

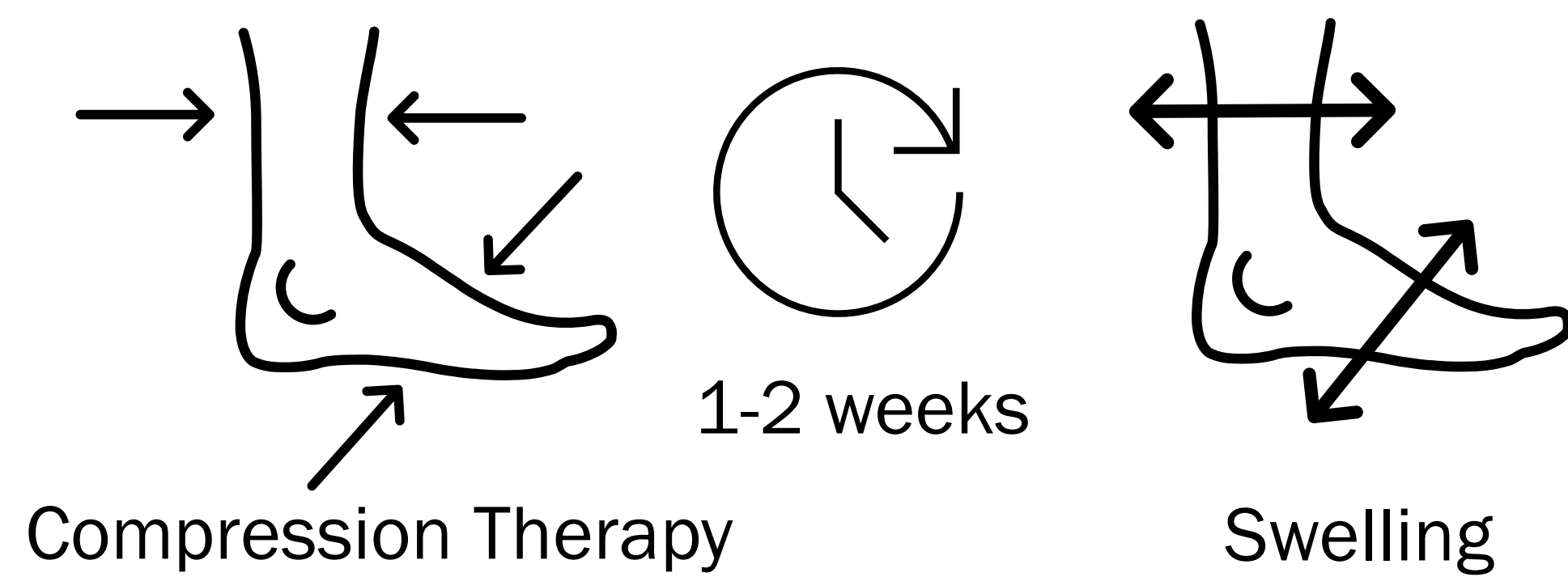
One Step at a Time: Addressing Severe Lymphedema through a Novel Shoe Design

Carl R. Russell III, Anjolie M. Ramakrishna, Christopher H. Johns, Alana V. van Wijnen, Adaugo D. Ufomba

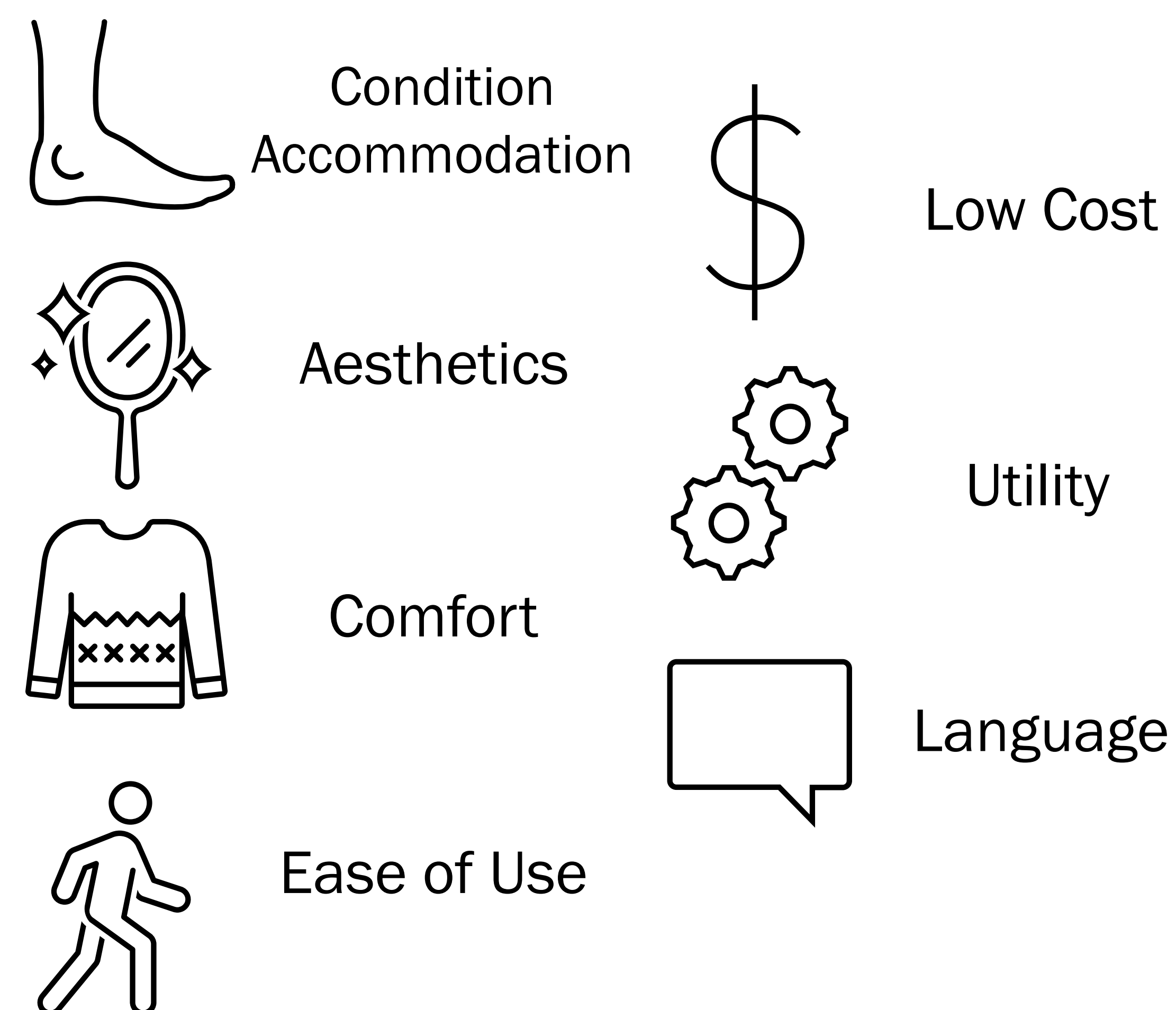
Objective

To design and develop a patient specific shoe to address severe lymphedema

Lymphedema Treatment



User Needs



Acknowledgments

We would like to acknowledge Asem Aboelzahab and Aparna Karnik for their mentorship and guidance

Project Partner



H.R. suffers from severe lymphedema, a condition that causes severe swelling of the arms and legs.

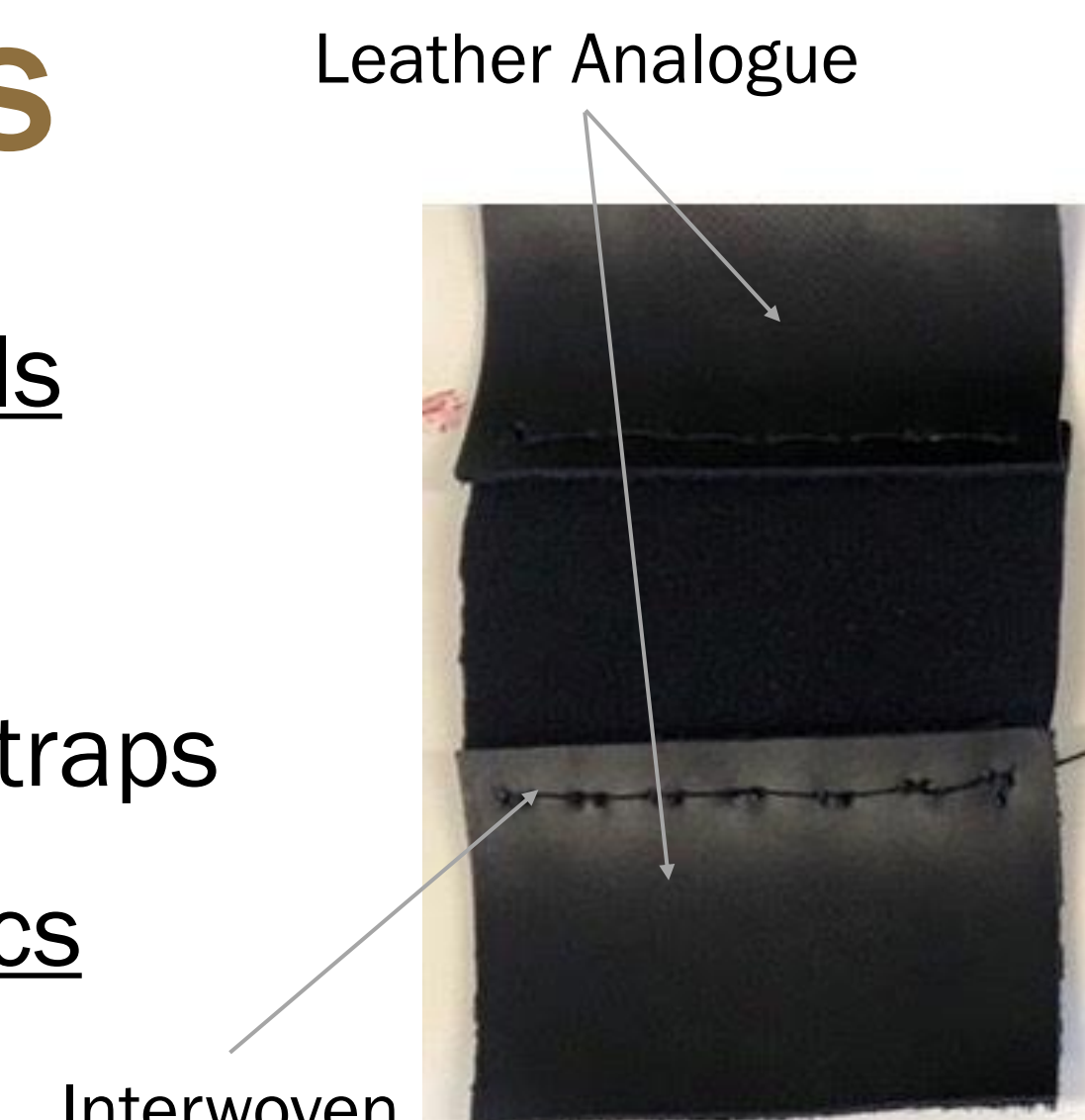


Materials

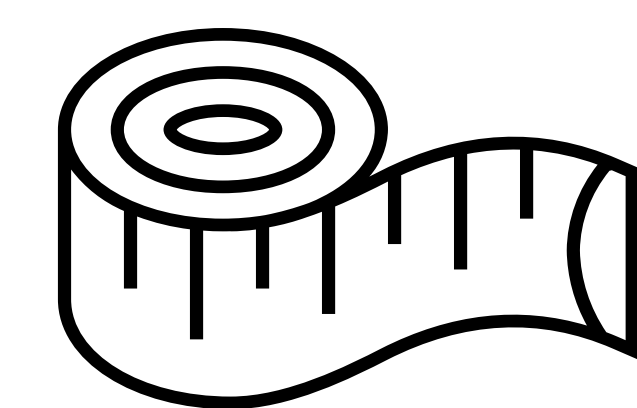


3D Printed PLA Guides for Testing Samples

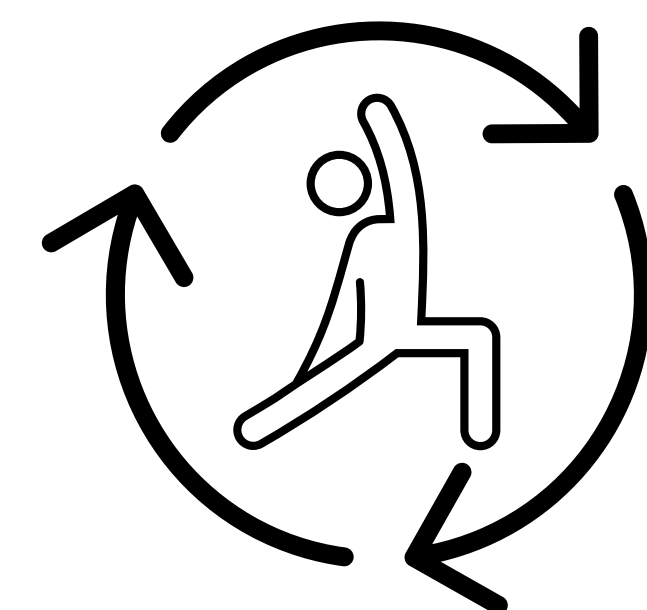
- Added Materials
- Spandex
 - PLA
 - Polyester Elastic Straps
- Candidate Elastics
- Neoprene
 - Spandex
 - Lycra



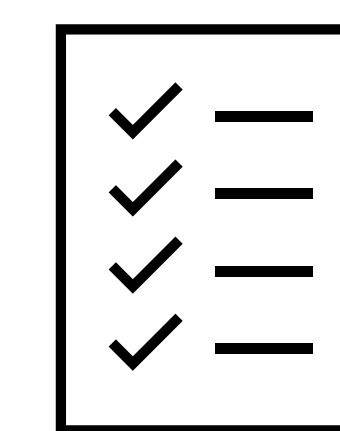
Testing



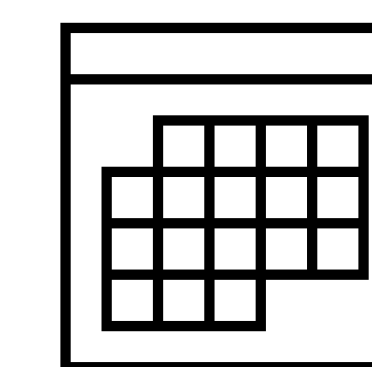
Repeatable Measurement



10 Cycle Tensile Testing per ASTM E328-21

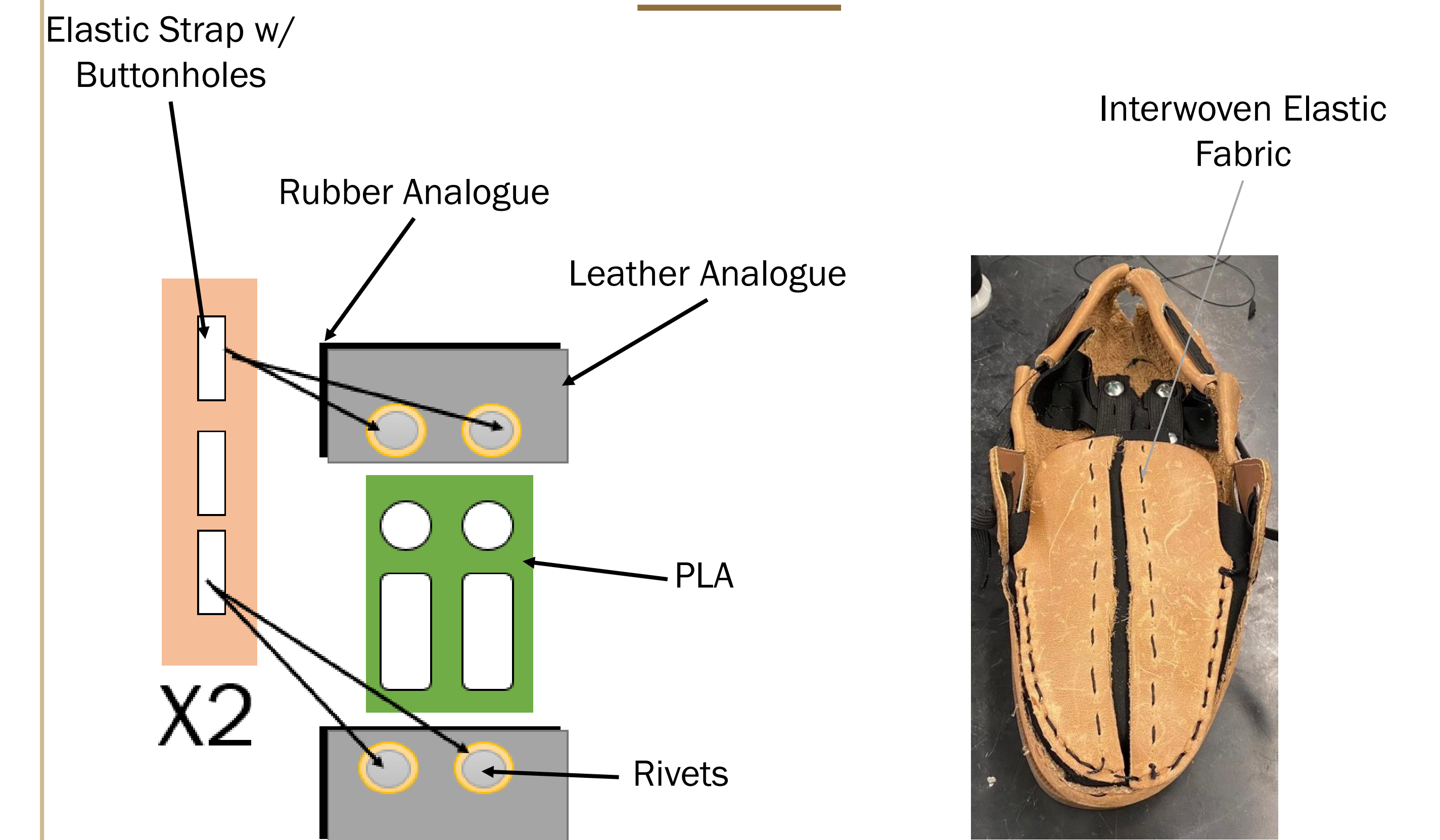


User Testing & Verification



Longitudinal Validation Testing

Current Design



Expansion System Sample Design

Expandable Toe Configuration

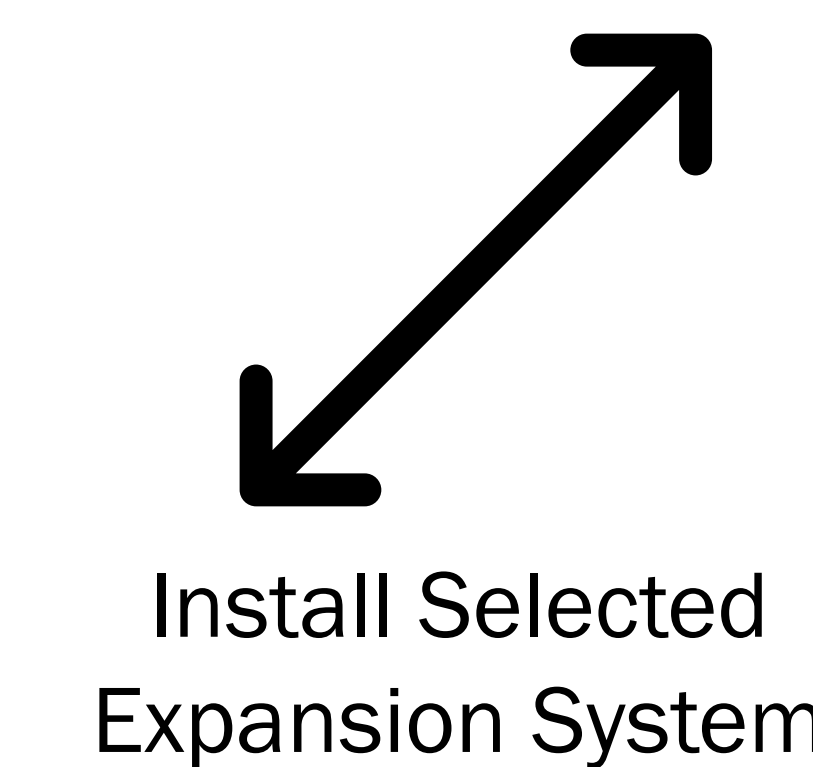


Expandable Fabric

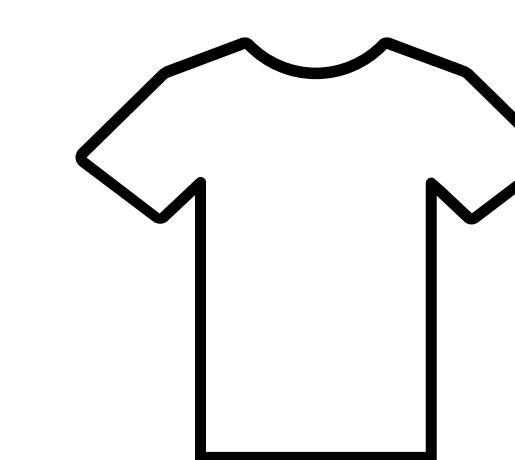
Break Sole

Modified On-the-Market Shoe

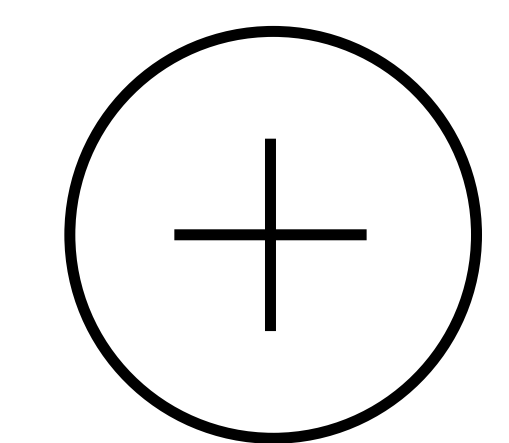
Future Directions



Install Selected Expansion System



Integrate Spandex



Iterate and Evaluate Future Prototypes