ODE 2027

FIRST INTERNATIONAL CONFERENCE ON ORTHOPEDIC DEVICE ENGINEERING

From Clinical Need to Engineered Solution

Friday, April 23, 2027 | 8:00 AM–5:50 PM U.S. Eastern Time | Fully online via WebEx

Detailed preliminary scientific program

The scientific timetable and presentation titles follow the preliminary program dated October 30, 2026. Speaker assignments and participation arrangements are not yet confirmed; the program may be revised.

8:00 AM–8:15 AM ET	**Opening and Founding Address**

Orthopedic Device Engineering: Establishing a New Translational Scientific Discipline

The scientific identity and translational scope of orthopedic device engineering.

8:00 AM–8:15 AM	Founding conference chair address

8:15 AM–9:00 AM ET	**Opening Keynote**

From Clinical Need to Engineered Orthopedic Solution: The Complete Translational Pathway

Linking clinical requirements, engineering design, performance evidence, and implementation.

8:15 AM–8:50 AM	Keynote presentation (35 minutes)
8:50 AM–9:00 AM	Moderated discussion (10 minutes)

9:00 AM–10:15 AM ET	**Session I**

Clinical Foundations and Musculoskeletal Biomechanics

How Clinical Orthopedic Problems Become Engineering Design Requirements

9:00 AM–9:25 AM	Defining the Clinical Need: What Orthopedic Surgeons Need Engineers to Understand
9:25 AM–9:50 AM	Musculoskeletal Loading and Joint Mechanics: Designing for the Real Mechanical Environment
9:50 AM–10:15 AM	From Stability to Healing: Biomechanics of Fracture Fixation and Bone–Implant Interaction

10:15 AM–10:30 AM ET **Morning Break**

Scheduled break

10:30 AM–12:05 PM ET **Session II**

Biomaterials, Device Design, and Manufacturing

Engineering the Physical Orthopedic Device

10:30 AM–10:55 AM	Orthopedic Biomaterials: Matching Mechanical Performance, Biological Response, and Clinical Function
10:55 AM–11:20 AM	Orthopedic Implant Design: Balancing Strength, Stiffness, Fixation, Fatigue, and Surgical Constraints
11:20 AM–11:45 AM	Additive Manufacturing and Porous Orthopedic Implants: From Digital Design to Clinical Device
11:45 AM–12:05 PM	Moderated Discussion — Can We Design the “Ideal” Orthopedic Implant?

12:05 PM–12:50 PM ET **Lunch & Virtual Industry Forum**

Lunch and Virtual Industry & Technology Forum

Informal and optional for attendees.

12:05 PM–12:20 PM	Industry Innovation Spotlight I — From R&D Concept to Commercial Orthopedic Product
12:20 PM–12:35 PM	Industry Innovation Spotlight II — Enabling Technologies in Orthopedic Device Development
12:35 PM–12:50 PM	Virtual Networking / Exhibitor Interaction

12:50 PM–2:30 PM ET **Session III**

Computational, Digital, and Patient-Specific Orthopedic Engineering

From Imaging to Digital Twin

12:50 PM–1:15 PM	Medical Imaging, Segmentation, and Image-to-CAD: Building the Patient-Specific Orthopedic Model
1:15 PM–1:40 PM	Finite Element Analysis of Orthopedic Devices: From Model Construction to Clinical Interpretation
1:40 PM–2:05 PM	Optimization and Artificial Intelligence in Orthopedic Device Design
2:05 PM–2:30 PM	Digital Twins and Personalized Orthopedic Engineering: Can We Predict the Best Treatment Before Surgery?

2:30 PM–2:45 PM ET **Afternoon Break**

Scheduled break

2:45 PM–4:00 PM ET **Session IV**

Testing, Failure Analysis, Regulatory Science, and Translation

Proving That an Orthopedic Device Works

2:45 PM–3:10 PM	Mechanical Verification and Preclinical Testing of Orthopedic Devices
3:10 PM–3:35 PM	When Orthopedic Devices Fail: Retrieval Analysis, Wear, Corrosion, Fatigue, and Root-Cause Engineering
3:35 PM–4:00 PM	From Prototype to Patient: Regulatory Strategy, Design Controls, Validation, and Clinical Translation

4:00 PM–4:50 PM ET **Session V**

Emerging and Future Technologies in Orthopedic Device Engineering

Beyond the Conventional Implant

4:00 PM–4:25 PM	Smart Orthopedic Implants: Sensors, Wireless Monitoring, and Adaptive Devices
4:25 PM–4:50 PM	Robotics, Augmented Reality, Virtual Reality, and Intelligent Surgical Systems

4:50 PM–5:10 PM ET **Rapid Research Presentations**

Four Selected ODE 2027 Outstanding Abstracts

Four 5-minute presentations · maximum 3 slides each; possible subjects: device design, biomechanics and biomaterials, computational engineering, and emerging technologies.

4:50 PM–4:55 PM	Outstanding Abstract Presentation 1
4:55 PM–5:00 PM	Outstanding Abstract Presentation 2
5:00 PM–5:05 PM	Outstanding Abstract Presentation 3
5:05 PM–5:10 PM	Outstanding Abstract Presentation 4

5:10 PM–5:40 PM ET **Grand Multidisciplinary Panel**

What Will Define Orthopedic Device Engineering Over the Next 20 Years?

Cross-disciplinary discussion of future scientific priorities.

5:40 PM–5:50 PM ET **Closing Session**

ODE 2027 Founding Scientific White Paper and the Future of the Field

Closing discussion of the proposed founding scientific white paper.

Rapid research: Four outstanding abstracts, five minutes each, with a maximum of three slides per presentation. Subject areas listed in the preliminary program include device design, biomechanics and biomaterials, computational engineering, and emerging technologies.

Program status: Preliminary scientific program. Individual speakers, registration policies, and abstract submission details are to be confirmed.