



UNIVERSITÀ DEGLI STUDI DI NAPOLI
FEDERICO II

itee^{PhD}
information technology
electrical engineering



Cristina Iacono

Automation of robot-assisted surgical procedures

Tutor: Fanny Ficuciello

Cycle: XXXV

Year: 1st

My background

- **MSc degree:** Automation Engineering at Università degli Studi di Napoli Federico II
 - Thesis: Collision Detection and Avoidance of Surgical Tools during Robot-Aided Dissection of Colorectal Polyp
- **Research group/laboratory:**
 - PRISMA LAB
 - ICAROS
- **PhD start date:** 1st November 2019
- **Scholarship type:** Not funded

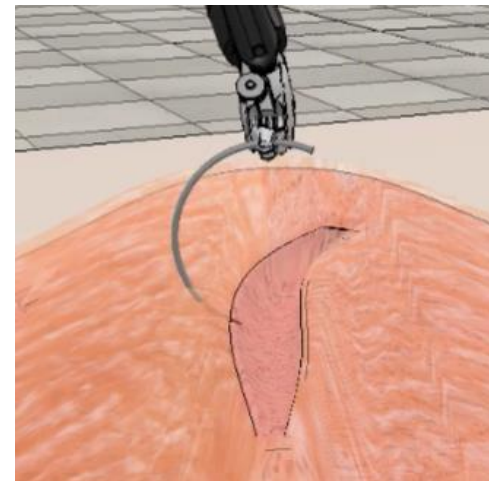


Research field of interest

- **Research topic:** Automation of robot-assisted surgical procedures
 - Automation of repetitive tasks,
 - Vision techniques for robotics systems
 - Shared control techniques



Figura 1 - dVRK presente nel laboratorio ICAROS



Summary of study activities

- Study on :
 - Tools and techniques used to program and control advanced robotics systems
 - Machine learning and deep learning techniques
 - Computer vision techniques
- Courses attended borrowed from MSc curricula :
 - Robot Interaction Control,
 - Vision for Robotic Systems,
 - Robotics Lab
- Attended
 - 2020 IEEE International Conference on Robotics and Automation (ICRA)
 - 2020 Conference on New Technologies for Computer and Robot Assisted Surgery (CRAS)

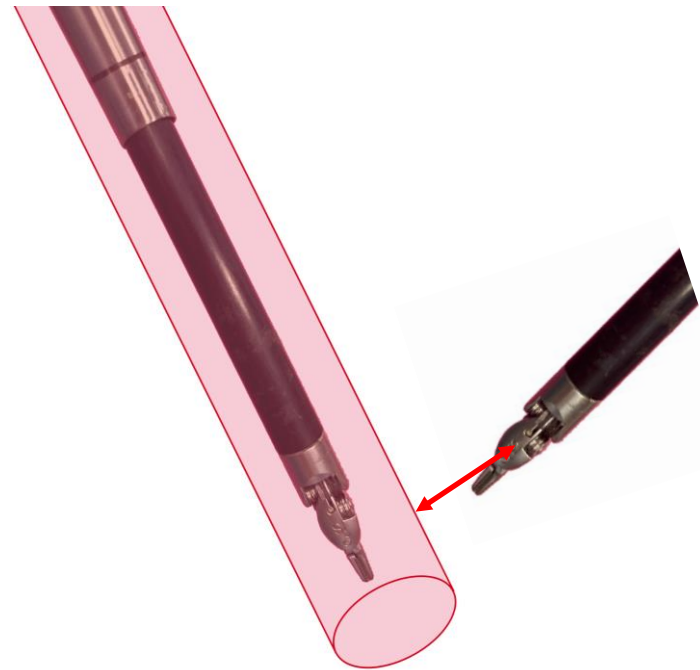
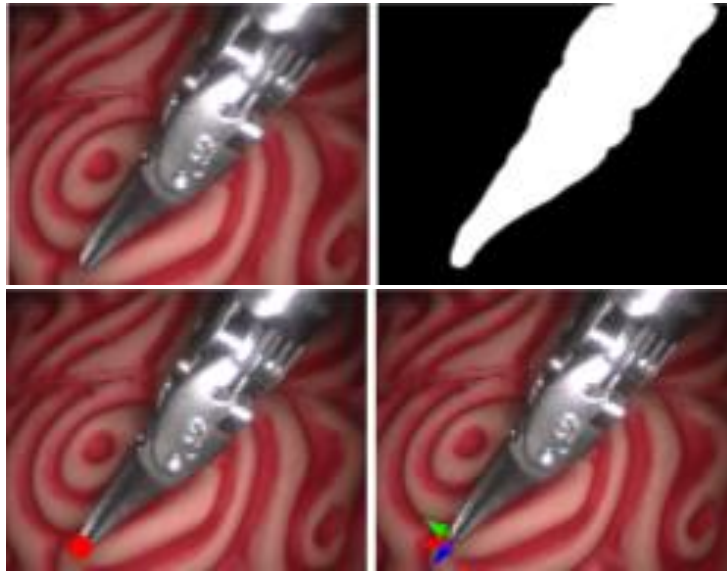
Research activity: Overview

- **Problem:** surgical procedures are comprised of a series of kinematically complex and repetitive tasks
 - Ex. palpating, suturing, cutting, debriding, etc.
- **Objective:**
 - Stereo vision for scene detection, tracking of soft tissues and surgical instruments
 - Shared control architectures to allow the human operator to supervise automated task execution
- **Intended contribution**
 - Full or partial automation of these tasks in order to reduce surgeon errors, duration of procedures, trauma, and expense

Products

[J1]

Moccia R, Iacono C, Siciliano B, Ficuciello F. Vision-based dynamic virtual fixtures for tools collision avoidance in robotic surgery. IEEE Robotics and Automation Letters. 2020 Jan 28;5(2):1650-5.



Thank you for your attention!