



## Smart Shoes For Diabetic Foot Ulcer Prevention and Rehabilitation

UTA (12-24)

### Technology Need:

Billions of dollars direct cost for the treatment to diabetes and its complications was spent in the United States every year. At least 33% of the cost was for foot ulcers. Therapeutic shoes and insoles are used by foot-care practitioners to reduce the pressure by redistributing the forces on the foot. Shear forces were found to be a significant factor for foot ulceration. However, current study to effect of shear forces on ulceration fail to address the plantar shear force accurately and conveniently due to lack of instruments.

### Solution/ Offering:

Researchers at UTA have developed smart shoes which allow users to manage diabetic foot ulcer prevention and rehabilitation. Pressure and shear stress sensors are embedded in the prosthetics liner materials in a configuration enables detection and monitoring of the magnitude and direction of shear stress, as well as skin breakdown and crack propagation. The smart shoes consist of hundreds of sensors per shoe, simultaneously acquiring thousands of data points which give highly accurate and reliable result. Hence, the wireless data communication makes smart shoes completely untethered and wearable.



### Value Proposition:

- ✓ Accurate and convenient measurement
- ✓ Wireless data transmission
- ✓ Lower manufacturing cost per unit

### Industrial application:

- ✓ Healthcare: Diabetic foot ulcer prevention and rehabilitation

### Patent Status:

- ✓ Patent Pending:  
[US20140230563 A1](#)

### Current Stage:

- ✓ Prototyped and Tested



### Meet the Inventor



Dr. Haiying Huang received her Ph.D. in Aerospace Engineering from Georgia Institute of Technology in 1998. She currently is a professor in Mechanical and Aerospace Engineering Department at UTA. Her research expertise is smart devices and systems for health monitoring of structures and human.

### Contacts:

Sharon Ngwenya  
701 S Nedderman St, Suite 333  
Arlington, TX 76019  
P 817.272.1130  
F 817.272.5808  
[sngwenya@uta.edu](mailto:sngwenya@uta.edu)  
[otm@uta.edu](mailto:otm@uta.edu)