

## Instrumented Sock: A Dynamic Shoe Fit Assessment Tool

**Company:** Deckers Outdoor Corporation (Parent company of HOKA, UGG, Teva, and AHNU)

**Location:** Goleta, California

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### Background:

When choosing a shoe, fit is among the most important attribute that is considered by wearers. Not only will that improve the comfort of the shoes, a good fitting shoe can improve performance, and potentially reduce the risk of injuries. During the research and development process, footwear manufacturers focus heavily on engineering well-fitting shoes. Shoe styles, materials, constructions, manufacturing locations, and more change season to season and year to year, so quality of shoe fit is continuously being assessed evaluated in the various stages of footwear development from prototyping to production.

The most typical method of assessing fit is to collect feedback from testers who try-on shoes and give feedback on the fit of the shoe including overall length, overall width, toe height, heel fit, and many others. This process can be time consuming and subjective. Using an objective measure of the shape and fit of a shoe would be useful in accelerating the development process and could improve the overall fit.

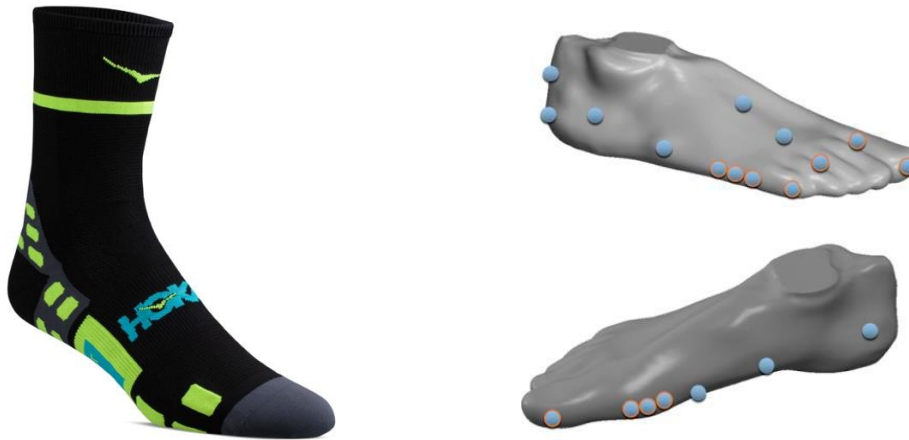


There are systems available that dimensionally compare the internal shape of a shoe with foot shapes. These comparisons are more objective but compare the dimensions statically. A dynamic assessment of fit is preferable, as during movement, foot shape change, and materials stretch and deform in different ways. There are sensors available to measure contact pressures between the foot and shoe. These sensors are typically thin film pressure sensors, and have some limitations in the process, including repeatably locating sensors, and the sensor itself affecting the fit of the shoe.

A 2024-25 UCSB Capstone Project was completed on this topic, which covered many aspects of this development, including sensor selection, data management, sensor integration, and more.

### **Objective:**

The objective of this project to continue to develop and Instrumented Sock: a sensor-based system to objectively and dynamically quantify the fit of a shoe.



The system should be repeatable and work across a broad range of feet and shoes. The system should be able to make dynamic measurements of the shoe-foot interface during wear, particularly at several important locations. The system should provide feedback on pressures during use, and be repeatable, accurate, and durable. It can be used in a laboratory setting.

### **About Deckers Brands**

Deckers Brands is a global leader in designing, marketing and distributing innovative footwear, apparel and accessories developed for both everyday casual lifestyle use and high performance activities. The Company's portfolio of brands includes UGG®, KOOLABURRA®, HOKA®, Teva®, and AHNU®. Deckers Brands products are sold in more than 50 countries and territories through select department and specialty stores, Company-owned and operated retail stores, and select online stores, including Company-owned websites. Deckers Brands has over 50-years of history building niche footwear brands into lifestyle market leaders attracting millions of loyal consumers globally.