Developing Artificial Intelligence-based systems to improve OR efficiency and patient safety

Scientific founder:

Dr. Marco Zenati, MD, MSc, FETCS
Professor of Surgery, Harvard Medical School, Chief of Cardiothoracic Surgery, Veterans Affairs Boston Healthcare System, Associate Surgeon, Brigham & Women's Hospital, Director, Medical Robotics and Computer Assisted Surgery (MRCAS) Laboratory, Boston, MA. Founder of Medrobotics Corporation

Surgeon and scientist:
- ✓ Performed the U.S.-first robotic coronary bypass surgery on the beating heart
- ✓ Published >250 peer-reviewed manuscripts and books in cardiovascular medicine
- ✓ Has been awarded continued Federal funding by the NIH and NHLBI for his groundbreaking research on innovative medical robotics
- ✓ Has received the Philip K. Caves Award for "Outstanding Contributions to the Field of Heart Failure Research" and of the Alexis Carrel International Award by transplant pioneer Christian Barnard

Innovator:
- ✓ Pioneered minimally invasive cardiac surgery and robotic surgery
- ✓ Currently developing artificial intelligence and computer vision-based technologies enabling better surgical performance and efficiency in the operating room

Successful Entrepreneur:
- ✓ Founded Medrobotics Corporation, a privately-held, surgical products company that developed the Flex Robotic System enabling surgeons to access and visualize hard-to-reach anatomical locations
- ✓ In 2017 Medrobotics closed a $20MM financing and will be building next generation robot system

Passionate about addressing safety concerns in the operating room:

Methods currently used to improve access to low-cost/high-quality OR space and experienced OR teams are focused on improvement of peri- and intra- operative efficiency. Unfortunately, the impact of these methods (overlapping surgeries, surgical flow redesign, standardization of instruments, team huddles, use of checklists and data tracking sensors) is limited by their inability to prevent errors that could lead to inefficiencies and intraoperative adverse events in real time.

Our Vision:

We will create a company that would leverage the entrepreneurial and clinical experience of Dr. Zenati, and build artificial intelligence/computer learning-based systems to address both safety and efficiency concerns associated with OR use

Implementation of these systems in the clinic would:

- ✓ Enable real-time monitoring, identification and elimination of any events that could increase a risk of adverse effects associated with surgical procedures
- ✓ Improve OR use efficiency without compromising the quality of clinical care
- ✓ Lead to substantial reduction of the costs associated with OR use in hospitals

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Artificial Intelligence-based systems to improve operating room efficiency and patient safety

1. Pedigree of inventor(s) and team

Marco Zenati is a Professor of Surgery at Harvard Medical School, Chief of Cardiothoracic Surgery at Veterans Affairs Boston Healthcare System, and an Associate Surgeon at Brigham & Women's Hospital. He is also one of the co-founders of *Medrobotics Corporation.*

2. Best data, or demo (video can be helpful)

At the moment, we are working with the concept developed by Professor Zenati. When funding becomes available, a functional system can be created within 2 years. We have developed an approximate budget that can be shared if necessary.

In addition, Professor Zenati has submitted a Bioengineering Research Partnership (BRP) Proposal centered around the disclosed IP, entitled: "Context-Aware Cognitive System for Transcatheter Aortic Valve Replacement". The grant is currently under review by the Center for Scientific Review of the NIH.

3. History of project as a venture so far

The company has not been formed yet. We are looking for a business leader and/or investor interested in supporting our efforts aimed at development of prototype systems that could be tested in a virtual OR environment and, eventually, implemented in a clinical setting.

4. Has this tech been used in a real trial with CRO / added value to a hospital?

This technology is currently being tested in the operating room. Simulations are planned for next year under Dr. Zenati's currently funded NIH R01 grant ("Developing Standardized Intraoperative Process Models to enhance Surgical Safety" R01HL126896 $1.3M 09/01/2016 - 06/30/2019)

5. Details of previous companies founded by investors

Dr. Zenati is one of the founders of *Medrobotics Corporation.* The company is manufacturing robotic systems for minimally invasive surgeries. In 2017 the company closed a $20MM financing and is using the funding to expand and build next generation robotic systems. In 2018 Medrobotics received FDA Clearance for World's First and Only Flexible Transabdominal and Transthoracic Robotic Scope.

6. Technology backstory

Dr. Zenati is passionate about patient safety. His vision is to develop an AI-based system that would monitor surgeon's performance and reduce risks associated with cognitive overload during surgery. Based on feedback from potential partners, we decided to emphasize that in addition to improved patient safety, implementation of this system in clinic could improve efficiency of OR use. The latter aspect could be very attractive for hospitals that have been criticized for prioritizing efficiency over safety.

7. Do you have any info on the fate of analogous companies?

To our best knowledge, the only company developing products for enhancement of OR safety using AI-based approach is Surgical Black Box in Toronto, Canada. Several players, including ExplORer Surgical (as part of the Siemens Healthineers Digital Ecosystem) and CareSyntax develop solutions for increasing OR efficiency.