gruebel, R., Hall, N. (2024). Development of an Automated Human Scent Olfactometer and its Use to Evaluate Detection Dog Perception of Human Scent. *PlosOne*.

Andrukonis, A., Protopopova, A., Schroeder, K., Hall, N. (2023). A mixed-methods analysis of similarities and differences in animal shelter staff, dog behavior professionals, and the public in determining kenneled dog welfare. *Journal of Applied Animal Welfare Science*, 1-18.

Whitehead, A., Matheus, K., Hall, N., Barnes, M. Advancing early detection technologies for Dreissena polymorpha (Pallas, 1771): comparing mussel detection in environmental samples with environmental DNA (eDNA) and scent detection canines. *Management of Biological Invasions*.

Kane, S., Aviles Rosa, E., Hall, N. (2023). Development and assessment of Spotted Lanternfly (Lycorma delicatula) training aids for detection canines. *Applied Animal Behavior Science, 266*, 106011.

Brustkern, M., Lawhon, S., Good, K., Bunker, P., Thompson, R., Tiedemann, P., Hall, N. (2023). Effect of Rapid Changes in Environmental Conditions on Canine Detection of Methyl Benzoate. *Applied Animal Behavior Science, 264*, 105924.

Hall, N., Edwards, T., Lazarowski, L. (2023). Experimental analysis of canine behavior and cognition.. *Journal of the Experimental Analysis of Behavior, 120*(1), 3-5.

Gallegos, S., Aviles Rosa, E. O., DeChant, M., Hall, N., Tiedemann, P. (2023). Explosive Odor Signature Profiling: A Review of recent advances in technical analysis and detection.. *Forensic Science International, 347*.

Aviles Rosa, E., Kane, S., Nita, M., Feuerbacher, E., Hall, N. (2023). Olfactory threshold of dogs (Canis lupus familiaris) to cold-killed Spotted Lantern Fly eggs. *Applied Animal Behavior Science, 261*, 105880.

Pasiuk, E. L., Rudd, C., Webberson, E., Anderson, N., Hall, N., Stellato, A., Schroeder, K. (2023). Investigating human experiences and perceptions of unmounted activities commonly practiced in equine-assisted services. *Human-Animal Interactions, 11*(1).

Aviles Rosa, E., Nita, M., Feuerbacher, E., Hall, N. (2023). An evaluation of Spotted Lanternfly (Lycorma delicatula) detection dog training and performance. *Applied Animal Behavior Science, 258*, 105816.

Aviles-Rosa, E., Dechant, M., Tiedemann, P., Hall, N. (2023). A Laboratory Model of Canine Search Vigilance Decrement, I. *Journal of the Experimental Analysis of Behavior, 120*(1), 103-119.

DeChant, M., Aviles Rosa, E., Tiedemann, P., Hall, N. (2023). A laboratory model of canine search vigilance decrement, II: Non-contingent Reward and Pavlovian Appetitive Stimuli. *Journal of the Experimental Analysis of Behavior, 120*(1), 120-136.

DeChant, M., Aviles Rosa, E., Tiedemann, P., Hall, N. (2023). Part, III: Increasing odor detection performance after training with progressively leaner schedules of odor prevalence. *Journal of the Experimental Analysis of Behavior, 120*(1), 137-152.

Eagan, B. H., Wang, S., Hall, N., Protopopova, A. (2022). Consumer attitudes toward bacteriophage applications to pet food. *Frontiers in Veterinary Science, 9*.

Gallegos, S., Aviles Rosa, E., Hall, N., Tiedemann, P. (2022). Headspace Sampling of Smokeless Powder Odor in a Dynamic Airflow Context. *Forensic Chemistry*.

Wilson, C., Hall, N., Aviles Rosa, E., Campbell, Arnott, Reeve, C. (2022). The effect of repeated testing on judgement bias in domestic dogs (Canis familiaris).. *Animal Cognition, 26*, 477-489.

Aviles Rosa, E., Fernandez, L., Collins-Pisano, C., Hall, N. (2022). The use of an intermittent schedule of reinforcement to evaluate detection dogs’ generalization to Smokeless-Powder. *Animal Cognition, 25*, 1609–1620.

Judge, A., Hall, N., Richeson, J., Daigle, C. (2022). Using Canine Olfaction to Detect Bovine Respiratory Disease: A Pilot Study. *Frontiers in Veterinary Science*.

Gallegos, S., Aviles-Rosa, E., Hall, N., Prada, P. (2022). Headspace Sampling of Smokeless Powder Odor Stimuli in a Dynamic Airflow Context. *Forensic Chemistry, 27*.

Andrukonis, A., Protopopova, A., Xiang, Y., Liao, Y., Hall, N. (2021). Behavioral correlates of urinary output in shelter cats. *Applied Animal Behaviour Science, 241*, 105397.

Teixeira, A. R., Hall, N. (2021). Effect of greeting and departure interactions on the development of increased separation-related behaviors in newly adopted adult dogs. *Journal of Veterinary Behavior: Clinical Applications and Research, 41*, 22--32.

Bray, E., Otto, C., Udell, M., Hall, N., Johnston, A., MacLean, E. (2021). Enhancing the Selection and Performance of Working Dogs. *Frontiers in Veterinary Science*(8), 644431.

Mendez, A., Hall, N. (2021). Evaluating and re-evaluating intra- and inter-species social transmission of food preferences in domestic dogs. *Behavioural Processes, 191*, 104471.

Andrukonis, A., Brown, K. M., Hall, N., Protopopova, A. (2021). Intake Vaccinations Reduced Signs of Canine Respiratory Disease During an Outbreak at an Animal Shelter. *Frontiers in Veterinary Science, 8*, 627580.

DeChant, M., Bunker, P. C., Hall, N. (2021). Stimulus control of odorant concentration: Pilot study of generalization and discrimination of odor concentration in canines. *Animals, 11*(2), 326.

DeChant, M., Hall, N. (2021). Training with varying odor concentrations: implications for odor detection thresholds in canines. *Animal Cognition, 24*, 889–896.

Hall, N., Johnston, A., Bray, E., Otto, C., MacLean, E., Udell, M. (2021). Working Dog Training for the 21st Century. *Frontiers in Veterinary Science, 8*.

Aviles Rosa, E., Gallegos, S., Tiedemann, P., Hall, N. (2021). An Automated Canine Line-up for Detection Dog Research. *Frontiers in Veterinary Science*.

Aviles Rosa, E., McGuiness, G., Hall, N. (2021). Case Study: An evaluation of Detection dog generalization to a large quantity of an unknown explosive. *Animals, 11*(5), 1341.

Protopopova, A., Brown, K. M., Hall, N. (2020). A Multi-Site Feasibility Assessment of Implementing a Best-Practices Meet-And-Greet Intervention in Animal Shelters in the United States. *Animals, 10*(1), 104.

Jarvis, T., Hall, N. (2020). Development of point following behaviors in shelter dogs. *Learning and Behavior, 48*, 335–343.

DeChant, M., Ford, C., Hall, N. (2020). Effect of Handler Knowledge of the Detection Task on Canine Search Behavior and Performance. *Frontiers in Veterinary Science, 7*, 250.

Aviles Rosa, E., McGlone, J., Hall, N. (2020). Evaluating the use of a habituation-dishabituation paradigm to assess gilt olfaction and sensitivity to the boar pheromone. *Appl. Anim. Behav. Sci., 231*, 105086.

Brown, K. M., Feuerbacher, E. N., Hall, N., Protopopova, A. (2020). Minor Procedural Variations Affect Canine Behavior during Sociability Assessments. *Behavioural Processes, 177*, 104145.

Andrukonis, A., Hall, N., Protopopova, A. (2020). The Impact of Caring and Killing on Physiological and Psychometric Measures of Stress in Animal Shelter Employees: A Pilot Study. *MDPI AG, 17*(24), 9196.

Protopopova, A., Hall, N., Brown, K. M., Andrukonis, A., Hekman, J. P. (2019). Behavioral predictors of subsequent respiratory illness signs in dogs admitted to an animal shelter. *PLOS ONE, 14*(10), e0224252.

Dalal, S., Hall, N. (2019). Behavioral persistence is associated with poorer olfactory discrimination learning in domestic dogs. *Behavioural Processes, 162*, 64-71.

Hall, N., Wynne, C. D.L. (2018). Odor mixture training enhances dogs' olfactory detection of Home-Made Explosive precursors. *Heliyon, 4*(12), e00947.

Kertes, D. A., Hall, N., Bhatt, S. S. (2018). Children’s Relationship With Their Pet Dogs and OXTR Genotype Predict Child--Pet Interaction in an Experimental Setting. *Frontiers in Psychology, 9*, 1472.

Chersini, N., Hall, N., Wynne, C. D. (2018). Dog Pups’ Attractiveness to Humans Peaks at Weaning Age. *Anthrozoos, 31*(3), 309--318.

Hall, N., Gadbois, S. (2018). Special Issue Introduction.. *Behavioural Processes, 155*, 1.

Kertes, D. A., Liu, J., Hall, N. J., Hadad, N. A., Wynne, C. D., Bhatt, S. S. (2017). Effect of Pet Dogs on Children’s Perceived Stress and Cortisol Stress Response. *Social Development, 26*(2), 382–401.

Hall, N., Peron, F., Cambou, S., Callejon, L., Wynne, C. D. (2017). Food and food-odor preferences in dogs: A pilot study. *Chemical Senses, 42*(4), 361--370.

Hall, N. (2017). Persistence and resistance to extinction in the domestic dog: Basic research and applications to canine training. *Behavioural Processes, 141*, 67--74.

Mehrkam, L. R., Hall, N., Haitz, C., Wynne, C. D. (2017). The influence of breed and environmental factors on social and solitary play in dogs (Canis lupus familiaris). *Learning and Behavior, 45*(4), 367--377.

Hall, N., Liu, J., Kertes, D., Wynne, C. D. (2016). Behavioral and Self-report Measures Influencing Children’s Reported Attachment to Their Dog. *Anthrozoös, 29*(1), 137–150.

Hall, N., Smith, D. W., Wynne, C. D. (2016). Effect of odorant pre-exposure on domestic dogs’ sensitivity on an odorant detection task. *Applied Animal Behaviour Science, 178*, 80–87.

Hall, N., Collada, A., Smith, D. W., Wynne, C. D. (2016). Performance of domestic dogs on an olfactory discrimination of a homologous series of alcohols. *Applied Animal Behaviour Science, 178*, 1–6.

Hall, N., Lord, K., Arnold, A.-M. K., Wynne, C. D., Udell, M. A. (2015). Assessment of attachment behaviour to human caregivers in wolf pups (Canis lupus lupus). *Behavioural processes, 110*, 15–21.

Hall, N., Smith, D. W., Wynne, C. D. (2015). Pavlovian conditioning enhances resistance to disruption of dogs performing an odor discrimination. *Journal of the experimental analysis of behavior, 103*(3), 484–497.

Hall, N., Glenn, K., Smith, D. W., Wynne, C. D. (2015). Performance of Pugs, German Shepherds, and Greyhounds (Canis lupus familiaris) on an odor-discrimination task.. *Journal of Comparative Psychology, 129*(3), 237.

Hall, N., Protopopova, A., Wynne, C. D. (2015). The role of environmental and owner-provided consequences in canine stereotypy and compulsive behavior. *Journal of Veterinary Behavior: Clinical Applications and Research, 10*(1), 24–35.

Hall, N., Smith, D. W., Wynne, C. D. (2014). Effect of odor preexposure on acquisition of an odor discrimination in dogs. *Learning & Behavior, 42*(2), 144–152.

Protopopova, A., Hall, N., Wynne, C. D. (2014). Association between increased behavioral persistence and stereotypy in the pet dog.. *Behavioural processes, 106*, 77-81.

Udell, M., Hall, N., Morrison, J., Dorey, N. R., Wynne, C. D. (2013). Point topography and within-session learning are important predictors of pet dogs’(Canis lupus familiaris) performance on human guided tasks. *Revista Argentina de Ciencias del Comportamiento, 5*(2), 3–20.

Hall, N., Smith, D. W., Wynne, C. D. (2013). Training domestic dogs (Canis lupus familiaris) on a novel discrete trials odor-detection task. *Learning and Motivation, 44*(4), 218–228.

**Journal Article, Professional Journal**

Aviles Rosa, E., Schultz, J., Maughan, M., DiPasquale, D., Farr, B., Best, E., Dicepolo, D., Buckley, P., Perri, E., Zoran, D., Hall, N. (2024). The Running Nose: the effect of exercise intensity and duration on olfactory detection limits. *Frontiers*.

**Research Report**

Sonowal, R., Hall, N., Stellato, A. (2023). *Assessing the preference of Emulsifier and Non-Emulsifier scented Playology toys in domestic dogs*.

**Presentations Given**

Aviles Rosa, E. (Author Only), Hall, N. (Author Only), Kane, S. (Presenter & Author), 31st Annual International Conference on Comparative Cognition, "Development of a Spotted Lanternfly egg mass training aid," Comparative Cognition Society, Albaquerque, NM. (April 2024).

Aviles Rosa, E. (Author Only), Hall, N. (Author Only), Rothkoff, L. (Presenter & Author), 31st Annual International Conference on Comparative Cognition, "Effects of physical activity on odor detection performance," Comparative cognition Society, Albuquerque, NM. (April 2024).

Aviles Rosa, E. (Author Only), Hall, N. (Presenter & Author), 31st Annual International Conference on Comparative Cognition, "Enhancing Detection Canine Performance in Target Lean Environments," Comparative Cognition Society, Albaquerque, NM. (April 2024).

Aviles Rosa, E. (Presenter & Author), Hall, N. (Author Only), The 31st International Conference on Comparative Cognition., "Development of an Automated Human Scent Olfactometer and its use to evaluate detection dog perception of Human Scent.," Comparative cognition Society, Albuquerque, NM. (April 2024).

Hall, N., ABAI Annual Conference, "Evaluating use of dogs for detection of invasive mussels," Association for Behavior Analysis International, Denver, CO. (2023).

Hall, N., K9 SciCon, "Effect of Low Prevelance Targets on Detection Dog Performance," Florida International University, Miami, FL. (2023).

Aviles Rosa, E. (Presenter & Author), Medrano, A., Cantu, A. (Other), Tiedemann, P. (Other), Maughan, M. N. (Other), Gadberry, J. D., Greubel, R. R. (Other), Hall, N. (Other), FIU Canine Olfaction and Detection Science Conference., "Development of an Automated Human Scent Olfactometer and its use to evaluate detection dog perception of Human Scent.," Florida International University, Miami. (May 2023).

Aviles Rosa, E. (Presenter & Author), Medrano, A., Cantu, A., Tiedemann, P., Maughan, M., Gadberry, J., Greubel, R., Hall, N., 5th Annual Working Dog Research Forum, "Development of an Automated Human Scent Olfactometer and its use to evaluate detection dog perception of Human Scent," Department of Defense (DoD), Virtual Platform. (April 2023).

Kane, S. (Presenter & Author), Fernandez, L., Tiedemann, P., Hall, N., 5th Annual Working Dog Research Forum, "Environmental effects on canine detection limits of explosives," Department of Defense (DoD), Virtual Platform. (April 2023).

Medrano, A., Aviles Rosa, E., Hall, N., Gadberry, J., Maughan, M., Tiedemann, P., 22nd Annual Graduate Student Research Poster Competition Texas Tech University, "The Use of a Novel Chamber Sampling Approach to Instrumentally Evaluate Whole Human Odor Volatiles," Texas Tech University, Lubbock,TX. (March 2023).

Cantu, A., Aviles Rosa, E., Hall, N., Tiedemann, P., American Chemical Society Spring 2023 Meeting Division of Analytical Chemistry Section, "Evaluating volatile organic compounds from the spotted lanternfly (Lycorma delicatula) using headspace vapor odor sampling methods," American Chemical Society, Indianapolis, IN. (March 26, 2023).

Aviles Rosa, E. (Author Only), Hall, N. (Presenter & Author), SCAPE conference., "Development of an Automated Human Scent Olfactometer and its use to evaluate detection dog perception of Human Scent," New Mexico Search and Rescue, Philmont New Mexico. (February 2023).

Hall, N., Australian Detection Dog Science Conference, "Science of Canine Detection," Red Team, Sydney. (2022).

Hall, N., Pacific North West Police K9 Association, "Canine olfaction and behavior," Pacific North West Police K9 Association, Walla Walla, Washington. (2022).

Hall, N., Penn Vet Working Dog Conference, "Canine Detection of Invasive Mussels," Penn Vet Working Dog Center, Remote. (2022).

Rudd, C. (Presenter & Author), Pasiuk, E. L. (Author Only), Schroeder, K. (Author Only), Anderson, N. (Author Only), Hall, N. (Author Only), Annual Meeting, "Utilizing physical, behavioral, and self-report measures to assess horse and human affect in equine-assisted services," PATH, International, St. Louis, Missouri. (October 28, 2022).

Hall, N., HITS K9, "Canine Olfaction and Research," HITS, Orlando, FL. (August 2022).

Rudd, C. (Presenter & Author), Pasiuk, E. L. (Author Only), Schroeder, K. (Author Only), Anderson, N. (Author Only), Hall, N. (Author Only), Annual Meeting, "A psychobiological approach to promoting low-stress interactions in Equine-Assisted Services.," International Society of Anthrozoology, Boise, Idaho. (July 7, 2022).

Aviles Rosa, E. (Presenter & Author), Hall, N. (Author Only), Penn Vet Working Dog Conference, "The use of an intermittent schedule of reinforcement to evaluate detection dogs’ generalization to Smokeless-Powder," Penn State University, Online. (June 2022).

Barnes, M. (Presenter & Author), DeShon, D. (Author Only), Matheus, K. (Author Only), Steinkraus, B. (Author Only), Whitehead, A. (Author Only), Hall, N. (Author Only), Joint Aquatic Sciences Meeting, "Comparing in situ detection of invasive zebra mussels (Dreissena polymorpha) using environmental DNA and detection canines in Texas reservoirs," American Fisheries Society; Association for the Sciences of Limnology and Oceanography; Coastal and Estuarine Research Federation; Freshwater Mollusk Conservation Society; International Association for Great Lakes Research; North American Lake Management Society; Phycological Society of America; Society for Freshwater Science; Society of Wetland Scientists, Grand Rapids, MI. (May 2022).

Tiedemann, P. (Presenter & Author), Hall, N. (Presenter & Author), Annual Working Dog Symposium, "Explosives detection in varying environmental conditions," Department of Defense, Virtual. (April 2022).

Huff, D. (Presenter & Author), Hall, N. (Author Only), Prada-Tiedemann, P. A. (Author Only), 21st Annual Graduate Student Research Poster Competition, "Characterization of Odor Behavior in Extreme Environments," Texas Tech University, Lubbock, TX. (March 2022).

Rudd, C. (Presenter & Author), Pasiuk, E. L. (Author Only), Schroeder, K. (Author Only), Anderson, N. (Author Only), Hall, N. (Author Only), TTU Graduate Student Research Poster Competition, "Equine Stress Levels During Stationary and Mobile Activities Used in Equine-Assisted Services," Texas Tech University, Lubbock, TX. (March 3, 2022).

Thompson, R. (Presenter & Author), Aviles-Rosa, E. (Author Only), Hall, N. (Author Only), Tiedemann, P. (Author Only), American Academy of Forensic Sciences (AAFS), "Preliminary Perspectives of Environmental Conditions on Cocaine’s Chemical Odorant Methyl Benzoate Via Dynamic Airflow Sampling," Seattle, WA. (February 2022).

Gallegos, S. (Presenter & Author), Hall, N., Prada, P., American Academy of Forensic Sciences, "Odor stimuli validation in smokeless powders: the bridge between analytical chemistry approaches and dynamic airflow sampling," AAFS, Virtual platform. (February 2021).

DeChant, M., Ford, C., Hall, N., Association for Behavior Analysis International, "Effect of Handler Knowledge of the Detection Task on Canine Search Behavior and Performance," Association for Behavior Analysis International. (2020).

DeChant, M., Ford, C., Hall, N., PennVet Working Dog Conference, "Effect of Handler Knowledge of the Detection Task on Canine Search Behavior and Performance." (2020).

Hall, N., PennVet Working Dog Conference, "Improving selection and Training of Working Dogs." (2020).

Hall, N. (Author Only), "Understanding Canine Olfaction," Sport Dog Radio Podcast. (2020).

Hall, N., AKC Detection Dog Conference, "Variables influencing Canine Detection," American Kennel Club, Raleigh NC. (2019).

Hall, N., Association for Behavior Analysis International, "Canine Sense and Scent Ability," Association for Behavior Analysis International, Chicago, IL. (2019).

DeChant, M., Hall, N., Association for Behavior Analysis International, "Generalization of Olfactory Thresholds in Canines.," Association for Behavior Analysis International, Chicago IL. (2019).

Mendez, A., Hall, N., Association for Behavior Analysis International, "Social Transmission of Food Preferences in Canines.," Association for Behavior Analysis International. (2019).

Dalal, S., Hall, N., Association for Behavioral Analysis International, "Association Between Odor Discrimination and Cognitive Bias in Dogs," Association for Behavioral Analysis International, Chicago IL. (2019).

Jarvis, T., Hall, N., Association for Behavioral Analysis International, "How Dare You! I Smell Another Dog on You!," Association for Behavioral Analysis International, Chicago IL. (2019).

Hall, N., California Narcotics Canine Association, "Factors influencing detection dog performance," California Narcotics Canine Association, Palm Spring, CA. (2019).

Hall, N., Canine Science Symposium, "Canine Sense and Scent Ability," Arizona State University, San Francisco, CA. (2019).

Hall, N., Dogs Trust UK Dog Conference, "Canine Sense and Scent Ability," Dogs Trust UK, Oxford, UK. (2019).

Hall, N., K9 Talking Sense Podcast, "Research on Detection Canines," K9 Talking Sense Podcast. (2019).

Dalal, S., Hall, N., Southwestern Psychological Association, "Behavioral Persistence is Associated with Poorer Olfactory Discrimination Learning," Southwestern Psychological Association, Albuquerque NM. (2019).

Wyant, R., Hall, N., Southwestern Psychological Association, "Comparing Demand and Preference Assessments for Food Products in Dogs," Southwestern Psychological Association, Albuquerque NM. (2019).

Cordova, E., Hall, N., Southwestern Psychological Association, "Evaluating the Effects of Additional Walks or Play on Activity Levels in Dogs," Southwestern Psychological Association, Albuquerque NM. (2019).

Soto, S. M. (Presenter & Author), Hall, N., Southwestern Psychological Association, "Measuring Canine Olfactory Sensitivity on a Natural Detection Task," Albuquerque NM. (2019).

Jarvis, T., Hall, N., Southwestern Psychological Association, "The Development of Point Following Behaviors in Shelter Dogs," Southwestern Psychological Association, Albuquerque NM. (2019).

Nguyen, T. (Presenter & Author), Hall, N. (Author Only), Tiedemann, P. (Author Only), International Association for Identification, "Rapid Generation of Potential Explosive Training Materials in Biological Detection: An Additional Tool in Explosive Crime Scene Responses," IAI, San Antonio, Texas, US. (August 1, 2018).

Dalal, S., Hall, N., Association For Behavior Analysis, "Behavioral Persistence is Associated with Poorer Discrimination Learning.," Association For Behavior Analysis International, San Diego CA. (May 2018).

Jarvis, T., Hall, N., Association For Behavior Analysis, "Development of point following behavior in shelter dogs," Association For Behavior Analysis International, San Diego CA. (May 2018).

Hall, N., Kertes, D., Wynne, C., Association For Behavior Analysis, "Effect of Pet on Children's Stress Response," Association For Behavior Analysis International, San Diego CA. (May 2018).

Mendez, A., Soto, S., Hall, N., Association For Behavior Analysis, "Measuring Canine Olfactory Capacity on a Natural Detection Task," Association For Behavior Analysis International, San Diego CA. (May 2018).

Teixeira, A. R., Hall, N., Association For Behavior Analysis, "The Influence of Human Behavior on the Development of Separation Related Behavior in the Domestic Dog.," Association For Behavior Analysis International, San Diego CA. (May 2018).

Dalal, S., Hall, N., Undergraduate Research Forum, "Associations between behavioral persistence discrimination learning and stationary behavior," Undergraduate Research Forum, Lubbock TX. (April 2018).

Jarvis, T., Hall, N., Undergraduate Research Forum, "Development of point following behavior in shelter dogs," Undergraduate Research Forum, Lubbock TX. (April 2018).

Mendez, A., Soto, S., Hall, N., Undergraduate Research Forum, "Measuring odor capacity on a natural detection task.," Undergraduate Research Forum, Lubbock TX. (April 2018).

Hall, N., Pet Professional Guild Annual Meeting 2017, "Behavioral Treatment and Assessment of Stereotypic Behavior in Dogs," Pet Professional Guild, Orlando FL. (November 2017).

Hall, N., Pet Professional Guild Annual Meeting 2017, "Understanding Canine Olfaction," Pet Professional Guild, Orlando FL. (November 2017).

Hall, N., Canine Science Forum, "Food and Food Odor Preferences in Pet dogs," Canine Science Forum, Phoenix AZ. (October 2017).

Protopopova, A., Hall, N., Brown, K., Andrukonis, A., Hekman, J., North American Canine Science Conference, "Effects of temperament on disease susceptibility in shelter dogs," Canine Science Collaboratory, Phoenix, AZ. (June 2017).

Hall, N., Exploring the Frontier of the Arts, Innovation and Medicine- In Support of the Veteran., "Adjunct Therapies Using Companion Animals for the Veteran," Exploring the Frontier of the Arts, Innovation and Medicine- In Support of the Veteran., Lubbock TX. (November 2016).

Hall, N., Animal Behavior Society, "Training for enhanced detection of improvised explosives," Animal Behavior Society, Colombia, MO. (July 2016).

Hall, N., Society for the Quantitative Analysis of Behavior, "Behavioral Persistence in Dogs," Society for the Quantitative Analysis of Behavior, Chicago IL. (June 2016).

Hall, N., Association For Behavior Analysis, "Effect of odor pre-exposure on detection sensitivity.," Association For Behavior Analysis International, San Antonio TX. (May 2015).

Hall, N., Comparative Cognition Meeting, "Effect of odor pre-exposure on sensitivity to an odorant in dogs," Comparative Cognition Society, Melbourne FL. (March 2015).

**Media Contributions**

**Magazine**

PBS. (July 20, 2017).

**Newspaper**

Lubbock Avalanche Journal. (July 22, 2018).

Wall Street Journal. (March 24, 2017).

**Radio**

KCBS News Radio. (March 24, 2017).

**TV**

Fox 34 Lubbock. (December 16, 2017).

**Contracts, Grants and Sponsored Research**

**Awarded**

Aviles Rosa, E. (Principal Investigator), Tiedemann, P. (Principal Investigator), Hall, N. (Lead Principal Investigator), "Integrating Canine Behavior and Analytical Chemistry to Support Enhanced Canine Generalization and Non-Detonable Training Tools for Explosives Detection.," Sponsored by Department of Homeland security, Federal, $1,700,000.00. (2024 - 2026).

Hall, N. (Lead Principal Investigator), Prada, P. (Principal Investigator), "Detection Canine Sciences, Innovation, Technology and Education (DCSITE)," Sponsored by Auburn University (United States Department of Homeland Security DHS), Federal, $590,000.00. (August 2022 - December 2026).

Hall, N. (Lead Principal Investigator), Aviles-Rosa, E. (Principal Investigator), Feuerbacher, E. (Principal Investigator), Nita, M. (Principal Investigator), "Agricultural Detection Dogs: Measuring Capability and Enhancing Capacity," Sponsored by USDA-NIFA Cooperative State Research Ed & Extension Service, Federal, $475,000.00. (February 1, 2021 - January 31, 2025).

Aviles Rosa, E. (Principal Investigator), Tiedemann, P. (Principal Investigator), Hall, N. (Lead Principal Investigator), "The Development of a Person-Borne Electronically-Enhanced TADD (PBE2T) for Advanced K9 Training and Testing," Sponsored by Excet Incorporated, Industry/For Profit, $74,817.00. (January 2024 - August 2024).

Stellato, A. (Lead Principal Investigator), Hall, N. (Lead Principal Investigator), "Scented Playology Plush Toy Preference in Owned Domestic Dogs," Sponsored by Logical Brands Inc, Industry/For Profit, $99,001.00. (November 1, 2021 - October 31, 2023).

Tiedemann, P. (Principal Investigator), Hall, N., "Integrating Canine Behavior and Analytical Chemistry to Support Enhanced Canine Generalization and the development of Non-Detonable Training Tools for Explosives Detection," Sponsored by Department of Homeland Security, Federal, $1,748,411.00.

Tiedemann, P. (Principal Investigator), Hall, N. (Lead Principal Investigator), "The Development of a Person-Borne Electronically-Enhanced TADD (PBE2T) for Advanced K9 Training and Testing," Sponsored by Excet Inc. Department of Defense, Federal, $374,090.00. (June 2023 - Present).

Tiedemann, P., Hall, N., "Human Scent Instrumental and Canine Recognition," Sponsored by Excet Incorporated, $360,000.00. (2022 - June 2023).

Hall, N. (Lead Principal Investigator), "Behavioral, cognitive, sensory and morphological traits associated to performance in Military Working Dogs," Sponsored by Royal Canin SAS, Industry/For Profit, $60,242.00. (June 1, 2020 - November 30, 2022).

Hall, N. (Lead Principal Investigator), "Nutritional Solutions for Reduced Core Body Temperature During Brief Sprint Exercise," Sponsored by Royal Canin SAS, Industry/For Profit, $86,220.00. (December 1, 2020 - June 30, 2022).

Hall, N. (Lead Principal Investigator), Prada, P. (Principal Investigator), "Leveraging Canine Cognition to Enhance Search Vigilance in Operational Scenarios," Sponsored by United States Department of Homeland Security, Federal, $446,197.00. (June 1, 2020 - June 2022).

Prada, P., Hall, N., "Environmental Impact on Explosives Detection Dogs and Mitigation Strategies," Sponsored by Army Research Office, Federal, $270,717.00. (May 2021 - May 2022).

Hall, N. (Principal Investigator), Barnes, M. (Principal Investigator), "Advancing Early Detection Technologies for Dreissenid Mussel Invasion in Texas," Sponsored by DOI - Fish and Wildlife Service, Federal, $233,641.00. (March 1, 2021 - February 28, 2022).

Hall, N. (Lead Principal Investigator), Prada, P. (Principal Investigator), "New Deal Farm: Indicators of Heat and Acclimatization Responses in Canines," Sponsored by Chrion K9, Federal, $50,000.00. (2020 - 2021).

Hall, N. (Lead Principal Investigator), "Generalization Across Crude Oil Concentrations," Sponsored by Owens Costal Consulting, Industry/For Profit, $4,939.00. (2020 - 2021).

Hall, N. (Lead Principal Investigator), "Measuring Food Odor Preference in Domestic Dogs," Sponsored by Specialites Pet Food SAS, $98,036.00. (2020 - 2021).

Hall, N. (Lead Principal Investigator), Van Allen, J. (Lead Principal Investigator), "The effect of pet dog ownership on empirical measures of child activity," Sponsored by NIH - Shriver National Institute of Child Health and Human, Federal, $140,590.00. (September 2018 - September 2021).

DeChant, M. (Lead Principal Investigator), Hall, N. (Supporting), "Optimizing Vigilance with Pavlovian Instrumental Transfer in Detection Canines," Sponsored by Animal Behavior Society, $1,450.00. (June 1, 2019 - May 31, 2020).

McGlone, J. (Lead Principal Investigator), Hall, N. (Principal Investigator), "Measuring Olfactory Sensitivity and Insensitivity for the Boar Pheromone (Boar Better) in Peri-Pubertal Gilts," Sponsored by PIC North America, $106,470.00. (May 1, 2019 - April 30, 2020).

Hall, N., Sarturi, J., "Effects of direct-fed microbial supplementation on dietary nutrient digestibility and fecal characteristics of dogs," Sponsored by Fujisaki International LLC, Industry/For Profit, $26,721.00. (May 2018 - December 2019).

Hall, N. (Lead Principal Investigator), Kottapalli, K. R. (Principal Investigator), Crasto, C. (Principal Investigator), Tiedemann, P. (Principal Investigator), White, D. (Principal Investigator), "A multidimensional approach to assess olfaction in dogs with application to explosives detection," Sponsored by TTU Seed Grant, College or University, $70,000.00. (2017 - 2018).

Hall, N. (Lead Principal Investigator), "Development and Evaluation of Quantitative Measures of Food Preference, Odor Preference, and Food Demand in Dogs and Cats," Sponsored by Specialties Pet Food SAS, $4,396.00. (December 15, 2016 - August 31, 2018).

Hall, N. (Lead Principal Investigator), "Development and Evaluation of Quantitative Measures of Food Preference, Odor Preference, and Food Demand in Dogs and Cats," Sponsored by Specialites Pet Food SAS, Industry/For Profit, $4,396.00. (December 2016 - August 2018).

Hall, N. (Lead Principal Investigator), "Development and Evaluation of Quantitative Measures of Food Preference, Odor Preference, and Food Demand in Dogs and Cats," Sponsored by Specialites Pet Food SAS, $80,109.00. (December 15, 2016 - February 28, 2018).

**Pending**

Stellato, A. (Lead Principal Investigator), O'Hanley, K. (Investigator), Aviles Rosa, E. (Investigator), Hall, N. (Investigator), Monsur, M. (Investigator), Reel, L. A. (Investigator), "Environmental design as a catalyst for optimizing companion animal welfare and human health.," Sponsored by Davis College, College or University, $243,730.00.

Aviles Rosa, E. (Lead Principal Investigator), Hall, N. (Principal Investigator), "Evaluating heat gain and colling methods in Military Working dogs," Sponsored by USA Army, Federal, $226,000.00.

Anderson, N. (Investigator), Rudd, C. (Investigator), Schroeder, K. (Investigator), Hall, N. (Investigator), "Determining the Effect of Handler on Equine Affect and Compliance in Therapeutic Riding.," Sponsored by American Quarter Horse Foundation Young Investigator Award, Foundation, $17,061.00.

Prada, P. (Lead Principal Investigator), Hall, N. (Principal Investigator), "Environmental Impact on Explosives Detection Dogs and Mitigation Strategies," Sponsored by Department of Defense (DoD) Army Research office, Federal, $300,490.00.

**Research and Scholarly Works Awards and Honors**

Chancellor's Council Distinguished Research Award, Texas Tech University. (2023).

Marian Breland-Bailey Award for Student Research and Scholarship, Association for Behavior Analysis International. (May 2013).

**Research in Progress**

"Equine Odor Perceptions of Human Emotion States" (Planning). (September 2020 - Present).
The main objective of this research study is to determine horses' ability to discriminate between human chemosignals associated with fear and no fear.

"Effects of vaccination at intake on herd health in shelter dogs". (2017 - 2019).

"The interplay between temperament, stress, immune function, and disease likelihood in shelter dogs". (2015 - 2019).

"A Novel Method for the Creation of Explosive Detection Training Aids for Canines using an Olfactometer" (Complete). (August 2017 - 2018).

"Establishing a heritability estimate of behavioral traits in dogs using retired racing Greyhounds as a model". (2017 - 2018).

**Research Interests**

**SERVICE**

**University Service**

Committee Member, Institutional Animal Care and Use Committee. (August 2016 - Present).

**College Service**

Committee Member, CASNR Dean of Research Search Committee. (October 2018 - December 2018).

**Department Service**

Event Organizer, Companion Animal Science. (2020 - Present).

Faculty Advisor. (August 2019 - Present).

Faculty Advisor. (August 2019 - August 2020).

Committee Chair, Companion Animal Search Committee. (August 2019 - December 2019).

Faculty Advisor. (August 2018 - August 2019).

Faculty Advisor. (August 2017 - August 2018).

Faculty Advisor. (January 2017 - August 2017).

**Professional Service**

Committee Member, Association for Behavior Analysis International. (January 2019 - Present).

Editor, Guest, Frontiers in Veterinary Science. (January 2019 - Present).

Editor, Guest, Frontiers Veterinary Science Working Dog Form and Function Volume. (January 2019 - Present).

Editor, Associate Editor, Journal of the Experimental Analysis of Behavior. (July 2022 - May 2023).

Reviewer, Grant Proposal, National Institute of Child Health and Development. (2020).

Reviewer, Conference Paper, Southwest American Psychological Association. (November 2018 - December 2018).

Editor, Guest, Behavioural Processes. (January 2017 - October 2018).

**Public Service**

Attendee, Meeting, Wallis Annenberg Petspace Leadership Institute Retreat, Los Angeles, California. (January 2020).

**Service/Performance Partnerships**

ANSC 4411 Advanced Animal Behavior and Training, This Service-Learning, communication literacy, and animal science production course offers students a hands-on animal training experience including opportunities to serve as a companion animal trainer/instructor. This course will help students apply these principles through direct experience training dogs and/or cats with corrected feedback. Students will also provide a service to your animal shelter community, providing enrichment and training to dogs in need. Lastly, students will be given an opportunity to briefly serve as a training instructor to start developing the skills needed to become a professional trainer., Texas. (January 13, 2022 - May 2022).

Companion Animal Science Professional Development Webinar Series, Noncredit Classes and Programs, The Companion Animal Science (COAS) Professional Development Webinar Series connects COAS undergraduate students to experts in the fields of Companion Animal Science, Veterinary Science, and Human-Animal Interactions through themed events on research, career, and academic-related topics., Texas. (October 14, 2020 - Present).

Research facilities tour to national and international community visitors\_Fujisaki LLC Sponsorship, Relationship Development, The New Deal Research and Education Center (NDREC) is located 25 minutes north of Lubbock. The Center comprehends multiple research focuses, but not limited to: beef cattle, swine, and companion animals. When visitors (national and international) approach the Department of Animal and Food Sciences, faculty member available and related to the specific area of interest is contacted to prepare and provide tour on research facilities. Tour usually take approximately 2 hours (plus 1 h h round-trip), in which detailed description of activities performed in the center is provided, as well as update of ongoing research efforts. (November 29, 2018 - June 2018).

Research facilities tour to national and international community visitors\_UDC, Technical or Expert Assistance, The New Deal Research and Education Center (NDREC) is located 25 minutes north of Lubbock. The Center comprehends multiple research focuses, but not limited to: beef cattle, swine, and companion animals. When visitors (national and international) approach the Department of Animal and Food Sciences, faculty member available and related to the specific area of interest is contacted to prepare and provide tour on research facilities. Tour usually take approximately 2 hours (plus 1 h h round-trip), in which detailed description of activities performed in the center is provided, as well as update of ongoing research efforts. The Office of International Affairs organized current activity., Texas. (October 29, 2018 - October 2018).

Training For Adoption, Noncredit Classes and Programs, Research and Creative Activity, Students participating for course credit and/or volunteering work with a cohort of dogs providing training to enhance adoptability of rescue dogs. Students work with the dogs for a semester, engage in community outreach to advertise the dogs, and organize and hold a public graduation ceremony at a local rescue in the community. Students help get the dogs adopted and provide follow up support as needed to the future adopters., Texas. (January 1, 2018 - Present).

**GENERAL**

**Professional Memberships**

Animal Behavior Society. (April 2016 - Present).

Association for Behavior Analysis International. (January 2014 - Present).

**Development Activities Attended**

Workshop, "Faculty Search Committee Workshop," The Division of Diversity Equity and Inclusion. (July 2019).

Workshop, "Human-Wildlife Conflict," Army Research Office. (April 2019).

Workshop, "IACUC 101," TTU HSC and TTU Office of Research, Lubbock, Texas. (October 2018).

Faculty Fellowship, "STEP Program Fellow," STEM Teaching Engagement and Pedagogy, Lubbock, Texas. (August 2017 - May 2018).

Workshop, "Broader Impacts Workshop," Research Development Team, Lubbock, Texas. (March 23, 2018).

"CASNR Advising Academy," CASNR Advising, Lubbock, Texas. (August 2017 - December 2017).

Tutorial, "A small change can make a big impact: Increasing assignment transparency to improve stem learning outcomes," STEM Teaching Engagement and Pedagogy, Lubbock, Texas. (October 2017).

Workshop, "What is "Active Learning" and how do we activate our students to know that it works?," STEM Teaching Engagement and Pedagogy, Lubbock, Texas. (September 12, 2017).

Conference Attendance, "Military Health Systems Research Symposium," Military Health Systems Research Symposium, Orlando, Florida. (August 2017).

Workshop, "NSF Career Workshop," TTU Research Development Team, Lubbock, TX, USA. (June 7, 2017).