FootSTEPS
Gait Analysis System

FootSTEPS is a normal force pressure and shear stress sensor system used for gait analysis of the human foot. The FootSTEPS platform, combined with a force plate, provides the "best of both gait analysis worlds" … high resolution pressure and shear data under the entire foot and ground reaction force measurements that gait researchers know and trust.

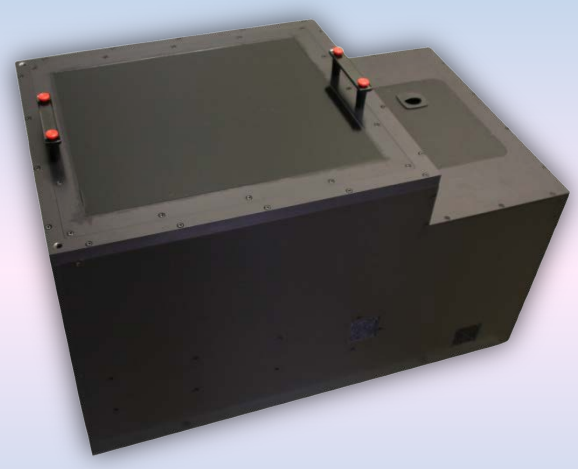
A high-resolution camera images ISSI's Surface Stress Sensitive Film (S3F) layer, polymerized on a glass window, as participants walk across the FootSTEPS platform.

The S3F layer contains a probe material that enables changes in film thickness, produced primarily by pressure, to be visualized as changes in illumination level. The mathematical ratio of loaded and unloaded images quantifies the vertical displacement of the film.

A series of markers are applied to the film below the opaque upper layer. These markers are displaced laterally during foot contact, primarily by shear forces. Cross-correlation analysis quantifies the displacements produced by shear.

The force plate, mounted underneath the FootSTEPS platform, simultaneously measures three forces and three moments about the x, y, and z axes. Synchronized data collection is initiated by a trigger pulse from the force plate on initial foot contact.

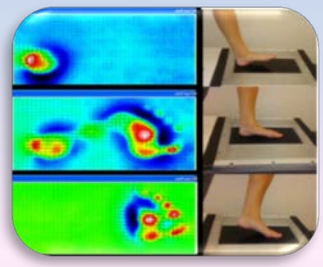
3-D displacement maps provide rapid visualization of the pressure and shear patterns produced by foot contact. Reconstruction of the pressure and shear force values is provided by offline analysis using a finite element model of the S3F with the measured displacements as inputs.

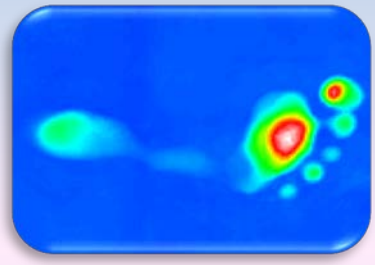


Why FootSTEPS?

High-resolution visualization of plantar interactions with the ground will help to evaluate pressure and shear data at specific plantar locations during gait. The information gained from studies using FootSTEPS for diabetic patients may help to predict skin breakdown and ulcer formation. Custom orthotics can be designed specifically for each patient to mitigate development of ulceration or tissue breakdown in the foot.

Power	110-120 VAC, 50-60 Hz
Interface	USB 3.0, USB 2.0
Linear Pressure Range	15-700 kPa. Unsaturated response over 2,000 kPa.
Linear Shear Range	3 to ±100 kPa. Also not the saturation point.
Accuracy	±5% of full scale for both pressure and shear
Data Capture Rate	50 fps
Spatial Resolution	2 mm
Crosstalk	Less than 3% between pressure and shear
Active Measurement Area	32 cm x 43 cm (12.6 in x 17 in)
Data Streams	Synchronized using force plate SYNC signal
Size	91.4 cm (L) by 53.3 cm (W) by 54.9 cm (H) (36 in by 21 in by 21.6 in) not including force plate.
Weight	138 kg (305 lb)
ECCN	EAR99





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