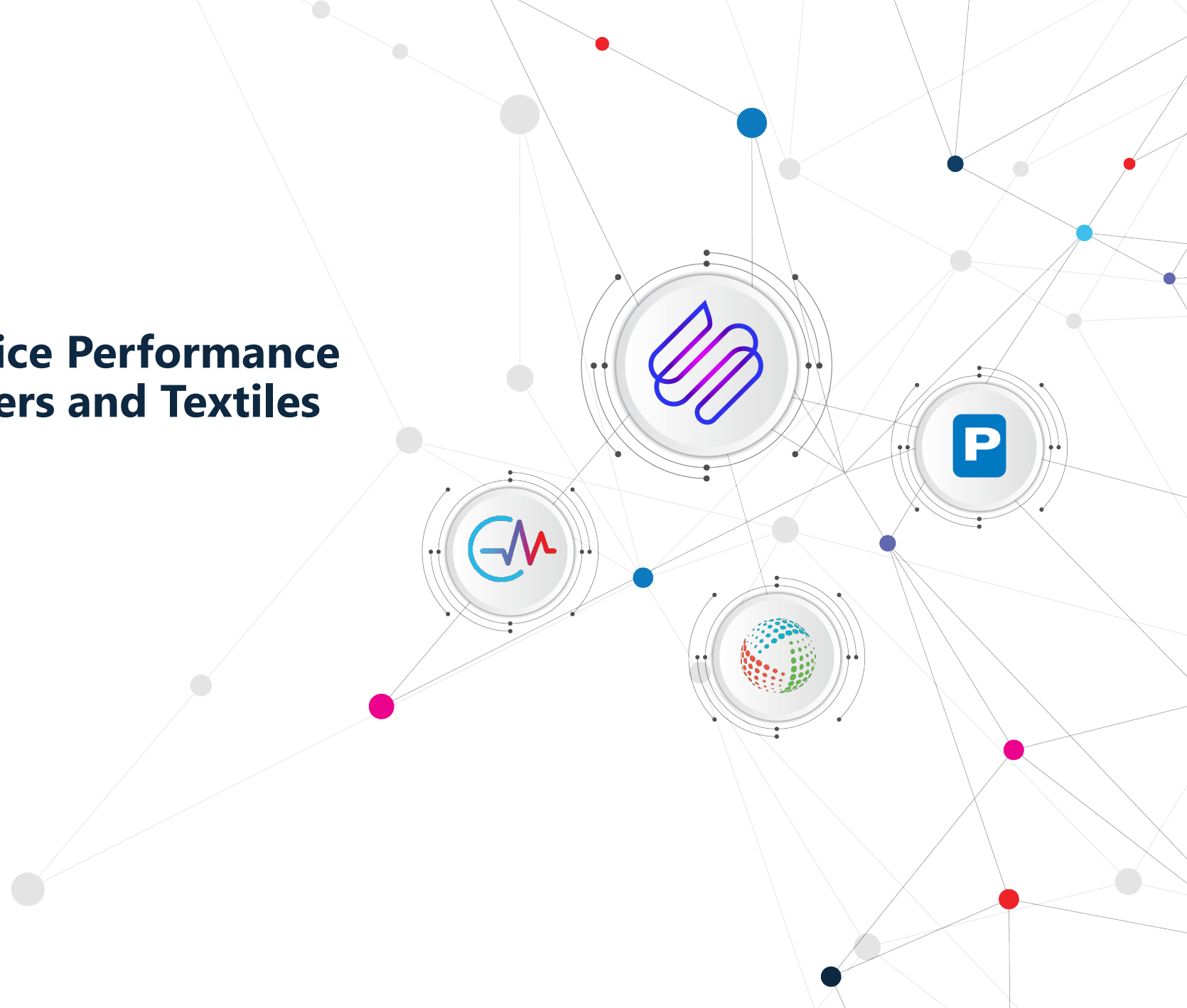


02-03-2026

# Advancing Vascular Device Performance Through Applied Polymers and Textiles

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MD&M West - Design Alley



# Today's **Speakers**



**Sunil Inamdar**

Vice President of  
Technical Development

**Solesis**



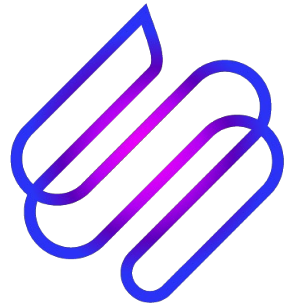
**Swati Patel**

Senior Director of MedTech  
Product Development

**Solesis**



Thank you for joining  
us **and welcome**



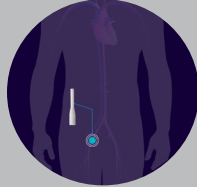


- 1. Solesis Overview: A Unified Biomaterials Partner**
- 2. Vascular Device Evolution & Material Challenges**
- 3. Integrated Material Strategies Across Vascular Submarkets**

# Solesis Overview

With decades of material expertise, Solesis designs, develops, and manufactures applied biomaterial solutions leveraging **textile & polymeric platforms** that support the advancement of:

- Medical devices
- Delivery systems
- Biopharma processing
- Performance applications



 <p><b>MEDICAL DEVICE SOLUTIONS</b></p> <p>We develop and manufacture custom components that improve the functionality of medical devices for the MedTech industry.</p>	 <p><b>DELIVERY SYSTEM SOLUTIONS</b></p> <p>We develop custom components and polymer platforms that provide optimal delivery mechanisms for medical devices and therapies for the MedTech and Pharma industries.</p>	 <p><b>BIOPHARMA SOLUTIONS</b></p> <p>Our innovative portfolio and custom-developed single-use solutions are built to enhance the manufacturing feasibility for therapy development.</p>	 <p><b>PERFORMANCE MATERIAL SOLUTIONS</b></p> <p>Our legacy is built on producing performance solutions for aerospace, oil and gas, and filtration applications.</p>
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<p>7 sites in Pennsylvania, North Carolina, USA &amp; Costa Rica</p>	<p>Multiple ISO certifications</p> <p>FDA-registered facilities</p>	<p>51% Altaris</p> <p>49% Michelin</p> <p>Ownership Structure</p>
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# Solesis' Companies & Therapeutic Areas We Serve



Single-use  
Solutions

**POLYZEN**

Material Science &  
Polymer Processing



secant group

Implantable Medical Textiles &  
Biomaterial Development

## Biopharma (Bioprocessing)

Genetic & Nucleic Acid Therapies

Antibody & Protein Therapies

Cell-based Therapies

## Pharma (Drug Delivery)

Sensory Organs

Central Nervous System

Endocrine

Oncology

## MedTech

Vascular

General Surgery

Orthopedics

## Performance Materials

Aerospace

Oil & Gas

Filtration



# Vascular Device Evolution & Material Challenges

## Increasing device complexity

Vascular systems are advancing toward smaller profiles, deeper anatomical access, and more demanding performance requirements.

## Miniaturization without compromise

Deliverability through smaller catheters must be achieved while maintaining structural integrity, durability, and functional performance.

## Balancing flexibility and strength

Materials must support tortuous anatomy while withstanding cyclic loading, fatigue, and deployment forces.

## Barrier performance vs. profile reduction

Thinner constructs improve deliverability but introduce challenges related to blood permeation, leakage, and long-term reliability.

## Manufacturability as a critical constraint

Traditional assembly methods can limit scalability, consistency, and yield as device designs become more complex.

## Material strategy as a performance enabler

Advanced polymers, coatings, and textile architectures are increasingly central to solving these tradeoffs early in development.

*In next-generation vascular devices, material selection and architecture directly govern mechanical performance, biological response, and manufacturability, making early and integrated materials engineering critical to successful device design and scale-up.*

# Solesis' Focus on **Vascular Solutions**

Vascular Submarkets and Applications We Focus on

- **Peripheral Vascular**
- **Neurovascular**
- **Interventional Cardiology**
- ✓ **Structural Heart**
  - **Transcatheter Aortic Valve Replacement (TAVR)**
  - **Transcatheter Mitral and Tricuspid Therapies (TMTT/TMVR/TEER)**
  - **Delivery systems and components**
- ✓ **Cardiac Rhythm & Assist**
  - **Electrophysiology**
  - **Ablation, mapping and delivery system components**



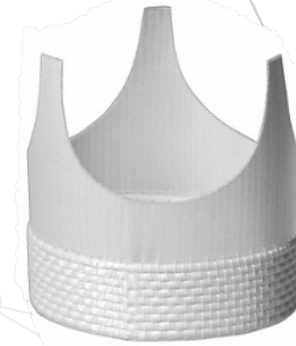
# Structural Heart Challenges and Solutions

## Challenges within the structural heart space

- Profile/Thickness
- Strength/Durability
- Anatomical shape
- Porosity/Fabric density
- Sealing

## Textile and polymeric components can be applied in the following ways as a solution to the above challenges:

- As flexible scaffolds for tissue in-growth and implant integration
- As conduits or barriers for blood flow and leakage prevention
- To join materials and secure implants in the body
- Thin films for delivery system sheaths
- Balloons for delivery systems that aid in the delivery and anchoring of the heart valve



# Structural Heart - Heart Valve and Delivery System Materials

Solexis can customize textiles and polymer-based materials to meet the required specifications for structural heart valves and delivery systems through specialized manufacturing techniques.

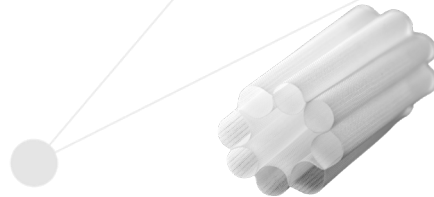
## Materials

- Films
- Textile foams
- Low-profile fabrics
- Near-net fabrics
- Sealing fabrics
- Shape-memory materials
- High density woven PET fabrics



## Enabling Technologies

- Near net jacquard weaving
- Knitting
- Lasercutting/2D Lasercut
- Laser or ultrasonic welding
- Extrusion



## Customized components include:

- Valve covers
- Skirt materials
- Balloons
- Sheaths
- Specialty sutures

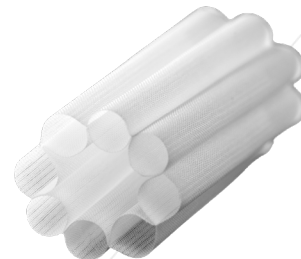


# Enabling Technologies for **Structural Heart Solutions**

## Near Net Jacquard Weaving

Solesis' specialized manufacturing techniques and enabling technologies using near net Jacquard weaving which provides many advantages for structural heart devices:

- Allows for larger diameter tubes
- Near net shapes ideal for structural heart
- Three-dimensional constructs with tapers
- Unlimited design capability

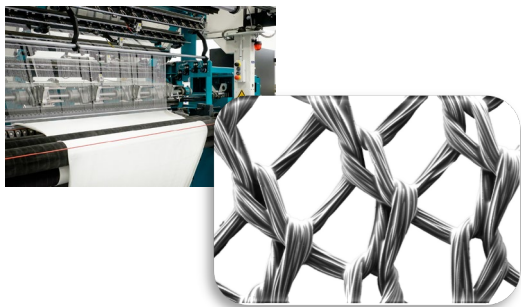


# Enabling Technologies for **Structural Heart Solutions**

## Knitting capabilities

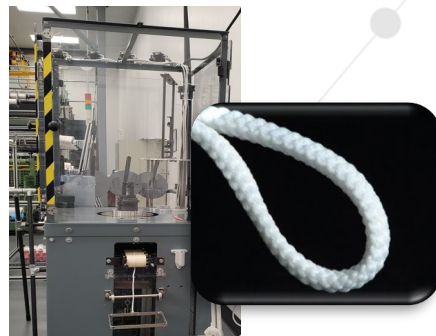
### Warp Knitting:

- Fine denier flexible
- Three dimensional
- Dense/high porosity
- Monofilament
- Loop pile
- Various pattern capability



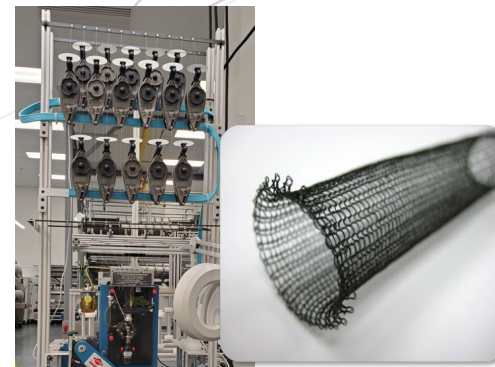
### Weft Knitting:

- Single end structure
- Tubular - small diameter
- Prone to unravelling



### Circular Warp Knitting:

- Tubular – small diameter



### Crochet:

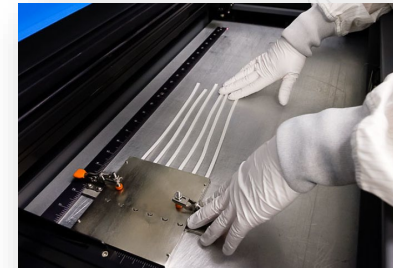
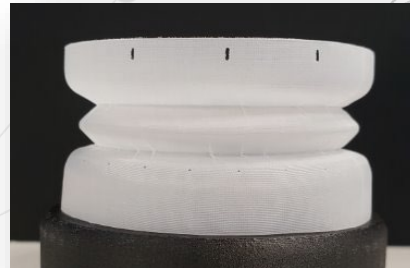
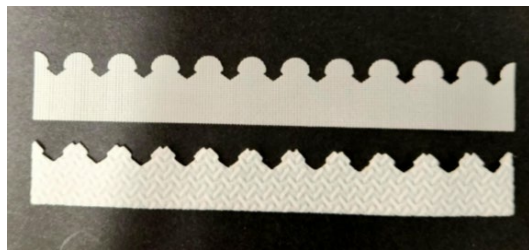
- Loop/terry structures
- Foam like textile for sealing



# Enabling Technologies for **Structural Heart Solutions**

## Lasercutting

- CO2 lasercutting 10W, 25W, 30W lasers
- 2D lasercutting
  - Flat knitted, and woven fabrics can be laser cut to specific size/shape suitable for end application of structural heart devices
- 3D lasercutting
  - Tubular braided, knitted, and woven constructs can be laser cut via a rotary system.
- Applied as a component finishing
  - Where the processing griege materials further to improve overall functionality using various finishing techniques and getting them a step closer to the end-product.



**Critical Parameters: Power, PPI, Z height, lens, quality standard, fixture, dry or wet cutting, number of passes**



# Enabling Technologies for **Structural Heart Solutions**

## Laser or ultrasonic welding

- Laser welding
  - Creates sealed edge for structural heart devices
- Method: Ultrasonic
  - High-frequency ultrasonic acoustic vibrations are applied to the structural heart components under pressure to:
    - Cut and create a welded/sealed edge
    - Melt and hardened the textile
    - Create a weld between two edges/components



# Enabling Technologies for **Structural Heart Solutions**

## **Extrusion**

Solesis' specialized extrusion manufacturing techniques and enabling technologies for structural heart.

## **Cast Film Applications**

- Cardiovascular devices

## **Cast Film Benefits**

- Soft and flexible films : enable complex shapes
- Custom surface finishes : influence COF and deployment
- Wide variety of thicknesses : aids in miniaturization
- Multilayer film constructions Co-Extrusion (AB, ABA) : aid different functionalities and assembly with other subcomponents
- Carrier films : manufacturing aids in semi-automated to automated manufacturing



# Enabling Technologies for **Structural Heart Solutions**

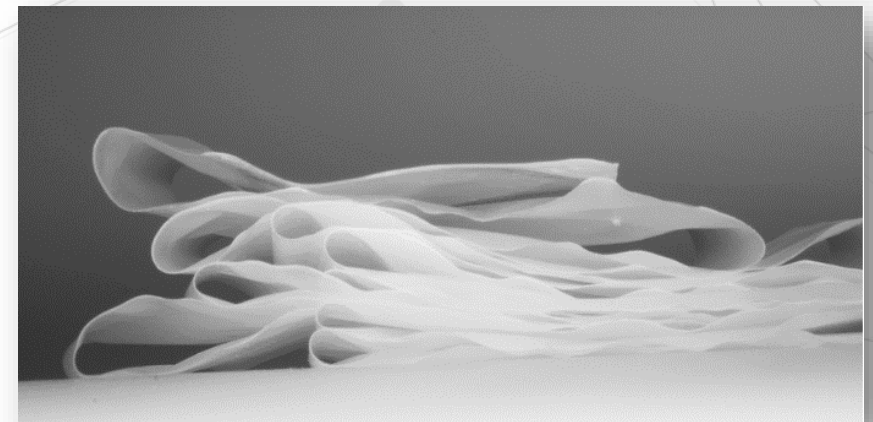
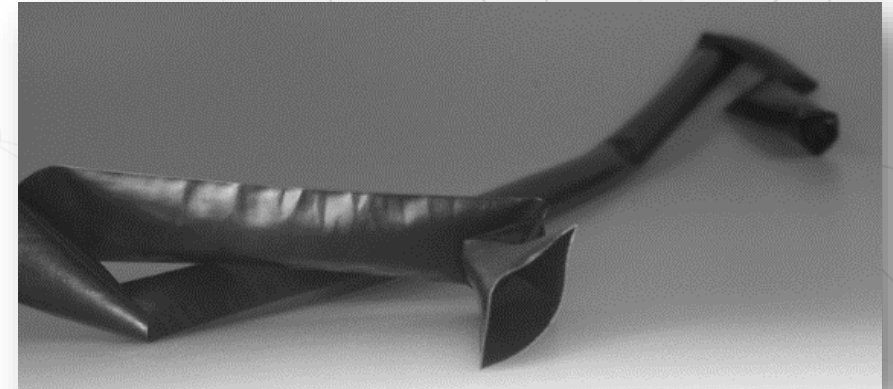
## Extrusion

### Lay Flat Film

- Single use sheaths
- Barriers
  - Temperature Measurement
  - Intubation
  - Catheter Cover

### Lay Flat Film Benefits

- Seamless, collapsible tubes: as deployment sheaths, introducer sheaths to minimize tissue or vessel damage
- Small scale development for rapid prototyping for using minimal materials
- Wide range of materials available: TPU's, Pebax, TPE's, custom filled materials



# Cardiac Rhythm & Assist Challenges and Solutions

## Challenges within the electrophysiology space

- Encapsulation
- Attachment
- Electrical properties
- Uniformity
- Shapes
- Thickness
- Seamlessness
- Surface finish
- Elasticity
- Width

## Textile and polymeric components can be applied in the following ways as a solution to the above challenges:

- Coatings
- Encapsulations
- Films
- E-textiles
- Balloons
- Adhesives



# Cardiac Rhythm & Assist – Catheter Ablation Technology

Solesis can customize textiles and polymer-based materials to meet the required specifications for catheter ablation technology through specialized manufacturing techniques.

## Materials

- Thermoplastic polyurethane (TPU)
- Pebax®
- Silicone
- Polyethylene (PE)
- Thermoplastic elastomers (TPE)

## Enabling Technologies

- Spray coating
- Dip coating
- RF welding
- Material formulation
- Custom film extrusion

## Components can be customized to create:

- Spline coating
- Dielectric and electrical insulations
- PFA balloons
- Balloon support systems
- Cardiac mapping system components
- Catheters
- Catheter films/wrapping systems
- Precision energy transfer solutions
- Adhesive solutions for catheter assembly
- Custom functional coatings



# Enabling Technologies for **Electrophysiology**

## Coatings

- Methods:
  - In-line coating
  - Spray coating
  - Dip coating
  - Casting
- Coating is applied to achieve:
  - Impermeable/ less permeable structure : to act a barrier against fluid and provide continuity for consistent delivery of energy
  - Stretch and recovery : to enable complex geometries to be compacted in delivery and resize to original shape on deployment
  - Surface treatments : to enable in ease of delivery



# Enabling Technologies for **Electrophysiology**

## Radio Frequency (RF) Solid State Processing

### RF Welded Solutions

- Sheaths
- Covers
- Balloons
- Bags
- Bladders

### RF Welding Benefits

- Unique geometries : to enable anchoring and delivery through tortuous paths
- Scalable and repeatable manufacturing process
- Creates very thin, small seams compared to other welding processes : lower profile to meet small ID delivery



# Key Takeaways: Vascular Polymer & Textile Integrated Solutions

- **Vascular performance starts with material architecture**
  - Solesis engineers polymers, coatings, and textile structures as integrated systems to meet the mechanical and biological demands of vascular devices.
- **Unified expertise across polymers and textiles reduces complexity**
  - A single partner with deep capability in both domains enables optimized designs, faster iteration, and fewer handoffs during development.
- **Designed for real vascular environments**
  - Materials and structures are tailored to withstand tortuous anatomy, pulsatile loading, blood contact, and long-term durability requirements.
- **Profile reduction without sacrificing reliability**
  - Solesis supports thinner-wall, lower-profile designs while maintaining barrier performance, fatigue resistance, and device integrity.
- **Manufacturability is engineered from the start**
  - Material selection and construction methods are developed with scalability, consistency, and process efficiency in mind.
- **From concept through scale-ready production**
  - Solesis partners across the full development lifecycle, supporting early design, validation, and transition to commercial manufacturing.



# Thank you for joining us!

We're here to be the development partner that helps you take **your medical innovation** to the next level. Our development and material expertise teams are here to support your mission to **revolutionize medicine.**

**Visit us at Booth 2947**



**Q&A Session**

Have further question after the show? Email **[swati.patel@solesis.com](mailto:swati.patel@solesis.com)**