**RESEARCH STATEMENT**

As a researcher, I study how quantitative tools can help us understand real-world problems. I believe that fields like mathematical and cognitive psychology have developed many incredible tools, but until we apply these techniques to real problems, the tools are being underutilized. This leads me to ask: How could quantitative techniques be applied to the medical field to help patients? How could precise tools that can represent underlying cognitive processes impact our understanding of how the brain changes during illness?

During my undergraduate and master’s degrees, I was trained in parameter estimation and response time modeling. My master’s thesis evaluated the efficacy of a traditional estimation technique in model fitting through data simulation, to determine the strengths and limitations of the approach many researchers utilize. This process taught me the power of tools like response time modeling, and how much more information we can gain when we step away from only relying on averages to represent data. During my dissertation, I have had the opportunity to begin applying these tools to cognition in the cancer population. Many cancer patients experience cancer-related cognitive decline (CRCD), but despite the millions of people experiencing this impairment, many facets of CRCD have remained ambiguous. For one potent example, within the last 20 years, we have learned that CRCD is not necessarily caused by chemotherapy (despite its moniker ‘chemo-brain’). The cancer research field has chased inflammation as a possible cause but has run into many challenges, largely due to difficulties in measuring CRCD, as results have been varied, with quantitative and qualitative measures regularly lacking correlation. I believe that techniques like response time modeling can be part of the solution to our difficulty in capturing CRCD changes in quantitative measures. Thus, in my dissertation, I am applying response time modeling to neurocognitive tasks to evaluate attention, executive control, and working memory across a six-month intervention with cancer survivors. Additionally, I am assessing how inflammation relates to changes in the underlying cognitive processes, to determine if response time modeling can help us understand what may be causing CRCD. Despite the mountain of evidence that modeling can better represent data and provide meaningful parameters, these techniques have never been utilized in cancer research. My research is the first to implement accumulator models in cancer populations, and will hopefully be the first step in bridging one of the gaps between psychology tools and health science research.

Throughout my doctoral program, I have been able to speak on this alternative approach to measuring CRCD multiple times, leading to many planned projects. The organizations I plan to collaborate with over the next five years include the Mays Cancer Center—UT Health, the Netherlands Cancer Institute, and the HIV Manhattan Brain Bank. By leaning into collaborative projects, I hope to expand the use of techniques like response time modeling in health science studies, to help as many survivors as possible. Due to my mathematical psychology background, my connections in the health field, and first-hand experience with CRCD, I have been uniquely equipped to tackle CRCD, and I am determined to make the most of that combination. Whether it be tenacity or audacity, I refuse to settle for anything less than improving the lives of cancer patients on a global scale.

Throughout my career, I will determine the best way to combine cognitive and mathematical psychology techniques and inflammatory biomarker analysis in the health sciences. Wake Forest University would be the ideal location for me to build this research program. Firstly, the focus that the Department of Psychology places on measurement would translate into students who would be successful in my applied assessments laboratory. Secondly, my research is complementary to the department’s themes, so I would be able to contribute back to the department while learning from my peers in a synergetic environment. Thirdly, the Wake Forest School of Medicine would provide an avenue for cross-department collaborations, where psychology assessment techniques can be introduced to entrant healthcare providers. Finally, the multitude of Novant Health Cancer Institute facilities in the surrounding area would accommodate access to cancer survivors, while allowing me to give back to the community.