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ACADEMIC BACKGROUND

2009, Ph.D., Cellular and Molecular Biology, University of Texas at Austin
2002, Bachelor of Science, Molecular Biology, University of Southern Mississippi

RESEARCH EXPERIENCE

November 2015 – current, Assistant Professor; The University of Texas at Austin, Dell Medical School at the Dell Pediatrics Research Institute, Austin, Texas

October 2010 – October 2015, Post-doctoral fellow; Washington University School of Medicine, Developmental Biology, St. Louis, Missouri

- Research project: Genetics of vertebral column/spine defects using zebrafish as a model.
- Research supervisor: Lilianna Solnica-Krezel

July 2009 – October 2010, Post-doctoral researcher, Johns Hopkins School of Medicine, Center for Cellular Dynamics, Baltimore, Maryland

- Research project: Morphogenesis of primary mouse mammary gland organoids.
- Research supervisor: Andrew J. Ewald

2003 – May 2009, Ph.D. student; The University of Texas at Austin, Department of Cellular and Molecular Biology, Austin, Texas

- Research project: Diversity of Dishevelled genes and PCP effector genes on ciliogenesis.
- Research supervisor: John B. Wallingford

PERSONAL STATEMENT

The goal of my lab is the study of the cellular and molecular mechanisms of spine development and homeostasis using explicit animal models. We choose to utilize both mouse and zebrafish models to provide complementary approaches to study musculoskeletal development and disease. We developed conditional mouse model of idiopathic scoliosis (IS) and intervertebral disc herniation by removing *Gpr126/Adgrg6* function in osteochondral progenitors (*Human Molecular Genetics,* 2015 and *PLoS Genetics*, 2019) and of early-onset scoliosis after conditional ablation of *Prmt5* function in the same progenitor cell type (*Dis Model Mech.* 2019). Together these results have established a new model for the essential role of cartilaginous tissues and extracellular matrix or the 'matriosome' for idiopathic scoliosis (*Bone Research*, 2019).

We are at the forefront of establishing the zebrafish model to analysis a variety of scoliosis pathologies including congenital malformations (*Developmental Biology*, 2014) and IS (*Development Dynamics,* 2014). In an effort to promote gene discovery, we established a forward genetic screen in zebrafish which isolated a novel collection of adult viable scoliosis mutants, which are the focus of ongoing studies. To assist in isolation of the causative mutations in this collection, we help develop robust methods for rapid mapping and variant identification using modern genome sequencing (*G3*, 2017). Thus far, our studies in zebrafish identified common mechanistic roles for scoliosis and hydrocephalus affecting alterations in the physiology of the cerebrospinal fluid (*PLOS Genetics*, 2018) and established a novel, essential role for a cerebrospinal canal resident protein component, the 'Reissner fiber', which regulates spine morphogenesis downstream of disrupted cerebrospinal fluid flow (*Current Biology*, 2020). We will continue to use a multi-tiered approach, combining zebrafish, mouse, and cell culture models, informed by human genomic studies, with the goal to inform the diagnosis of pediatric/musculoskeletal diseases and provide avenues for therapeutic interventions of these disorders in humans.

AWARDS, HONORS, AND FELLOWSHIPS

2017 ORS Spine Section Early Investigator Podium Award
2013-2015 Standard Investigator Grant, Scoliosis Research Society
2015 14th International Phillip Zorab Symposium Best Poster Award, British Scoliosis Society
2012-2015 NRSA F32 Grant - 1F32AR063001-01
2011-13 Postdoctoral Fellowship Grant from the Children's Discovery Institute - MD-F-2011-143
2009 Best Talk Award – University of Texas at Austin Cell and Molecular Biology Retreat
2007, 2009 Society of Developmental Biology Travel Award
2006-2008 University of Texas at Austin Travel Award
2004 Joint Steering Committee for Public Policy Capitol Hill Day Travel
2002 Graduated with Honors University of Southern Mississippi
2001-2002 Dean's List University of Southern Mississippi
2001-2003 Beta Beta Beta Biological Honor Society

INSTITUTIONAL SERVICE ACTIVIVTIES

University of Texas at Austin

University Committees: Institutional Biosafety Committee (Fall 2016 - current); Animal Resources Advisory Committee (Fall 2016 - current).
Pediatrics Committees: Pediatric Research Committee (Fall 2016 - current); Pediatric Faculty Recruitment Committee (2017 - 2018).
Nutritional Sciences Committees: Nutritional Sciences Faculty Recruitment Committee (2019-current).

EXTERNAL SERVICE ACTIVIVTIES

Ad-hoc Reviewer - Grants

- NIH Special Emphasis Panel/Scientific Review Group 2020/10 Skeletal Biology Structure and Regeneration (SBSR) *ad hoc* reviewer (June 2020).
- Dutch Research Council (NWO) | Domain Applied and Engineering Sciences (AES) *ad hoc* reviewer (2020).
- External Reviewer for the Research Grants Council (RGC) of Hong Kong (2017, 2019).
- External review committee for the Washington University School of Medicine Musculoskeletal Research Center Pilot & Feasibility grants (2018).

Science Meeting Organizer

- Session chair 9th Adhesion GPCR Workshop, Portland, OR (2018).
- Co-Organizer 2019 Orthopedic Research Society Annual Meeting Workshop on Zebrafish: An Emerging Model for Orthopedic Research.
- Planning committee for International Consortium for Spinal Genetics Development and Disease (2020).

Ad-hoc Reviewer - Manuscripts

Nature Genetics, Plos Genetics, ELife, Nature Communications, Developmental Biology, Developmental Dynamics, Human Mutation, PlosONE, Science Bulletin, Connective Tissue Research, Genetics, Journal of Bone Mineral Research, Human Genome Variation, European Spine Journal, Journal of Human Genetics, and Disease Models and Mechanisms.

PROFESSIONAL SOCIETIES

2018-current, Adhesion-GPCR Consortium
2018- current, International Zebrafish Society
2016-current, Orthopedics Research Society, Spine Section (ORS)
2005-current, Society of Developmental Biology (SDB)
2013-current, International Consortium for Spine Genetics, Development, and Disease (ICSGDD).

MISC. POSITIONS

2001-2001, Field Research USGS, Alagnak River Basin, AK, Julie Meka, Native Trout Program Coordinator
2001-2003, Microbiology Lab Assistant, Microbiology lab, University of Southern Mississippi, Delia Anderson, Professor
2002-2003, Undergraduate Research, University of Southern Mississippi, George Santangelo, Professor

TEACHING EXPERIENCE

Microbiology Laboratory - The University of Southern Mississippi
Clinical Microbiology Laboratory - The University of Texas at Austin
Developmental Biology - The University of Texas at Austin
Nutrional Sciences Lab (NTR 126L) Fall 2019; Spring 2020; Fall 2020 - The University of Texas at Austin

PUBLICATIONS (reverse chronological)

26. Wang Y, Liu Z, Yang G, Gao Q, Xiao L, Li J, Guo C, Troutwine BR, Gray RS, Xie L, Zhang H. Coding variants coupled with rapid modeling in zebrafish implicate dynein genes, dnaaf1 and zmynd10, as adolescent idiopathic scoliosis candidate genes. ***Frontiers in Cell and Developmental Biology***. 2020.
25. Genomic characterization of the adolescent idiopathic scoliosis associated transcriptome and regulome. ***Human Molecular Genetics***. 2020
24. Troutwine BR, Gontarz P, Konjikusic MJ, Minowa R, Monstad-Rios A, Sepich DS, Kwon RY, Solnica-Krezel L, Gray RS. The Reissner Fiber Is Highly Dynamic In Vivo and Controls Morphogenesis of the Spine. ***Curr Biol***. 2020 Jun 22;30(12):2353-2362.e3. PMID: 32386529.
23. Roberson EC, Tran NK, Konjikusic MJ, Fitch RD, Gray RS, Wallingford JB. A Comparative Study of the Turnover of Multiciliated Cells in the Mouse Trachea Oviduct and Brain. ***Dev Dyn.*** 2020 Mar 5. PMID: 32133718.
22. Liu Z, Ramachandran J, Vokes SA, Gray RS. Regulation of terminal hypertrophic chondrocyte differentiation in *Prmt5* mutant mice modeling infantile idiopathic scoliosis. ***Dis Model Mech***. 2019 Dec 17;12(12). PMID: 31848143.
21. Liu Z, Easson GWD, Zhao J, Makki N, Ahituv N, Hilton MJ, Tang SY, Gray RS. Dysregulation of STAT3 signaling is associated with endplate-oriented herniations of the intervertebral disc in Adgrg6 mutant mice. ***PLoS Genet***. 2019 Oct;15(10). PMID: 31652254.
20. Ramachandran J, Liu Z, Gray RS, Vokes SA. PRMT5 is necessary to form distinct cartilage identities in the knee and long bone. ***Developmental Biology.*** 2019. Aug 20. PMID: 31442442.
19. Morgan RK, Anderson GR, Araç D, Aust G, Balenga N, Boucard A, Bridges JP, Engel FB, Formstone CJ, Glitsch MD, Gray RS, Hall RA, Hsiao CC, Kim HY, Knierim AB, Kusuluri DK, Leon K, Liebscher I, Piao X, Prömel S, Scholz N, Srivastava S, Thor D, Tolias KF, Ushkaryov YA, Vallon M, Van Meir EG, Vanhollebeke B, Wolfrum U, Wright KM, Monk KR, Mogha A. The expanding fucntional roles and signaling mechanisms of adhesion G protein-coupled recptors. ***Ann. NY Acad. Sci.*** 2019. Jun 6. PMID: 31168816.
18. Konjikusic MJ, Yeetong P, Boswell CW, Lee C, Roberson EC, Ittiwut R, Suphapeetiporn K, Ciruna B, Gurnett CA, Wallingford JB, Shotelersuk V, Gray RS. Mutations in Kinesin family member 6 reveal specific role in ependymal cell ciliogenesis and human neurological development. ***PLoS Genet.*** 2018 Nov 26;14(11):e1007817. PMID: 30475797.
17. Haller G, McCall K, Jenkitkasemwong S, Sadler B, Antunes L, Nikolov M, Whittle J, Upshaw Z, Shin J, Baschal E, Cruchaga C, Harms M, Raggio C, Morcuende JA, Giampietro P, Miller NH, Wise C, Gray RS, Solnica-Krezel L, Knutson M, Dobbs MB, Gurnett CA. A missense variant in SLC39A8 is associated with severe idiopathic scoliosis. ***Nat Commun.*** 2018 Oct 9;9(1):4171. PMID: 30301978.

16. Kim DH, Ewald AJ, Park J, Kshitiz, Kwak M, Gray RS, Su CY, Seo J, An SS, Levchenko A. Biomechanical interplay between anisotropic re-organization of cells and the surrounding matrix underlies transition to invasive cancer spread. ***Sci Rep.*** 2018 Sep 21;8(1):14210. PMID:30242256.
15. Giampietro PF, Pourquie O, Raggio C, Ikegawa S, Turnpenny PD, Gray RS, Dunwoodie SL, Gurnett CA, Alman B, Cheung K, Kusumi K, Hadley-Miller N, and Wise CA. Summary of the first inaugural joint meeting of the International Consortium for scoliosis genetics and the International Consortium for vertebral anomalies and scoliosis, March 16–18, 2017, Dallas, ***Texas Am J Med Genet. Part A.*** 21 Nov 2017.
14. Herbert AL, Fu M, Drerup CM, Gray RS, Harty BL, Ackerman SL, O'Reily-Pol T, Johnson SL, Nechiporuk AV, Barres BA, and Monk KR. Dynein/dynactin is necessary for anterograde transport of Mbp mRNA in oligodendrocytes and for myelination in vivo. ***Proc Natl Acad Sci***. 2017 Oct 24;114(43):E9153-E9162. PMID: 2907311.
13. Sanchez NE, Harty BL, O'Reilly-Pol T, Ackerman SD, Herbert AL, Holmgren M, Johnson SL, Gray RS, Monk KR. Whole Genome Sequencing-Based Mapping and Candidate Identification of Mutations from Fixed Zebrafish Tissue. **G3**. 2017. PMID:28855284.
12. Karner CM, Long F, Solnica-Krezel L, Monk KR, Gray RS. *Gpr126/Adgrg6* deletion in cartilage models idiopathic scoliosis and pectus excavatum in mice. ***Human Molecular Genetics***. 2015; 24(15):4365-73. PMID: 25954032.
11. Buchan JG, Gray RS, Gansner JM, Alvarado DM, Burgert L, Gitlin JD, Gurnett CA, Goldsmith MI. Kinesin family member 6 (kif6) is necessary for spine development in zebrafish. ***Developmental Dynamics***. 2014; 243(12):1646-57. PMID: 25283277.
10. Chen Q, Zhang N, Gray RS, Li H, Ewald AJ, Zahnow CA, Pan D. A temporal requirement for Hippo signaling in mammary gland differentiation, growth, and tumorigenesis. ***Genes & Development***. 2014; 28(5):432-7. PMID:24589775.
9. Gray RS, Wilm TP, Smith J, Bagnat M, Dale RM, Topczewski J, Johnson SL, Solnica-Krezel L. Loss of col8a1a function during zebrafish embryogenesis results in congenital vertebral malformations. ***Developmental Biology***. 2014; 386(1):72-85. PMID: 24333517.
8. Nguyen-Ngoc KV, Cheung KJ, Brenot A, Shamir ER, Gray RS, Hines WC, Yaswen P, Werb Z, Ewald AJ. ECM microenvironment regulates collective migration and local dissemination in normal and malignant mammary epithelium. ***Proceedings of the National Academy of Sciences***. 2012; 109(39). PMID: 22923691.
7. Bhise NS, Gray RS, Sunshine JC, Htet S, Ewald AJ, Green JJ. The relationship between terminal functionalization and molecular weight of a gene delivery polymer and transfection efficacy in mammary epithelial 2-D cultures and 3-D organotypic cultures. ***Biomaterials***. 2010; 31(31):8088-96. PMID: 20674001.
6. Kim SK, Shindo A, Park TJ, Oh EC, Ghosh S, Gray RS, Lewis RA, Johnson CA, Attie-Bittach T, Katsanis N, Wallingford JB. Planar cell polarity acts through septins to control collective cell movement and ciliogenesis. ***Science***. 2010; 329(5997):1337-40. PMID:20671153.
5. Kieserman EK, Lee C, Gray RS, Park TJ, Wallingford JB. High-magnification in vivo imaging of Xenopus embryos for cell and developmental biology. ***Cold Spring Harbor Protocols***. 2010; 2010(5):pdb.prot5427. PMID: 20439414.
4. Gray RS, Abitua PB, Wlodarczyk BJ, Szabo-Rogers HL, Blanchard O, Lee I, Weiss GS, Liu KJ, Marcotte EM, Wallingford JB, Finnell RH. The planar cell polarity effector Fuz is essential for targeted membrane trafficking, ciliogenesis and mouse embryonic development. ***Nature Cell Biology***. 2009; 11(10):1225-32. PMID:19767740.
3. Gray RS, Bayly RD, Green SA, Agarwala S, Lowe CJ, Wallingford JB. Diversification of the expression patterns and developmental functions of the dishevelled gene family during chordate evolution. ***Developmental Dynamics***. 2009; 238(8):2044-57. PMID: 19618470.
2. Lee C, Kieserman E, Gray RS, Park TJ, Wallingford J. Whole-mount fluorescence immunocytochemistry on Xenopus embryos. ***CSH Protocols***. 2008. PMID: 21356778.

1. Park TJ, Gray RS, Sato A, Habas R, Wallingford JB. Subcellular localization and signaling properties of dishevelled in developing vertebrate embryos. ***Current Biology***. CB. 2005; 15(11):1039-44. PMID: 15936275.

REVIEWS

6. Bagnat M, Gray RS. Development of a straight vertebrate body axis. ***Development***. 2020 Oct 6;147(21):dev175794. doi: 10.1242/dev.175794. PMID: 33023886.
5. Konjikusic MJ, Gray RS, Wallingford JB. The developmental biology of kinesins. ***Dev Biol.*** 2020 Sep 19:S0012-1606(20)30257-8. doi: 10.1016/j.ydbio.2020.09.009. Online ahead of print. PMID: 32961118
4. Wise CA, Sepich D, Ushiki A, Khanshour AM, Kidane YH, Makki N, Gurnett CA, Gray RS, Rios JJ, Ahituv N, Solnica-Krezel L. The cartilage matrisome in adolescent idiopathic scoliosis. ***Bone Research***. 2020, 8:13. PMID: 32195011.
3. Busse B, Galloway JL, Gray RS, Harris MP, Kwon RY. Zebrafish: An emerging model for orthopaedic research. ***J Orthop Res.*** 2019 Nov 26. PMID:31773769
2. Gray RS, Roszko I, Solnica-Krezel L. Planar Cell Polarity: coordinating morphogenetic cell behaviors with embryonic polarity. ***Developmental Cell***. 2011 Jul 19;21(1):120-33.
1. Gray RS, Cheung KJ, Ewald AJ. Cellular Mechanisms Regulating Epithelial Morphogenesis and Cancer Invasion. ***Current Opinions in Cell Biology***. 2010 Oct;22(5):640-50. PMID: 20832275.

BOOK CHAPTERS

Liu Z., Gray RS (2018) Animal Models of Idiopathic Scoliosis. In: Kusumi K., Dunwoodie S. (eds) ***The Genetics and Development of Scoliosis***. Springer, Cham.

Complete List of Published Work in MyBibliography:
https://www.ncbi.nlm.nih.gov/myncbi/ryan.gray.1/bibliography/public/

Publications in review/ in preparation

- "Postembryonic screen for mutations affecting spine development in zebrafish." *Available at BioRxiv* (https://www.biorxiv.org/content/10.1101/2020.08.12.248716v1).
- "Genomic characterization of the adolescent idiopathic scoliosis associated transcriptome and regulome." *in review at Human Molecular Genetics*
- "Homeostatic Regulation of Cartilaginous and Connective Tissues Controls Spinal Alignment: A Model for Idiopathic Scoliosis." *In preparation.*
- "Rare coding variants in axonemal dynein heavy chain genes are associated with adolescent idiopathic scoliosis." *In preparation.*
- "Animal Modeling for Idiopathic Scoliosis Research: History and Considerations." *In preparation.*

INVITED PRESENTATIONS

2020, The Allied Genetics Conference 2020, "The Reissner Fiber is Highly Dynamic in vivo and Controls Morphogenesis of the Spine" Selected speaker (online meeting due to COVID).

2019, The Company of Biologists workshop on Understanding Human Birth Defects in the Genomic Age, West Sussex, UK, "*Mediators of spine stability using the zebrafish model system: from fibers to flow".*

2019, University of North Carolina Orthopedics Department Seminar, Chapel Hill, NC, *"The pathogenesis of idiopathic scoliosis: effectors of the intervertebral disc and endochondral ossification".*

2019, Duke University School of Medicine, Department of Orthopedics, Durham, NC, *"The pathogenesis of idiopathic scoliosis: effectors of the intervertebral disc and endochondral ossification".*

2019, Syracuse University Biology Department Seminar Series Fall 2019, "*Mediators of spine stability using the zebrafish model system: from fibers to flow".*

2019, University of Colorado Denver Orthopedics Mack Clayton Visiting Scientist Lecturer, "*The Pathogenesis of Idiopathic Scoliosis: Effectors of the Intervertebral Disc and Endochondral Ossification*".

2019, The 14th International Zebrafish Conference, Suzhou, China, "*Identification of genetic factors contributing to spine stability and ventricular homeostasis in zebrafish*".

2019, The Orthopedics Research Society 2019 Annual Meeting, Austin, TX, "Zebrafish as an Emerging Model for Orthopaedic Research Workshop: *Discovering the mediators of spine stability using the zebrafish model system*".

2019, The Orthopedics Research Society 2019 Annual Meeting, Austin, TX, "*PRMT5 Is a Novel Regulator for Spine Stability and Intervertebral Disc Homeostasis in Mouse*". Selected speaker.

2019, 8th Strategic Conference of Zebrafish Investigators – January 12-15, 2019 at the Asilomar Conference Grounds, Pacific Grove, Monterey, California, "*Identification of genetic factors contributing to spine stability and ventricular homeostasis in zebrafish*". Selected speaker.

2018, 9th Adhesion GPRC Workshop, Portland, OR, "*ADGRG6 is essential for homeostasis of the intervertebral disc in mouse*". Selected speaker.

2018, The International Consortium for Spinal Genetics Development and Disease Conference, Hong Kong University-Shenzen Hospital, Shenzen, China, "*Defining the Pathogenesis of Idiopathic Scoliosis: A case for cartilage*".

2018, Institute of Developmental Biology & Molecular Medicine, Fudan University, Shanghai, China, " "*Defining the Pathogenesis of Idiopathic Scoliosis: A case for cartilage and cilia*".

2018, 4th Annual MBS Retreat, Lady Bird Johnson Wildflower Center, Austin, TX, "*Defining the Pathogenesis of Idiopathic Scoliosis*".

2017, ORS PSRS 4th International Spine Research Symposium, Lake Harmony, PA, *"Conditional Loss of Gpr126 Causes Scoliosis and Disc Degeneration in Mouse"*. Selected speaker.

INVITED PRESENTATION cont.

2017, International Conference on Neural Tube Defects, Austin, TX, "*Conservation of Kinesin Family Member 6 (KIF6*) *Function in Structural Brain Development"*. Selected speaker.

2017, Institute for Cellular and Molecular Biology Annual Retreat, Horseshoe Bay, TX" *Gpr126 is required for homeostasis of the intervertebral disc and spine*". Selected speaker.

2017, Royal Microscopy Society, Tomography for Scientific Advancement, Austin, TX, "*Using Iodine-Contrasted μCT to Facilitate Imaging of Structural Brain Defects"*. Selected speaker.

2017, Southern Biosafety Association Spring Symposium, Tulane University, New Orleans, LA, "*Gene editing systems*".

2017, 11th Structural Birth Defects Meeting, Bethesda, MD, "Conservation of KIF6 function in brain development*"*.

2017, 1st inaugural joint meeting of the International Consortium for scoliosis genetics and the International Consortium for vertebral anomalies and scoliosis: Genomic Approaches to Understanding and Treatment of Scoliosis, Dallas, TX, "*Animal Models of Scoliosis*".

2017, New Frontiers in Pediatric Medicine: DPRI Seminar Series, Austin, TX, "*G-protein Coupled Receptor 126 Signaling for Spine Development and Disease*". Selected speaker.

2016, Symposium on Zebrafish Models of Spine Development and Scoliosis, Durham, NC, "*Forward genetic screen in zebrafish to identify spine mutants*".

2016, 43rd Annual Meeting Texas Genetics Society, Houston, TX, "*Understanding spine development and disease: Animal models of idiopathic scoliosis*".

2015,14th International Phillip Zorab Symposium, Edinburgh, UK, "*A forward genetic screen in zebrafish identifies multiple loci important for normal spine development*". Selected speaker.

2014, 7th Aquatic Animal Models of Human Disease Meeting, Bastrop, TX, "*Zebrafish models of Scoliosis*".

2013, British Scoliosis Research Foundation International Phillip Zorab Symposium, London, UK, "*The Druk insertional mutant zebrafish, a model for adolescent idiopathic scoliosis*". Selected speaker.

2013, British Scoliosis Research Foundation International Phillip Zorab Symposium, London, UK, "*Early loss of col8a1 function in zebrafish results in the dysmorphogenesis of vertebral bodies and scoliosis*". Selected speaker.

2012, Molecular Pathways in Organ Development & Disease, Cold Spring Harbor, NY, "*The Druk Insertional Mutant Zebrafish, a Model for Adolescent Idiopathic Scoliosis*". Selected speaker.

2010, Society of Developmental Biology Mid-Atlantic Meeting, Baltimore, MD, "*Dynamic regulation of cell motility and adhesion during mammary branching morphogenesis"*. Selected speaker.

POSTER PRESENTATIONS

2019, 78th Annual Society of Developmental Biology Meeting. Boston, MA. "Regulation of terminal hypertrophic chondrocyte differentiation in Prmt5 mutant mice modeling infantile idiopathic scoliosis".

2107, Inaugural Musculoskeletal Regenerative Medicine and Biology: From Development to Regeneration, St. Louis, MO, "*GPR126* is Required for Homeostasis of the Intervertebral Discs and Synovial Joints in Mouse".

2015, 14th International Phillip Zorab Symposium, Edinburgh, UK, "*Specific loss of Gpr126 in osteochondroprogenitor cells of the mouse models' adolescent idiopathic scoliosis and pectus excavatum*".

2013, Aquatic Animal Models for Human Disease and Midwest Zebrafish, Milwaukee, WI, "*Investigations of early and late onset scoliotic curvatures in zebrafish*".

POSTER PRESENTATIONS cont.

2011, Society of Developmental Biology 70th Annual Meeting, Chicago, IL, "*Investigations of early and late onset scoliotic curvatures in zebrafish*".

2009, Society of Developmental Biology, 68th Annual Meeting, San Francisco, CA, "*The PCP effector protein Fuzzy is essential for targeted membrane trafficking, ciliogenesis, and mouse embryonic development*."

2008, Society of Developmental Biology. Southwest-Gulf Regional Meeting, Houston,TX, "*Distinct expression patterns and developmental functions of Dishevelled in Xenopus.*"

2007, Society of Developmental Biology, 66th Annual Meeting/1st Pan American Cong Dev Biol, Cancun, Mexico, "*Distinct expression patterns and developmental functions of Dishevelled in Xenopus*."

2006, Society of Developmental Biology. 65th Annual Meeting Meeting, Ann Arbour, MI, "*Subcellular localization and signaling properties of Dishevelled during Xenopus development*."

2002, Yeast Genetics and Molecular Biology Meeting, Madison, WI, "*The affects of glucose concentration on Saccharomyces cerevisiae in ΔGcr1 and ΔGcr2 backgrounds*"

PRE- and POST-DOCTORAL TRAINEES

Zhaoyang Liu (postdoc, 2016-current)
Mia Konjikusic (UT-Austin, MBS graduate student, 2017-current)
Ben Troutwine (postdoc, 2017-current)
Yunjia Wang (UT-Austin, China Scholarship Council Fellow, 2019-2021).

UNDERGRADUATES MENTORED

Current: Melisa N. Bayrak, Neeha Bandlapalli, Vraj K. Shah, and Holden Archer.
Previous: Yang Xue, Siyu Xiao, Judy Trihn, Dallas Miller, Ankit Hanmandlu, Debra Lee, and Kundanika Lakkadi, Tarika Srinivasan, Roberto Gonzalez, Louis Mai, Valeria Aceves, and Neriah Rodriguez.

STUDENT DISSERTATION COMMITTEES

Tim Kuka - Eberhart lab - The University of Texas (2017).
Mia Konjikusic - Gray/Wallingford labs - The University of Texas (2018).
Janani Ramachandran - Vokes lab - The University of Texas (2018).

GRANT SUPPORT

Ongoing

- NIH/NIAMS, R01 AR072009-01, PI Gray, "Towards a Mechanistic Understanding of Adolescent Idiopathic Scoliosis." (Impact Score:14, Percentile:1) $1,721,500 (5-year budget).
- NIH/NIAMS, R01AR068292-05, PI Hadley-Miller, Sub-PI, Gray, "Familial idiopathic scoliosis: gene discovery and functional studies" $1,720,500

Pending

- NIH/NICHD, R01 AR072009-01, PI Gray, "Mechanisms of the Reissner fiber and spine morphogenesis." (Impact Score:30, Percentile:22). Pending Council Review
- NIH/NIAMS, R01AR079188, PI Vokes, MPI Gray, "PRMT5-dependent regulation of articular cartilage development and homeostasis.' Pending IRG Review

Completed

- UT Austin CNS Catalyst Grant Program, Vokes and Gray, "PRMT5-dependent Regulation of Articular Cartilage Homeostasis and Osteoarthritis." $50,000.