

# The Future of Surgical Visualization

## └ Mantis 3D Digital Loupes & Cameras

Powered by Mantis ML & AI Engine



MANTIS  
H E A L T H

# INTRODUCING “DIGITAL SURGERY IN 3D”

Our first-of-its kind 3D Digital Loupes is a sleek and modern augmented reality headset that pairs with 3D camera technology to transform the surgery experience:

- 3D cameras are positioned in or around the patient during surgery
- Cameras stream 3D video in real-time back to the headset
- Immersive, game-changing anatomy visualization
- Light-weight, ergonomic digital loupes design
- Saves 3D surgical procedure video for AI software development and training purposes



Digital Loupes



3D Cameras and Station



# The Technology



# Mantis 3D Digital Loupes

Mantis Digital Loupes are the world's most advanced 3D smart glasses for live surgery. Our patented light-weight and ergonomic design is as comfortable as regular glasses, but with the power of immersive VR display technology – allowing surgeons to see pristine digital images in accurate 3D without hindering their view of the surrounding environment.



Accurate 3D high resolution low latency video

Immersive digital views of surgical field with simultaneous view of surroundings

Augmented reality overlays





# Mantis Overhead 3D Cam for Open Surgery

FDA registered, with numerous systems out in the field and being used daily. Over 1,000 procedures performed to-date

## Overhead 3D Cam for Open Surgery

Mounted 3D Camera is pointed at the incision and can be used for Open procedures with zoom up to 20x.

## Mantis Station

The Mantis Station is the central hub that the Loupes, Overhead Cam, and 3D Mini-Cams can plug into. It transmits, records, and analyzes 3D video in real-time.

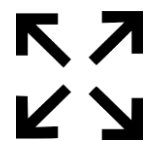
## Mantis 3D Digital Loupes

The Mantis Station transmits video to the Loupes for viewing



# Replacing Traditional Analog Microscopes

## Traditional Microscope



Large, cumbersome, and long set-up time



Extremely high cost, with frequent maintenance issues



Outdated, analog and only usable for Open Surgeries

## Mantis Overhead 3D Cam



Small, light-weight, with virtually no set-up time



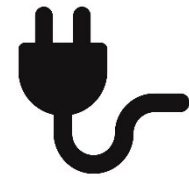
Fraction of the price, with little to no maintenance



Digital and expandable to All Surgeries with Mantis 3D Mini-Cams

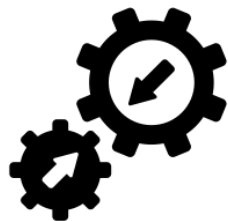


# Mantis 3D Mini-Cams for Less Invasive Procedures



## Plugs into Mantis Station and Loupes

Mantis 3D Mini-Cams are tiny scopes that capture patient anatomy in real-time from less invasive and endoscopic procedures for streaming to the Digital Loupes/



## Attachable to standard retractors

Mini-Cams attach to any standard muscle-splitting retractor (tubular and/or bladed) providing direct down-hole visualization.



## Replaces existing 2D scopes

Traditional scopes used annually in over 100M US surgeries and endoscopies are 2D and don't provide any 3D depth perception (the ability to see the real distance between anatomy) – this lack of perception has been a major visualization challenge for decades.

Mantis 3D Mini-Cam  
Spine Surgery Application Est.  
Q3 2023 release





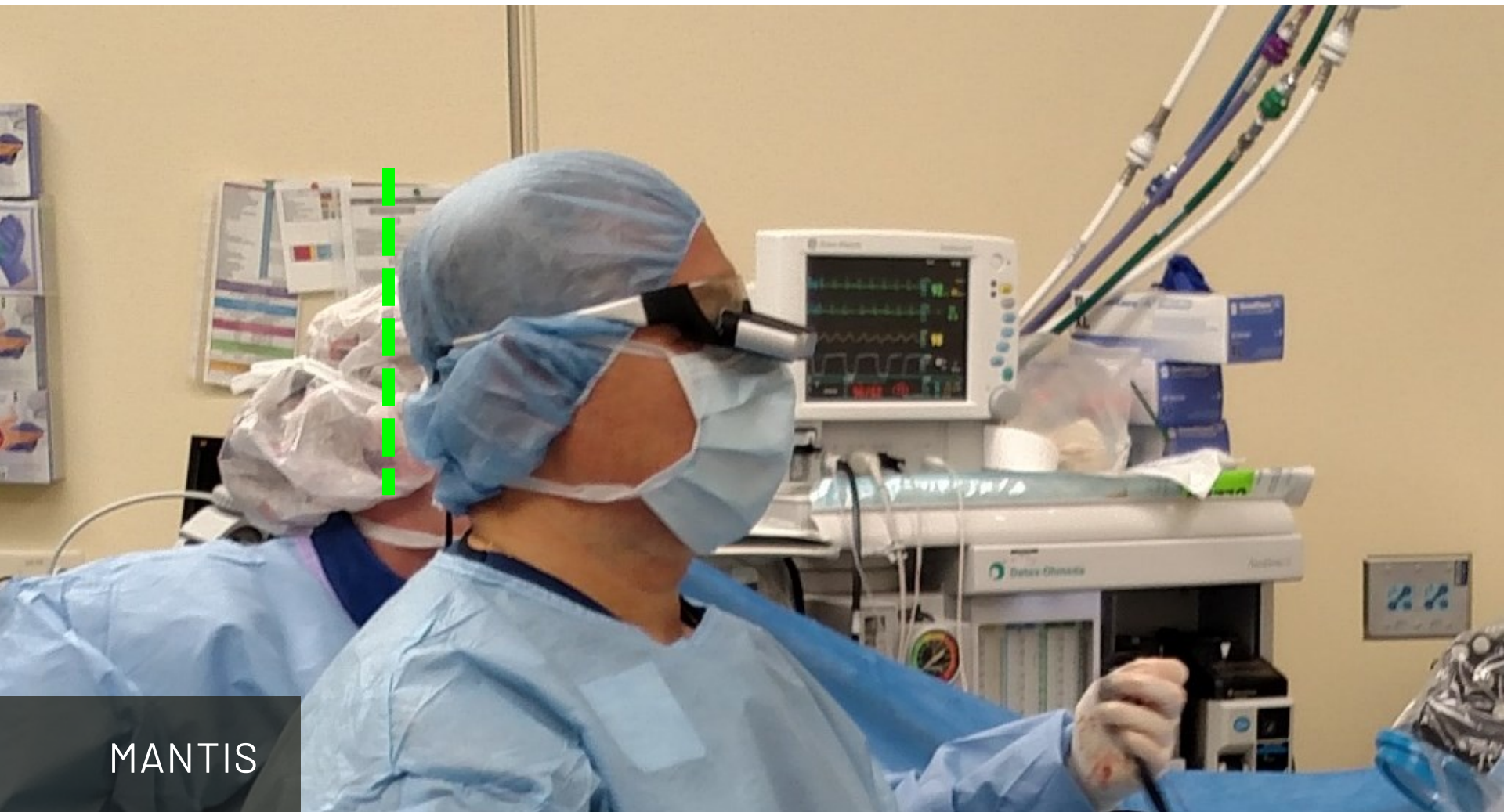
The Mantis Overhead 3D Cam for Open Surgery is FDA registered and has been used to perform over 1,000 procedures to-date. Over 15 systems have been deployed in the US and are being utilized daily.



MANTIS  
HEALTH



# Ergonomics: Loupes vs Mantis

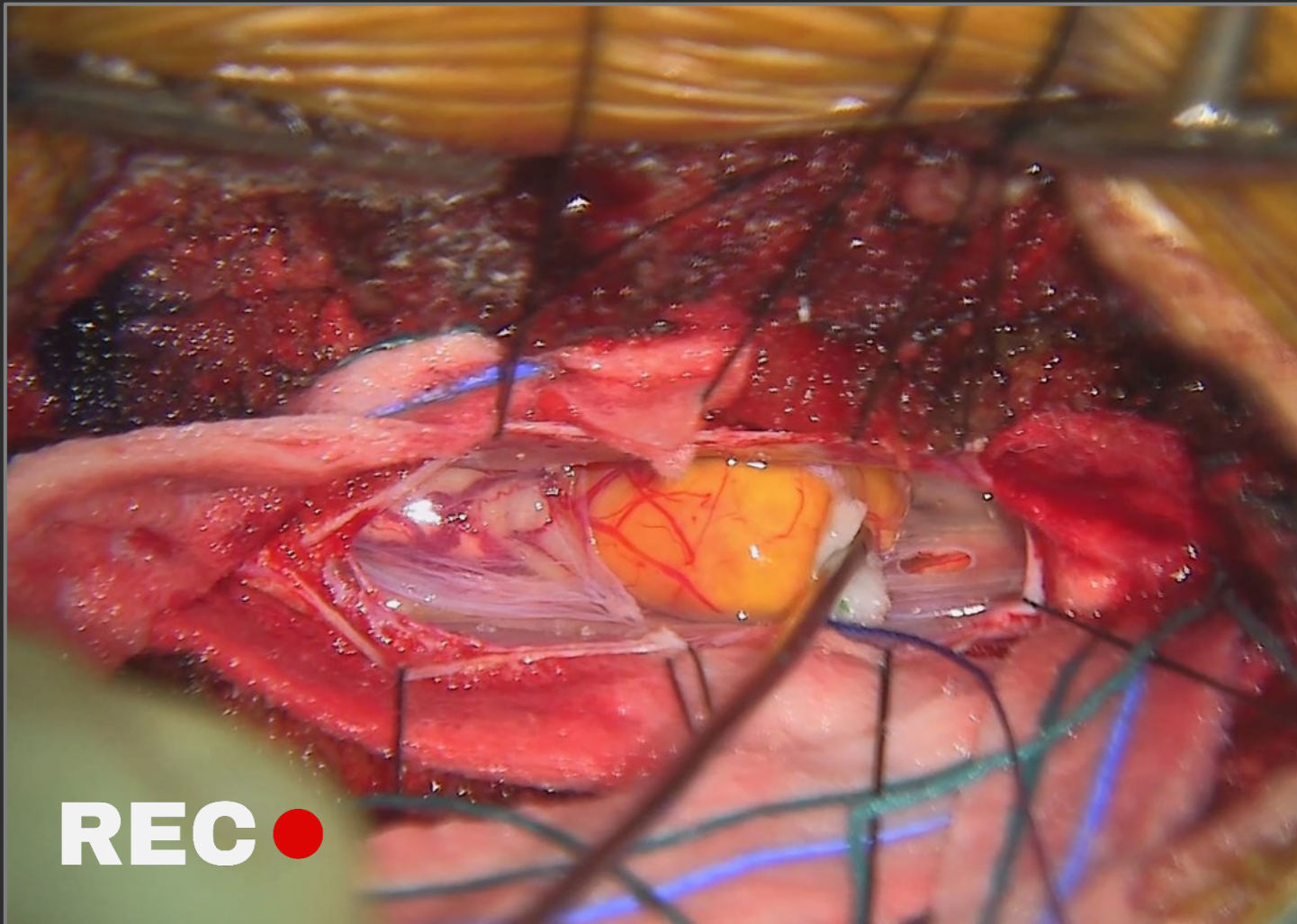


1 out of every 5 surgeons using loupes have a neck and/or back musculoskeletal disorder by the age of 46<sup>1</sup>, which in severe cases can require surgical intervention, and possible early retirement.

<sup>1</sup>Epstein S, S. E. (2018). Prevalence of Work-Related Musculoskeletal Disorders Among Surgeons and Interventionalists: A Systematic Review and Meta-Analysis. *JAMA Surgery*, 153(2).



# 3D Video Recording with Cloud Storage



Up to 4K resolution  
2D/3D recording with  
rich color contrast



Cloud storage access  
for EMRs, presentations  
and education materials



# Mantis AI and Machine-Learning software

Downloadable AI software packages built from machine-learning analysis of recorded 3D videos

## Building private database of 3D surgical video content

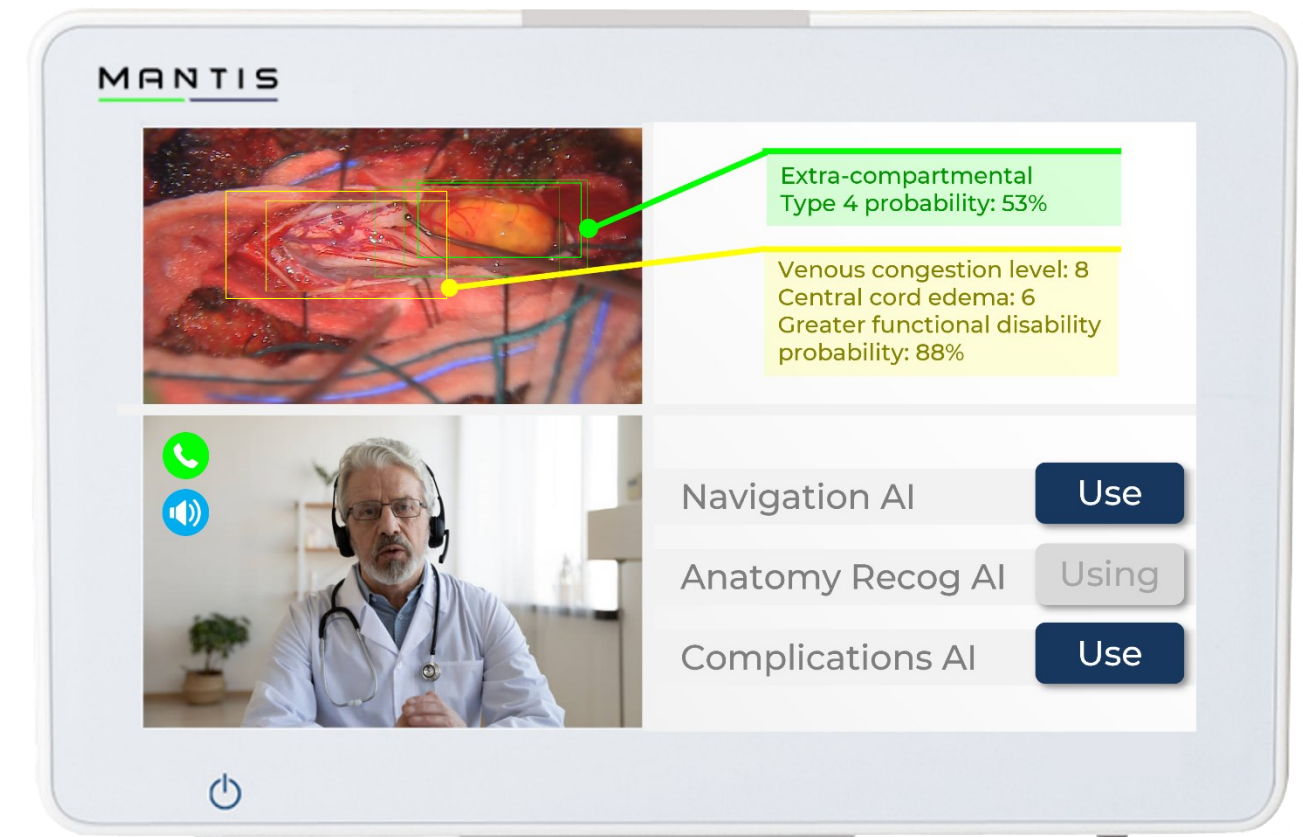
Mantis is building a large private database of 3D surgical videos recorded from procedures performed on the platform. These videos provide rich data that we extract using Mantis' proprietary machine-learning engine, and then utilize to develop patient-specific software features that are overlaid onto the Loupes.

### ● Surgical Navigation for X-Ray vision

Real-time anatomy registration and matching to patient's MRIs/CT scans. Hidden anatomy will be revealed via augmented reality overlays on the glasses. Applications in spine, neurosurgery, ENT and dental.

### ● 5G broadcast for real-time communication with remote physician(s)

Learning, teaching, and emergency telemedicine tool where expert specialists wear the Digital Loupes remotely and assist active surgeons during live procedures.

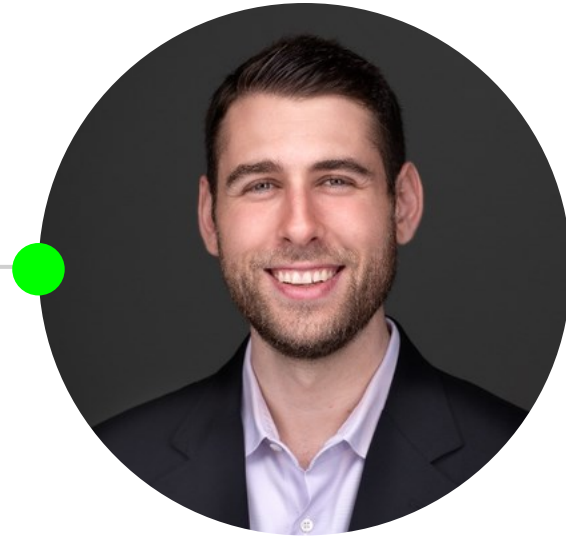




# Executive Team







## Joshua Aferzon

*Founder and CEO*

Josh launched his career when he co-patented and developed the SOLUS spinal fusion implant, which was licensed to Alphatec Spine in 2007. SOLUS became one of the top 5 most utilized implants in anterior lumbar spine surgery across multiple countries - with over 20k patients treated. He then went on to invent and co-develop numerous other successful products in the medical device industry, with both large Fortune 500 and medium-sized companies. Josh holds 18 patents, and a degree in Biomedical Engineering from the University of Connecticut.



**Solus®**



## Peter Dwyer, PhD

*SVP Sales and Marketing*

Pete has had a 25-year career in the biotech and medical device industries, with substantial experience in successfully leading start-up sales teams from launch to exit. His previous leadership roles include Newport Corp (acquired by MKS Instruments), Energetiq Technology (acquired by Hamamatsu), and prior to that, at PerkinElmer and Massachusetts General Hospital. Pete has a Biomedical Eng. degree and PhD in Optics from Northeastern University.



MASSACHUSETTS  
GENERAL HOSPITAL



## Lee Nicholson, PhD

*SVP Technology*

Lee has had a 25-year career leading R&D teams, including at IBM, where he developed an industry-first server chip for the SONY PS2, Nintendo GameCube and Xbox 360 consoles. Lee was a co-developer of IBM's precursor AI program that eventually turned into the Watson AI business. He also held prior roles at PepsiCo, and NASA nanotechnology. Lee coauthored 29 peer-reviewed articles and holds 21 US patents. He holds a PhD in Physics & Materials Science from the University of Cambridge.





# Board of Directors



**Kevin Sidow**

Kevin was the Worldwide President of DePuy Johnson & Johnson before becoming the CEO of St. Francis Medical Technologies, Inc., which was sold to Kyphon for \$725M. Kevin was also the CEO of Moximed. He sits on the boards of several life science start-ups, including Ceterix which sold to Smith+Nephew for \$105M in 2019.



**Ken Trauner, M.D.**

Dr. Trauner is an orthopedic surgeon and serial entrepreneur. He is a co-founder of NSF's Center for Biophotonics at UC Davis, co-founder of Bespoke Innovations (sold to 3D Systems), founder of Docspera, and co-founder and CEO of Invuity (IVTY) which was acquired by Stryker in 2018. He has 76 issued patents. Ken received his MD from Harvard Medical School.



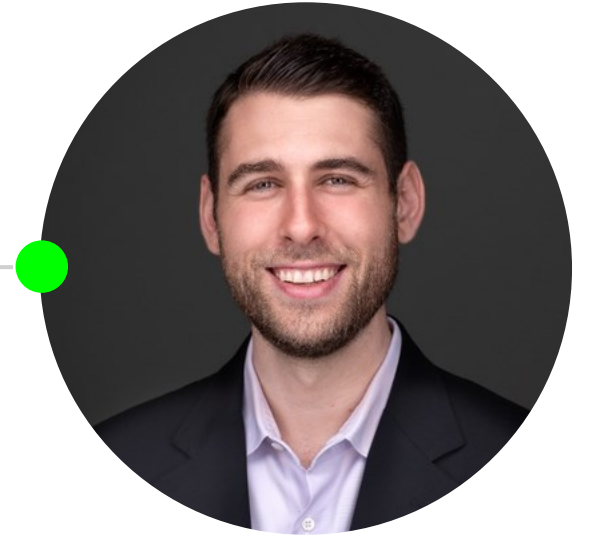
**Florence Tsai**

Florence Tsai is a business strategist and financial adviser with broad industry expertise. She advises Chairpersons and CEOs in the Americas and Asia, with a focus on the world's leading family companies. She holds an A.B. in Economics from Harvard College, an M.P.A from Harvard Kennedy School of Government, and an M.B.A from Harvard Business School.



**Frank J. Wilich, Jr.**

Frank is currently a founding principal in Global Medical REIT (GMRE), with specialty in medical real estate assets. Prior to GMRE, Frank had over 35 years experience in the medical device industry with several successes in small venture and large corporate businesses. Frank has also owned and operated several for-profit hospitals in the US.



**Joshua Aferzon**

Bio on previous slide



# Clinical Advisory Board

Mantis Health's clinical advisory board is comprised of some of the nation's leading surgeon specialists and innovators - all of whom work closely with the Mantis team to design and develop its products.

Ravi Ramachandran, MD

Director of Spine Surgery at Mercy Hospital - Folsom, CA

Praveen Prasad, MD

Director of Dignity Health Neurosciences Institute - Sacramento, CA

Jeffrey Bash, MD

Chief of Spine Surgery at Middlesex Health - Middletown, CT

Isaac Moss, MD, CM

Chairman of Orthopedic Surgery at UConn Health - Farmington, CT

Joshua Greenwald, MD

Founder of the Greenwald Plastic Surgery Group - Westchester, NY

Samuel Beran, MD

Founder of the Cosmetic Surgery Centers of New York - Harrison, NY

Ken Trauner, MD

Orthopedic Surgeon and Co-Founder of Invuity (IVTY), Sharp Fluidics, and DocSpera

Santiago Figuereo, MD

Chief of Neurosurgery at Alliance Spine & Joint - Miami, FL



# Thank you

For more information, please contact Joshua Aferzon.

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