

- **Seminar Presentation**
- **3D Scanning for Footwear Customization**

# Overview

- Introduction to 3D scanning
- Technology types
- Footwear applications
- Shoe lasts, soles, heels
- Foot measurement
- Workflow & best practices

# What is 3D Scanning?

- Capturing exact geometry using sensors.
- Provides accurate 3D models for design.

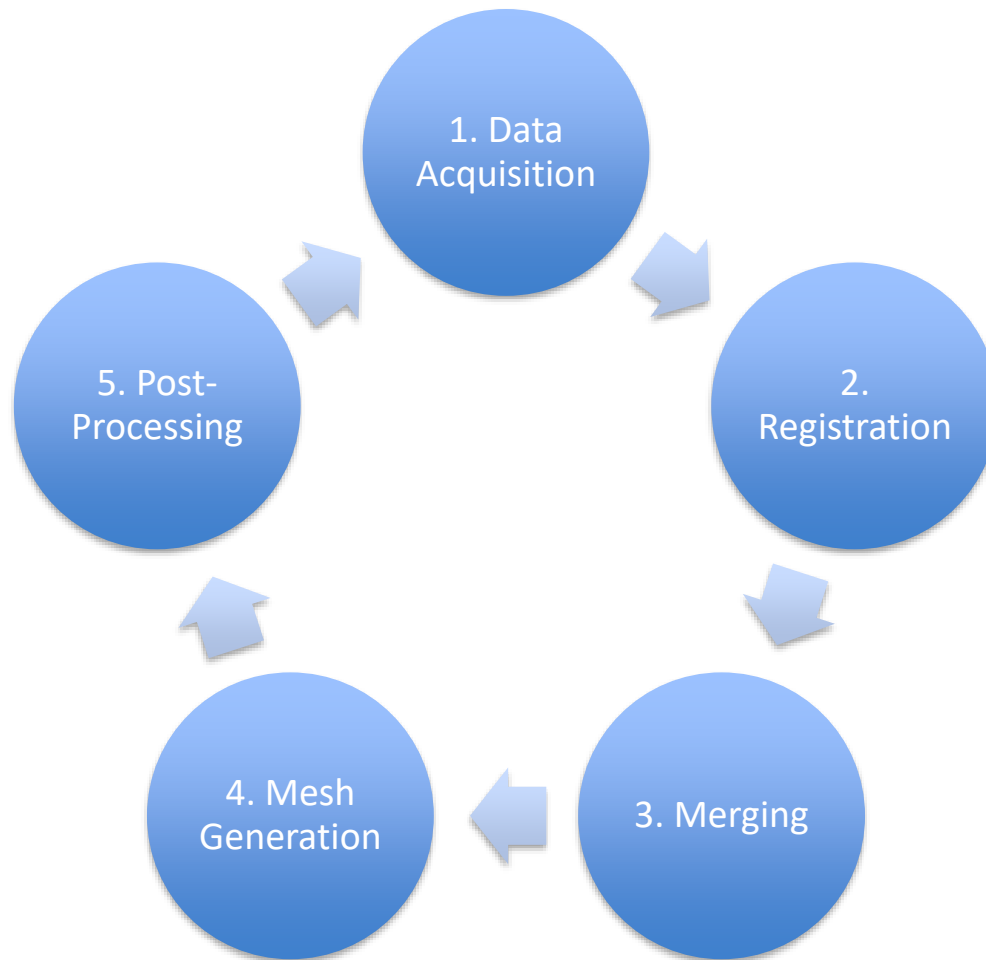


## Why It Matters in Footwear

- Fit accuracy
- Customization
- Faster prototyping
- Less errors
- Better ergonomics



# 3D Scan Pipeline



# Data Acquisition

- Captures object geometry from different angles.

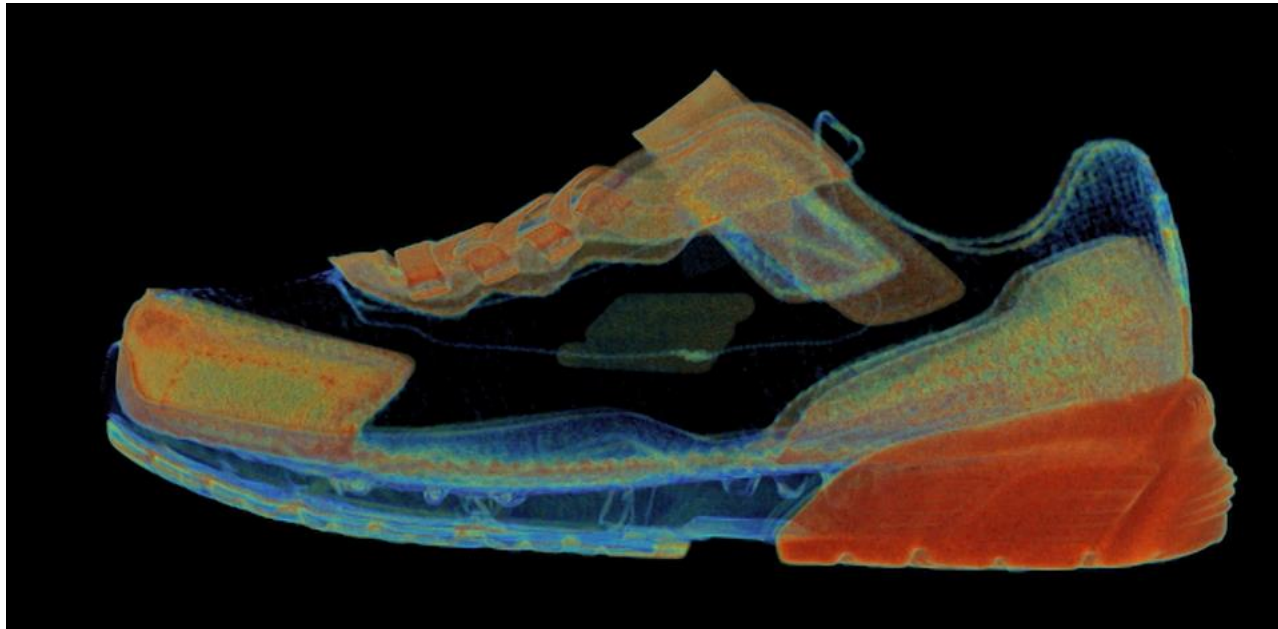


# Registration

- Aligning scans into one consistent model.

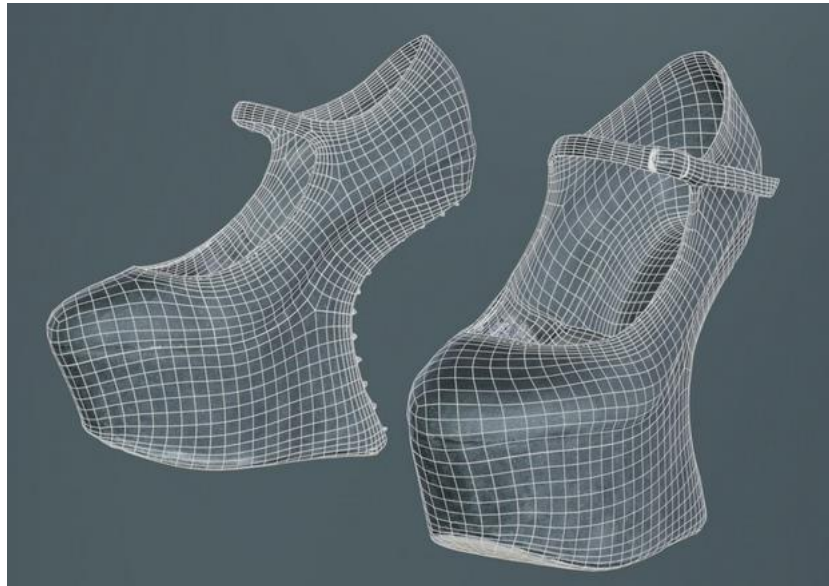
## Merging & Cleaning

- Combining scans and removing noise or artifacts.



# Mesh Generation

- Creating polygonal mesh formats (STL/OBJ).



## Post-Processing

- Smoothing, hole-filling, scaling, cleanup.

## Types of Scanning

- • Contact Scanning
- • Non-Contact Scanning

## Contact Scanners

- Touch probe;  $\pm 0.01$  mm accuracy.

# Laser Triangulation

- Laser projection;  $\pm 0.05$  mm accuracy.

# Structured Light

- Pattern projection; fast & accurate.

## Time-of-Flight (LiDAR)

- Fast, low accuracy (1–2 mm).

# Photogrammetry

- Reconstruction from photos; low-cost.

## Smartphone Scanning

- Convenient; limited precision.

## Scanning Shoe Lasts

- Digitizing lasts for fit and design.

## Last Scanning Workflow

- Prep → Scan → Merge → Mesh → CAD edits → Export.

## Applications of Last Scanning

- Orthopedic, custom, digital archive, rapid prototyping.

## Scanning Soles

- Capturing tread and flex zones.

## Sole Scanning Challenges

- Deep grooves, dark rubber, undercuts.

## Heel Scanning

- Capturing pitch, stability, aesthetics.

## Foot Scanning Tech

- Structured light best for feet.

## Foot Measurement Outputs

- Length, width, girths, arch height, volume.

## Pressure Scanning

- Load distribution and gait data.

## Applications of Foot Scanning

- Custom insoles, orthotics, athlete footwear.

## Advantages

- High accuracy, repeatable, digital.

## Limitations

- Cost, movement issues, lighting sensitivity.

## Conclusion

- 3D scanning transforms footwear customization.