

Diabetic foot ulcers are a severe complication caused by peripheral neuropathy and sustained plantar pressure. Current prevention strategies, such as static orthotics, fail to provide real-time adjustments during gait cycle and over long durations of time. This project introduces Orthon, a dynamic orthotic insole designed to continuously monitor plantar pressure and actively reduce localized pressure and high-risk regions of the foot. The Orthon system features a custom insole housing an embedded control architecture system. This system interacts with the pressure sensing layer to detect ulcers and actuate the offloading modules to change the plantar pressure distribution. Changing such pressure distribution aims to prevent ulcer conditions from further deteriorating and grant opportunity to heal. Preliminary results show peak plantar pressure reduction between 30% to 50% in real-time. Future work will include transition to a compact, fully wearable device and conducting trials with diabetes and post-surgical cohorts.