The next generation of quantum technologies relies heavily on quantum entanglement as a foundational resource. However, the inherent fragility of highly entangled quantum states poses significant challenges in realizing efficient quantum devices. Addressing this issue requires innovative approaches. One promising avenue is through topological quantum systems, which are distinguished by their protected patterns of long range entanglement. Topological quantum systems have already demonstrated their efficacy in quantum devices dedicated to metrology. For instance, the practical standard for electrical resistance is based on quantum Hall systems. Moreover, proposals for quantum devices for computation, sensing, and communication based on topological systems are at the forefront.

In this context, my research aims to employ topological systems for the next generation of quantum technologies, and to develop practical applications for those technologies.