

## Erica M. Branham

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## EDUCATION & RESEARCH

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August 2020 – Present	<b>University of North Carolina at Chapel Hill</b>   Chapel Hill, NC <b>Dr. Sarah D. Linnstaedt Laboratory</b> Ph.D. Candidate in Genetics and Molecular Biology Research: “ <i>Stress-dependent mechanisms driving the transition from acute to chronic pain following traumatic stress exposure</i> ”
August 2016 – May 2020	<b>Texas A&amp;M University</b>   College Station, TX B.S. in Genetics, Minor in Anthropology GPA: 3.797  <b>Dr. Helene Andrews-Polymenis Laboratory</b> Undergraduate Research Assistant (Sept. 2019 – May 2020) Project: “ <i>The role of multicopy single-stranded DNA (msDNA) in <i>Salmonella enterica</i> pathogenesis during environmental stress conditions</i> ”  <b>Dr. Geoffrey Kapler Laboratory</b> Undergraduate Research Assistant (June 2019 – Sept. 2019) Project: “ <i>Ciliate cell cycle regulation by RNA-dependent RNA polymerases in <i>Tetrahymena thermophila</i></i> ”  <b>Dr. Dorothy Shippen Laboratory</b> Undergraduate Research Assistant (May 2017 – May 2019) Laboratory Technician (May 2017 – Jan 2019) Project: “ <i>Regulation of plant telomere maintenance by long non-coding RNA in <i>Arabidopsis thaliana</i></i> ”
August 2012 – May 2016	<b>A&amp;M Consolidated High School</b>   College Station, TX Diploma  <b>Dr. Michael Cristiciello Laboratory</b> High School Research Assistant (January 2016 – June 2016) Project: “ <i>Comparing immune responses following mucosal and systemic routes of immunization in <i>Danio rerio</i></i> ”

## FUNDING

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2024 – 2026	<b>F31 Predoctoral Fellowship</b>   NIAMS (1F31AR083833) “ <i>Stressful life events confer risk for chronic posttraumatic musculoskeletal pain through DNA methylation changes at the POMC promoter</i> ”
2023	<b>\$10,000 Research Award</b>   UNC Department of Anesthesiology
2021 – 2022	<b>T32 Training Grant</b>   NIGMS (1T32GM135128)

## PUBLICATIONS

### Published Articles

2025 McKibben LA, Iyer M, Zhao Y, Florea R, Kuhl-Chimera S, Deliwala I, Pan Y, **Branham EM**, Géranton SM, McLean SA, & Linnstaedt, SD. (2025). *Transcriptional changes across tissue and time provide molecular insights into a therapeutic window of opportunity following traumatic stress exposure*. *Translational psychiatry*, 15(1), 244. <https://doi.org/10.1038/s41398-025-03451-y>

2023 **Branham EM**, McLean SA, Deliwala I, Mauck MC, Zhao Y, McKibben LA, Lee A, Spencer AB, Zannas AS, Lechner M, Danza T, Velilla MA, Hendry PL, Pearson C, Peak DA, Jones J, Rathlev NK, & Linnstaedt SD. (2023). *CpG Methylation Levels in HPA Axis Genes Predict Chronic Pain Outcomes Following Trauma Exposure*. *The journal of pain*, 24(7), 1127–1141. <https://doi.org/10.1016/j.jpain.2023.03.001>

2021 Lee SR, Pollard DA, Galati DF, Kelly ML, Miller B, Mong C, Morris MN, Roberts-Nygren K, Kapler GM, Zinkgraf M, Dang HQ, **Branham E**, Sasser J, Tessier E, Yoshiyama C, Matsumoto M, & Turman G. (2021). *Disruption of a ~23-24 nucleotide small RNA pathway elevates DNA damage responses in Tetrahymena thermophila*. *Molecular biology of the cell*, 32(15), 1335–1346. <https://doi.org/10.1091/mbc.E20-10-0631>

2020 Bose S, Suescún AV, Song J, Castillo-González C, Aklilu BB, **Branham E**, Lynch R, & Shippen DE. (2020). *tRNA ADENOSINE DEAMINASE 3 is required for telomere maintenance in Arabidopsis thaliana*. *Plant cell reports*, 39(12), 1669–1685. <https://doi.org/10.1007/s00299-020-02594-0>

### Articles in Review

2025 **Branham EM**, Winfield B, McLean SA, Zannas AS, Mauck MC, Zhao Y, McKibben LA, Xu A, Arora R, House SL, Beaudoin FL, An X, Stevens JS, Neylan TC, Clifford GD, Rauch SL, Haran JP, Storror AB, Musey PI... & Linnstaedt SD. *Predictive EWAS of chronic posttraumatic pain development identifies sites of DNA methylation in axon guidance pathway genes with known links to neuropsychiatric disorders*. In review at *Molecular Psychiatry*, Aug. 2025.

2025 McKibben LA, Layne MN, Albertorio-Sáez LM, Zhao Y, **Branham EM**, House SL, Beaudoin FL, An X, Stevens JS, Neylan TC, Clifford GD, Germine LT, Bollen KA, Rauch SL, Haran JP, Storror AB, Lewandowski C, Musey PI Jr, Hendry PL, Sheikh S, Jones CW, Punches BE, Swor RA, Hudak LA, Pascual JL, Seamon MJ, Datner EM, Peak DA, Merchant RC, Domeier RM, Rathlev NK, O'Neil BJ, Sanchez LD, Bruce SE, Sheridan JF, Harte SE, Kessler RC, Koenen KC, Ressler KJ, McLean SA, Linnstaedt SD. *Peritraumatic C-reactive protein levels predict pain outcomes following traumatic stress exposure in a sex-dependent manner*. In review at *The Journal of Pain*, Aug. 2025.

### Articles in Preparation

2025 **Bell KI and Branham EM**, Layne MN, Bhatia S, Zhao Y, McKibben LA, House SL, Beaudoin FL, An X, Stevens JS, Neylan TC, Clifford GD, Germine LT, Bollen KA, Rauch SL, Haran JP, Storror AB, Lewandowski C, Musey PI Jr, Hendry PL, Sheikh S, Jones CW, Punches BE, Swor RA, Hudak LA, Pascual JL, Seamon MJ, Datner EM, Peak DA, Merchant RC, Domeier RM, Rathlev NK, O'Neil BJ, Sanchez LD, Bruce SE, Sheridan JF, Harte SE, Kessler RC, Koenen KC, Ressler KJ, McLean SA, Linnstaedt SD. *High levels of peritraumatic progesterone and 17 $\beta$ -estradiol are associated with lower chronic pain following traumatic stress exposure*. In preparation to be submitted to *The Journal of Pain*, Jan. 2026.

## Published Abstracts

		(presenter is marked with *)
2025		<b>Branham EM*</b> , Winfield B, McLean SA, Zhao Y, Mauck MC, Zannas AS, McKibben LA, Arora R, Xu A, Linnstaedt SD. Epigenome-wide association study identifies DNA methylation loci that predict chronic musculoskeletal pain outcomes after traumatic stress exposure. <i>Poster presentation</i> at the 2025 US Association for the Study of Pain Meeting, Chicago, IL, April 2025.
2025		McKibben LA, Layne MN*, McLean SA, Zhao Y, <b>Branham EM</b> , Linnstaedt SD. Peritraumatic CRP levels predict chronic pain development following traumatic stress exposure in a sex-dependent manner. <i>Poster presentation</i> at the 2025 US Association for the Study of Pain Meeting, Chicago, IL, April 2025.
2024		<b>Branham EM*</b> , Zannas AS, Zhao Y, Kosyk O, McLean SA, Linnstaedt SD. Stress-related methylation of <i>POMC</i> impacts chronic posttraumatic musculoskeletal pain development. <i>Poster presentation</i> at the 2024 International Association for the Study of Pain World Congress, Amsterdam, Netherlands.
2023		<b>Branham EM*</b> , Deliwala IH, Mauck MC, Zhao Y, Lee A, Zannas A, McKibben LA, Spencer AB, Cairns BA, Lechner M, Danza T, Kurz MC, Velilla MA, Hendry PL, Pearson C, Datner E, Peak DA, Jones J, Rathlev NK, Lewandowski C, McLean SA, Linnstaedt SD. DNA methylation levels in hypothalamic-pituitary-adrenal axis genes predict chronic pain outcomes following trauma exposure. <i>Poster presentation</i> at the 2023 Society for Biological Psychiatry Meeting. San Diego, CA. April 2023.
2022		<b>Branham EM*</b> , Deliwala IH, Mauck MC, Zhao Y, Lee A, Zannas A, McKibben LA, Spencer AB, Cairns BA, Lechner M, Danza T, Kurz MC, Velilla MA, Hendry PL, Pearson C, Datner E, Peak DA, Jones J, Rathlev NK, Lewandowski C, McLean SA, Linnstaedt SD. DNA methylation levels in hypothalamic-pituitary-adrenal axis genes predict chronic pain outcomes following trauma exposure. <i>Poster presentation</i> at the 2022 Conference of the US Association for the Study of Pain. Cincinnati, OH. May 2022.
2016		Young M, Li ES, <b>Branham E*</b> , Browne Z, Koufteros CA, Pham SE, Kim JC, Stebbins EA, Wenck FE, Zhang AL, Kommein S, Russo M, & Criscitiello MF. Investigating distinct immunization routes in zebrafish on mucosal immunity. <i>Poster presentation</i> at the 2016 American Association of Immunologists Meeting, Seattle, WA.

## RESEARCH PRESENTATIONS

### Oral Presentations

2025		<b>Maixner Pain Research Symposium</b>   Duke University, Durham, NC “ <i>The intricate link between stress and pain: mechanistic insights from DNA methylation of POMC</i> ”
2025		<b>Department of Genetics Scientific Retreat</b>   Chapel Hill, NC “ <i>Divergent effects of acute and chronic stress on the axon guidance pathway and its contributions to the development of chronic post traumatic pain</i> ”
2024		<b>AURORA Consortium Grand Rounds</b>   Chapel Hill, NC “ <i>Epigenome-wide association study of chronic pain development following traumatic stress exposure</i> ”
2023		<b>AURORA Consortium Grand Rounds</b>   Chapel Hill, NC “ <i>Epigenetic risk factors for chronic pain and PTSD following traumatic stress exposure</i> ”
2018		<b>Summer Undergraduate Research Symposium</b>   College Station, TX “ <i>Trafficking of long noncoding RNA TER2 in vivo</i> ”

## Poster Presentations

2025	<b>Department of Anesthesiology Celebration of Research</b>   Chapel Hill, NC “Exploring the influence of stress hormone exposure on axon morphology to gain insights into neuronal mechanisms driving chronic posttraumatic musculoskeletal pain development”
2025	<b>United States Association for the Study of Pain</b>   Chicago, IL “Epigenome-wide association study identifies DNA methylation loci that predict chronic musculoskeletal pain outcomes after traumatic stress exposure”
2024	<b>Duke University Maixner Pain Research Symposium</b>   Durham, NC “Epigenome-wide association study identifies DNA methylation loci that predict chronic musculoskeletal pain outcomes after traumatic stress exposure”
2024	<b>Department of Anesthesiology Celebration of Research</b>   Chapel Hill, NC “Epigenome-wide association study identifies DNA methylation loci that predict chronic musculoskeletal pain outcomes after traumatic stress exposure”
2024	<b>International Association for the Study of Pain</b>   Amsterdam, Netherlands “Stress-related methylation of POMC impacts chronic posttraumatic musculoskeletal pain development”
2024	<b>RNA Discovery Center Retreat</b>   Chapel Hill, NC “MicroRNA-19 Influences Posttraumatic Chronic Pain Development via Sex-Dependent Regulation of Sleep/Circadian Rhythm and Innate Immune Pathways: Results of a Preliminary Analysis in Humans and Animals”
2023	<b>Duke University Maixner Pain Research Symposium</b>   Durham, NC “Validation of posttraumatic chronic pain-associated POMC CpG methylation, and new insights into the effects of stress on POMC and DNMT3A activity”
2023	<b>Department of Anesthesiology Celebration of Research</b>   Chapel Hill, NC “Validation of posttraumatic chronic pain-associated POMC CpG methylation, and new insights into the effects of stress on POMC and DNMT3A activity”
2023	<b>NIH Helping End Addiction Long-Term (HEAL) Investigator Meeting</b>   Virtual “DNA methylation levels in hypothalamic-pituitary-adrenal axis genes predict chronic pain outcomes following trauma exposure.”
2023	<b>Society for Biological Psychiatry</b>   San Diego, CA “DNA methylation levels in hypothalamic-pituitary-adrenal axis genes predict chronic pain outcomes following trauma exposure.”
2022	<b>Andrew S. Rachlin UNC Neuroscience Symposium</b>   Chapel Hill, NC “DNA methylation levels in hypothalamic-pituitary-adrenal axis genes predict chronic pain outcomes following trauma exposure.”
2022	<b>United States Association for the Study of Pain</b>   Cincinnati, OH “DNA methylation levels in hypothalamic-pituitary-adrenal axis genes predict chronic pain outcomes following trauma exposure.”
2016	<b>American Association of Immunologists</b>   Seattle, WA “Investigating distinct immunization routes in zebrafish on mucosal immunity”

## HONORS & AWARDS

2025	<b>Innovators of Tomorrow Award for Pain Science</b>   Maixner Pain Symposium
2024	<b>F31 Predoctoral Fellowship</b>   NIAMS
2024	<b>G.F. Gebhart Young Investigator Award Finalist</b>   The Journal of Pain
2023	<b>\$10,000 Research Award</b>   UNC Department of Anesthesiology
2023	<b>Course Design Excellence Award</b>   TIBBS Summer Teaching Workshop Series
2021	<b>T32 Training Grant</b>   NIGMS, UNC Department of Genetics
2018	<b>Summer REU Program</b>   National Science Foundation, Texas A&M University
2017	<b>Joe and Billie Manion Scholarship</b>   Texas A&M University

## TEACHING & MENTORING

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### Instructional

2022

**Teaching Assistant** | UNC Chapel Hill

**BIOL 202: Molecular Biology & Genetics**

Led two sections of one hour-long recitations per week during which I taught approximately sixty students topics in genetics and molecular biology, including PCR, gel electrophoresis, mitosis and meiosis, and prokaryotic and eukaryotic gene regulation. In addition, I wrote and graded exam questions over recitation material.

### Research Mentorship

#### Post-baccalaureates

2024 – Present

2023 – Present

2023 – Present

#### Undergraduates

2024 – Present

2023 – 2024

2021 – 2023

2021-2023

2021

**Seka Shahriar, B.S.** | Research Assistant

**Kennedy Bell, B.S.** | Research Technician & Lab Manager

**Miranda Layne, B.S.** | Research Assistant

**Amanda Xu** | Student Researcher

**Meghana Venumbaka** | Student Researcher

**Rhea Arora** | Student Researcher

**Ishani Deliwala** | Student Researcher

**Aaron Lee** | Student Researcher

## SERVICE

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### Leadership

2022 – 2024

2023

### Outreach

2024

2022

2021 – 2022

2021 – 2022

2021 – 2022

2019

### Committees

2025

2024

2024

### Graphic Design

2024

2023

2023

2023

2023

2022

**Co-Chair** | UNC Future Science Educators (FuSE), Chapel Hill, NC

**Planning Committee Co-Chair** | TIBBS Summer Teaching Workshop Series

**UNC Science Expo** | Future Science Educators, Chapel Hill, NC

**Invited Scientist Presentation** | Salem Middle School, Apex, NC

**DNA Day Ambassador** | UNC Chapel Hill

West Cartet High School, Morehead City, NC

Gray's Creek High School, Hope Mills, NC

**First Year Group Mentor** | UNC Biological & Biomedical Sciences Program (BBSP)

**Recruitment Host** | UNC Biological & Biomedical Sciences Program (BBSP)

**Science Night Demonstration** | Texas A&M University

Pebble Creek Elementary School, College Station, Texas

**Student Speaker Selection Committee** | UNC Department of Genetics Retreat

**Student Representative** | UNC Genetics Faculty-Invited Speaker Committee

**Student Speaker Selection Committee** | UNC Department of Genetics Retreat

**Custom Logo Design** | UNC Department of Genetics Scientific Retreat

**Custom Logo Design** | UNC Department of Genetics Scientific Retreat

**Website Design** | Linnstaedt Laboratory

**Logo Redesign** | UNC Curriculum in Genetics & Molecular Biology

**Logo Redesign** | UNC Curriculum in Bioinformatics & Computational Biology

**Custom Logo Design** | UNC Future Science Educators (FuSE)

## PROFESSIONAL DEVELOPMENT

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2023

**Certificate of Completion** | TIBBS Summer Teaching Workshop Series

2023

**Certificate of Completion** | How to Learn to Code R Training Series