In the world of microscopy, there is a big problem when it comes to seeing through certain materials. Tissues inside our bodies, or structures like frosted surfaces or fog make it difficult to see clearly through them. The pictures end up blurry and messed up, and we cannot even tell what is hiding behind them.

We are investigating this issue and aim to find a way to improve the microscopy techniques in these tricky situations. It is not easy because the light gets scattered inside these structures, making everything look fuzzy. Additionally, living tissues changes over time, which makes the task even more difficult. Our research aims to develop a platform that will allow us to observe structures behind changing living tissues.

Additionally, we want to use these scattering materials for something amazing, quantum computation. We are capable to perform advanced calculations using the smallest portions of light called photons. By specifically preparing photons and injecting them inside scattering material, we can do calculations that were impossible before. It is like having a supercomputer that can solve problems in a whole new way. To make all this possible, we are using special detectors that can sense photons. They are called Single-Photon Avalanche Diode (SPAD) arrays, and they are very fast and sensitive.

Our goal is to create a specific system that can capture the dim light coming from objects hidden inside changing tissues and reconstruct the image. This project aims finding new ways to see through fog, tissues, and other challenging materials.

Additionally, we want using the power of light to do amazing quantum calculations. If we succeed, it could lead to big advancements in how we process information and solve problems, which no one never solved.