

Statement of Purpose

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Data. A very simple term for the big chunk out there, waiting to be explored and modified in a creative yet useful way. This statistical analysis of the world started fascinating me while I was still pursuing my Master's in Applied Physics and made me want to explore more of this "magical" land of artificial intelligence (AI). Thus, I decided to switch my major from studies related to unraveling the mysteries of the universe to unraveling the subjective understanding of the human brain. How can the translation of scientific breakthroughs into practical applications be facilitated within the broader scientific community? With the availability of enormous data from different sectors, what strategies can be employed to assist disciplines beyond computer science and leverage its value? With the motivation to find solutions to such questions, I want to pursue a PhD in computer science.

The intersection of AI-based scientific research and its technological implementations, especially in healthcare, medicine, and cognitive processes (bridging brains and computers), appeals to me the most, and I look forward to exploring this domain and helping improve the health outcomes of human life. My main research interests are machine learning (ML) and its applications in healthcare to improve the digital detection of neurodevelopmental disorders through crowdsourced-powered AI.

In the past, I got the opportunity to work with Dr. Peter Washington to explore the fields of digital phenotyping and human-computer interaction (HCI), which I am continuing further through different projects. Digital phenotyping involves analyzing the digital footprint of a user and its interaction with various devices to study the human phenotype, which has the potential to improve diagnostic processes and refine personalized healthcare in general. However given the complex nature of healthcare data, the ML models often tend to overfit, resulting in decreased accuracy and reliability. Additionally, it can be subjected to the risk of bias and misuse, occasionally putting certain communities at risk. Crowdsourcing-based models have the potential to identify nuanced patterns that a model might miss, and involving human-annotated labels may improve the explainability and performance of the ML models. Such human-in-the-loop tasks also allow for the integration of communities in the development process, improving the ethics of the research while also improving data quality. During my PhD, I aim to work on human-in-the-loop based ML for neurodevelopmental disorders while also looking into ways to improve the ethics of such research.

I believe that teaching is an integral part of the research process, and during my time as a teaching assistant (TA), I have learned and improved a lot, both professionally and personally.

Being a TA has not only helped me work on the technical skills indirectly related to my research work but has also allowed me to improve my presentation skills. As a PhD student it is important to have good public speaking skills to defend our thesis or present our research findings at conferences. Given all of my previous experiences, I believe that pursuing a PhD will provide me the opportunity to further integrate the advancement of knowledge in my field through rigorous research and the possibility of mentoring other students.

The University of Hawai'i at Manoa allows interdisciplinary research by providing different collaboration opportunities, and I hope to make an impact in the scientific community through my work by working with other researchers. I want to gain hands-on experience with different data modalities and their applications in various fields. After my PhD, I plan to pursue a career in industry, where the specialized knowledge and problem-solving skills I will learn here will contribute to creating a positive impact on real-world problems.

My master's degree in Applied Physics has also provided me with a strong foundation in analytical, computational, and problem-solving skills that are directly applicable to the field of computer science. Through my master's program, I gained extensive experience in data analysis and statistical modeling, which are essential components of both high-energy physics research and computer science. With different research groups working towards the same goal of understanding embodied AI, I look forward to all the challenges, opportunities, and collaborations as a PhD student at UH Manoa.