

# Robotic Surgery and AI

Roger Smith, PhD, MBA



Linked  /rogersmithcto

[www.rddsmith.com](http://www.rddsmith.com)



SENIOR PLANET

*Aging with Attitude*

# Surgery

**1.0**

Open  
1800's



Open the body wide and enter with hands and instruments. Sever any muscle, bone, vessels, or nerve.

**2.0**

Minimally  
Invasive  
1980's



Small incision for tubular instruments with limited mobility and visibility. Reduce blood loss, nerve damage, and infection area.

**3.0**

Robotic  
Assisted  
2000



Computer and mechanical assistance to restore mobility and some visibility. Control of more than two instruments.

**4.0**

Information  
Guided  
2030



Information connection for guidance, assistance, and population history. Augment the hands and the mind of the surgeon.

# Two Robots

Intuitive Surgical  
da Vinci



Stryker  
Mako

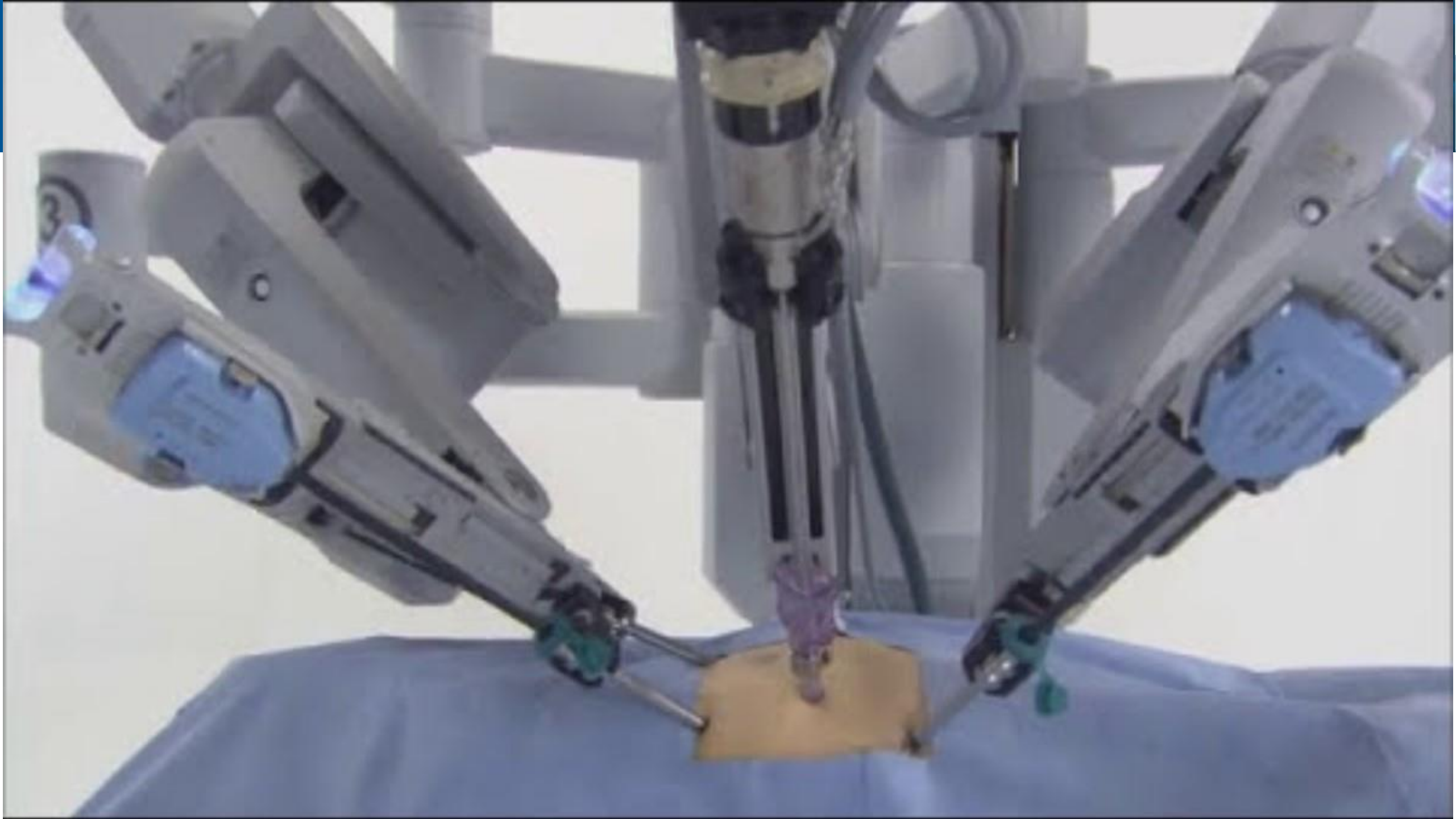




# da Vinci (Intuitive Surgical)

<https://youtu.be/HHKEHTr7o3Y?si=-cdu0ei08KBW5aDk>







# Discussion



# Mako (Stryker Inc)

<https://youtu.be/XYQnllE2yH8?si=MCVlfn1Ri5nxKkMI&t=23>







# Discussion



# Robotic Surgery Platforms

## 116 Companies

### Neuro

- Medtronic
- Synaptive
- Zimmer
- Monteris
- Elekta
- Renishaw
- AiM Medical
- BrainLab
- IMRIS
- Remebot
- Insightec
- OrbSurgical
- Kymero
- Varian
- Xcath
- Eindhoven Med
- Medtronic
- Brain Navi
- Sinovation
- Aesculap
- Koh Young
- Tamar
- Zeiss

### Abdomen

- Intuitive/dv
- Asensus Surgical
- Accuray
- CMR Surgical
- Meere Co.
- Micro Hand S
- J&J/Verb
- Medtronic
- Medcaroid
- Virtual Incision
- Vicarious Surgical
- Momentis
- Distal Motion
- Kongduo
- Avatera
- Lapara Surgical
- SS Innovations
- DocRobo

### Hair

- Restoration Robotics

### Spine

- Medtronic/Mazor
- Globus Medical
- Interventional Sys
- Zimmer Biomet
- LEM
- Nuvasive
- J&J/Dupuy
- Tinavi
- Accelus
- eCential

### Transanal

- EndoQuest
- EDAP TMS
- NISI
- Invendo
- Endotics

### General

- Kuka
- Microsure
- Medical Micro Inst
- Microbot Medical
- Histosonics

### Dental

- Neocis
- Remebot

### Thyroid

- Theraclion

### Skin

- Avra

### Heart

- Stereotaxis
- Heartlander

### Blood

- Veebot

### Urethra

- Procept
- TURBoT
- FocalOne

### Cardiac Cath

- Corindus
- Robocath
- Microbot Med
- Catheter Precision
- Luban

### Eyes

- Preceyes
- ForSight
- AcuSurgical
- Cambridge Consult
- Keranova
- Horizon

### ENT

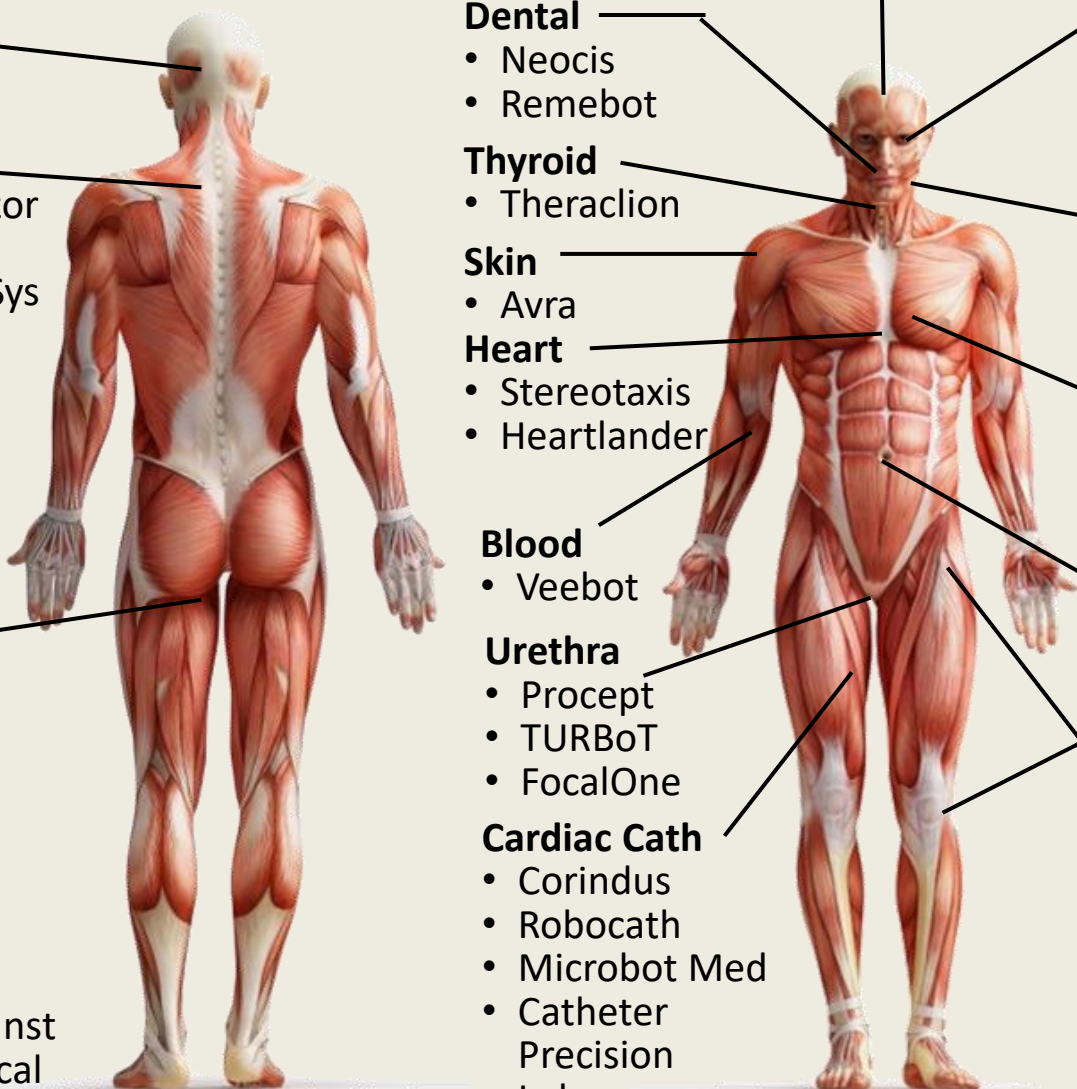
- Intuitive/SP
- Medineering
- Galen Robotics
- J&J/Auris
- Intuitive/Ion
- Noah Medical
- NDR Medical
- iotaMotion
- Collin Med
- Cascination

### Lungs

- J&J/Auris
- Intuitive/Ion
- Noah Medical
- NDR Medical

### Knee/Hip

- Stryker/Mako
- THINK Surgical
- Smith & Nephew
- Zimmer Biomet
- Tinavi
- OmniLife
- J&J/Velys
- AOT
- Monogram Ortho
- Ganymed
- Microport
- Robossis
- Dexterite Surgical
- Levita Magnetics
- Medical Micro
- EndoControl
- OrionPax-MST
- AKTORmed
- Endomaster
- Human Xtensions
- ACTIV Surgical
- Epione
- Sina Robotics
- ValueBioTech
- USMI
- XACT
- Perfint
- Freehand
- Riverfield
- Moon Surg
- MicroPort
- Endiatx





# AI: Better Tools ... Better Partners





# AI Applications

- Pre-Operative
  - Medical Record Analysis (predict situation)
  - Imagery Analysis (tumors, obstructions, anomalies)
  - Simulation (teach surgeon and patient)
- Intra-Operative
  - Recommended Path, Instruments
  - Guidelines & Warnings (no-go areas)
  - Materials Tracking (needles, sponges, etc.)
- Post-Operative
  - Outcome Predictions (recovery path)
  - Teaching the AI (improvement on every device)

New Tech in Surgery... [rddsmith.com](http://rddsmith.com)

