Research Statement

Why do some children exposed to early life stress develop problem behavior while others do not? What are the mechanisms by which early life stress exposure increases risk for psychopathology? I have a passion for pursuing research designed to support the social and emotional development among young children from underserved populations: those raised in poverty, exposed to maternal psychopathology, and children with prenatal substance exposure. My research is grounded in developmental psychopathology, biological sensitivity to context, and prenatal programming theories. I examine the interplay between prenatal stress, epigenetic processes, and infant social and emotional development. Ultimately, the goal of these efforts is to guide targeted interventions that may prevent the development of problem behavior in early childhood.

My graduate work focused on studying the development of emotion regulation and dysregulation among infants of mothers living in poverty. I measured emotion regulation at multiple levels of analysis, spanning physiological and behavioral domains and found that a specific physiological marker was related to increased problem behavior in early childhood, but only among infants who were raised in disorganized, chaotic environments (Conradt, Measelle, & Ablow, 2013). This finding led to a desire to examine the mechanisms that drive the development of the physiological response to stress. It is important that we identify these mechanisms, as they may be key to uncovering how both adaptive and maladaptive responses to stress may form. One likely candidate is epigenetic in nature. A better understanding of molecular-level mechanisms that are involved in the development of problematic behavior trajectories could enable us to demonstrate that these disorders could be prevented with behavioral interventions that target epigenetic processes.

As a post-doctoral fellow I found that prenatal exposure to maternal depression was related to impaired newborn neurobehavior, in part via epigenetic processes (Conradt et al., 2013). While our initial epigenetic results are exciting, they leave open a number of avenues for future research; principally, whether similar prenatal programming processes may explain the development of child problem behavior in addition to impaired newborn neurobehavior. I have begun to answer this question by recruiting a sample of women who present with varying degrees of emotion dysregulation, a transdiagnostic marker that may encompass internalizing disorders such as depression as well as externalizing behavior. This study is funded in part by my K08 award and two intramural research grants (see CV). I am also Co-I on an R21 with Sheila Crowell as PI to develop a novel epigenetic assay that will target epigenetic marks with known links to the primary stress response system thought to be implicated in prenatal programing, the HPA axis. This study will form the basis for an R01 proposal that Dr. Crowell, Dr. Raby and I plan on submitting in February, 2018 that will allow us to expand sample size and study additional biological markers of risk for psychopathology. I have written a single-author theoretical paper outlining the significance of this research in Child Development Perspectives. Along with Sheila Crowell, Daniel Adkins (Sociology), Catherine Monk (Columbia University), and Mike Kobor (University of British Columbia), I have written a second paper arguing for the significance of our epigenetic research. This research is
important because we may be able to identify novel therapeutic targets designed to reduce the impact of fetal exposure to maternal stress.

I am managing, along with my graduate student Brendan Ostlund, a sub-project from the sample described above that is designed to capture how pre and postnatal exposure to maternal emotion dysregulation may be associated with a neurophysiological signature infancy that is predictive of later problem behavior in children. I am collaborating with Drs. Trafton Drew and Martha Ann Bell to conduct eye tracking and EEG studies designed to assess whether exposure to maternal emotion dysregulation is related to activation of fear circuitry networks in infants. A related project using a different sample of mothers with anxiety during pregnancy is currently being conducted by my graduate student. These data form the basis of his dissertation and his F31 NRSA proposal, which was resubmitted in June, 2017 with Dr. Drew and Dr. Crowell as co-mentors.

I am also collaborating with Tom Miller and Martin Tristani- Firozzi in the department of Pediatric Cardiology to examine newborn neurobehavioral predictors of cognitive and behavioral outcomes among children with congenital heart disease. Currently pediatric cardiologists have poor indicators of which subgroups of children are at highest risk for behavioral and cognitive problems later in life. I am on a center grant (PI Tristani-Firozzi) to investigate both the genetic and neurobehavioral predictors of clinical course and cognitive-behavioral outcome, and I am on a co-author on an empirical paper which recently received a revise and resubmit. We found that infants with congenital heart disease exhibit a profile of neurobehavior that is particularly concerning given it’s association in independent samples with more problem behavior, lower IQ, and decreased school readiness.

I have a number of sub-projects which expand on my research program to uncover the epigenetic mechanisms linking early life stress exposure with poor physical and mental health outcomes. First, I am investigating how discrimination and acculturation may biologically embed to lead to risk for poor gestational health outcomes in Latinas and non-Hispanic Whites. In order to secure funding for this epigenetic research in November, 2017 I submitted an R01 proposal as MPI with Daniel Adkins and Sheila Crowell (Co-I) along with Dennis Wei in Geography (Co-I) to uncover the epigenetic basis driving health disparities in preterm birth outcomes between Latinas and non-Hispanic Whites. Second, I am continuing my research program on prenatal substance exposure that was initiated when I was a post-doctoral student. I, along with Dr. Crowell and Dr. Marcela Smid (OB/GYN) recently submitted an IRB to collect pilot data on newborns exposed to opioids prenatally. Our goal is to collect pilot data for a later R01 proposal.