Engineering a Composite Ballet Pointe Shoe Shank

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Traditional ballet pointe shoes are made out of materials including leather, paper, fabric, burlap, and cardboard bound with adhesive. Unfortunately, all of these materials break down over a short amount of time with sweat and heat given off by the feet. Most professional dancers only use a pair of pointe shoes for one show. This disposability becomes an incredible expense and inconvenience for the dancer who must keep buying and breaking in pointe shoes every day. In this engineering design project a pointe shoe shank was made by utilizing carbon fiber and epoxy resin. Multiple shanks of varying thicknesses were made. The shanks were able to withstand both dancing and failure tests. This project was able to create comparable shanks that gave the same feel as a traditional pointe shoe but never broke down or loosened. They held their shape and feel in both the ballet class and performance setting. The engineered shoe is continuing to be tested but has consistently performed in over three months of daily ballet class and rehearsal. By changing traditional pointe shoe shanks from cardboard and leather to carbon fiber the dancer experienced extended shoe life with comparable appearance as well as improved balance and minimized risk of injury to the foot.

Awards Won:

Arconic Foundation: Material Science or Engineering, Third Award of $1,000