Sana Tabbassum is President of the Medical Physics Journal Club and works in Prof Linda Nie's lab for her Ph.D. study. Her research focuses on two aspects: first, instrumentation development, and second, its application in the multidisciplinary fields including but not limited to: medical physics, health physics, occupational health, nutritional studies, and public health. She designed and developed a customized in-vivo neutron activation analysis system based on her lab's neutron generator. This is a compact and economical system to quantify metals and trace elements non-invasively in human tissues and small animals in vivo. The trace elements Sana is interested are sodium (Na) and potassium (K).

Alone in the United States, almost half of adults (108 million, or 45%) have hypertension, a primary risk factor for heart attack and stroke. In the past few decades, low sodium and high potassium diets like DASH [Dietary Approaches to Stop Hypertension] have gained popularity, as literature profoundly supports a positive relationship between decreased sodium/ increased potassium and lower blood pressure. In her recent research project, she has been utilizing the neutron generator based NAA system to determine the total body potassium in small animals, sodium and potassium kinetics in a swine model and humans, and associated health outcomes. This valuable research can help to provide insights into the sodium and potassium storage and retention in the human body that were not possible before.

Moreover, she utilized the system for toxicology studies regarding manganese exposure, a neurotoxin. Comparing with traditional methods, the neutron activation analysis system takes advantage of either total body manganese deposition (in the case of small animals) or manganese storage in bones (MnBn- for humans). This study has helped to establish novel biomarkers for determining toxic metals, i.e. manganese.