

## **CHMI-24-07: Modeling and Real-Time Health Monitoring of Composite and Multi-Material Structural Joints**

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This project aims to prevent potential catastrophic failure and improve the safety and reliability of large multi-material structural joints that are critical across industry, such as wind energy, aerospace and automotive. The CHMI team is developing advanced analytical and numerical models as well as real-time wireless health monitoring systems that uses radio-frequency (RF) technology to track joint integrity under operation loading and environmental conditions. This system will help detect early signs of joint degradation, such as bolt loosening and uneven load distribution, which can lead to structural failure. The project combines simulation, sensor technology, and real-world testing to create a scalable solution for wireless health monitoring of critical infrastructure.