Cristina Iacono

Profile

Postdoctoral Researcher at the Surgical Robotics Laboratory of the PRISMA Lab at the Università degli Studi di Napoli Federico II, Department of Electrical Engineering and Information Technology (DIETI) and Interdepartmental Center for Advances in Robotic Surgery (ICAROS). Trained in control theory and robotics. Highly motivated and with a lot of spirit of enterprise. Effective team player with a continuous learning attitude.

Education

Nov 2019 – May 2024 **PhD in Information Technology and Electrical Engineering**, *Università degli Studi di Napoli Federico II*, Research Topic : Automation of Robot-Assisted Surgical Procedures, Supervisor: Prof. Fanny Ficuciello.

Sept 2016 – July 2019 **Master's Degree in Automation Engineering**, *Università degli Studi di Napoli Federico II*, Thesis work: Collision Detection and Avoidance of Surgical Tools in Robot-Aided Dissection of Colorectal Polyp, Final mark 110/110 cum laude.

Sept 2013 – Sept 2016 **Bachelor's Degree in Automation Engineering**, *Università degli Studi di Napoli Federico II*, Thesis work: Automatic calibration of PID with Extremum Seeking method, Final mark 110/110 cum laude.

Experience

May 2024 – ongoing **Post-doc at PRISMA Lab**, *Università degli Studi di Napoli Federico II*, Interdepartmental Center for Advances in Robotic Surgery (ICAROS), Research Topic: Control Strategies for Automated Surgical Robotic Procedures.

Mar 2022 – Dec 2022 **Visiting Student at AIM Lab**, *Worcester Polytechnic Institute*, Research topic: User study for surgical data collection, Supervisor: Prof. Gregory Fisher.

Feb 2018 – July 2018 **ERASMUS+ exchange student**, *Máster en Ingeniería Electrónica, Robótica y Automática*, Universidad de Sevilla.

Research interests

- Shared autonomy in surgical robotics
- Robot teleoperation
- Vision-Based Control
- Optimization-Based Control

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Publications

J2 O. F. Argin, R. Moccia, **C. Iacono**, F. Ficuciello, "da Vinci Research Kit Patient Side Manipulator Dynamic Model using Augmented Lagrangian Particle Swarm Optimization," *IEEE Transaction on Medical Robotics and Bionics, vol. 6, no. 2, pp. 589-599, May 2024, doi: 10.1109/TMRB.2024.3387070*

J1 R. Moccia, **C. Iacono**, B. Siciliano, F. Ficuciello, "Vision-Based Dynamic Virtual Fixtures for Tools Collision Avoidance in Robotic Surgery," *IEEE Robotics and Automation Letters*, vol. 5, no. 2, pp. 1650-1655, April 2020, doi: 10.1109/LRA.2020.2969941

C4 C. Pecorella, **C. Iacono**, B. Siciliano, F. Ficuciello, "Human-Robot Interactive Framework with Remote Center of Motion and Virtual Fixtures for Minimally Invasive Robotic Surgery," *International Symposium on Advances in Robot Kinematics*, Cham: Springer Nature Switzerland, 2024, doi: 10.1007/978-3-031-64057-5_44.

C3 M. Caianiello, M. Ricci, A. Smaldone, S. Hussain, **C. Iacono**, F. Ficuciello, "Optimizing Safety and Efficiency in the Suturing Task: A Comparison of Model Predictive Control and Control Barrier Function Framework," *2024 IEEE International Conference on Advanced Robotics and Its Social Impacts (ARSO)*, Hong Kong, 2024, pp. 104-109, doi: 10.1109/ARSO60199.2024.10557861

C2 **C. Iacono**, M. Caianiello, S. Bartiromo, A. Smaldone, F. Ficuciello, "Design and Validation of a Multimodal Dataset of Robot-Assisted Suturing Gestures based on Kinematic and Force Information," *2024 IEEE International Conference on Advanced Robotics and Its Social Impacts (ARSO)*, Hong Kong, 2024, pp. 98-103, doi: 10.1109/ARSO60199.2024.10557810

C1 M. Caianiello, **C. Iacono**, A. Imperato, F. Ficuciello, "Exploring the Use of Deep Reinforcement Learning Algorithms for Wound-Approaching Trajectories in Robot-Assisted Minimally Invasive Surgery," *2023 21st International Conference on Advanced Robotics (ICAR)*, pp. 285-290, Abu Dhabi, United Arab Emirates, 5-8 December 2023, doi: 10.1109/ICAR58858.2023.10406708

W7 R. Moccia, **C Iacono**, M. Caianiello, F. Ficuciello, "Safe Teleoperation of Surgical Robots through Control Barrier Functions," *40th Anniversary of the IEEE International Conference on Robotics and Automation*, Rotterdam, Netherlands, September 23-26, 2024

W6 M. Caianiello, **C. Iacono**, A. Imperato, F. Ficuciello, "Deep Deterministic Policy Gradient from Success: A New Approach for Robot-Assisted Suturing", *Proc. Institute for Robotics and Intelligent Machine Conference*, Rome, Italy, October 20-22, 2023.

W5 **C. Iacono**, S. Moccia, A. Marzullo, E. De Momi, F. Ficuciello, U. Bracale, "Deep learning-based localization of the biliary tract on white-light images acquired during laparoscopic cholecystectomy," *11th Joint Workshop on New Technologies for Computer/Robot Assisted Surgery*, Naples, Italy, April 25-27, 2022.

W4 **C. Iacono**, S. Moccia, A. Marzullo, E. De Momi, U. Bracale, F. Ficuciello, "Deep learning-based localization of the biliary tract in laparoscopic images acquired during surgical robotic procedures," *17th IFSES World Congress of Endoscopic Surgery*, Barcelona, Spain, Nov. 2021.

W3 **C. Iacono**, S. Moccia, A. Marzullo, E. De Momi, F. Ficuciello, U. Bracale, "Deep learning-based localization of the biliary tract in laparoscopic images acquired during surgical robotic procedures," *Proc. Institute for Robotics and Intelligent Machine Conference*, Rome, Italy, October 8-10, 2021.

W2 **C. Iacono**, R. Moccia, B. Siciliano, F. Ficuciello, "Forbidden Region Virtual Fixtures for Surgical Tools Collision Avoidance," *Proc. Institute for Robotics and Intelligent Machine Conference*, Rome, Italy, October 18-20, 2020.

W1 **C. Iacono**, R. Moccia, B. Siciliano, F. Ficuciello, "Vision-Based Dynamic Virtual Fixtures for Tools Collision Avoidance in MIRS," *10th Joint Workshop on New Technologies for Computer/Robot Assisted Surgery*, Barcelona, Spain, September 28-30, 2020.

Language Skills

Italian **Native Language**

English **Advanced**

Spanish **Intermediate**

Teaching experience

Teaching assistant **Prof. Fanny Ficuciello - *Robotics for Bioengineering*** *2023-2024*

Teaching assistant **Prof. Fanny Ficuciello - *Medical Robotics*** *2023-2024*

Teaching assistant **Prof. Fanny Ficuciello - *Robotics for Bioengineering*** *2019-2021*

Teaching assistant **Prof. Fanny Ficuciello - *Medical Robotics*** *2019-2021*

Professional Service

- Co-organizer of the Workshop Hybrid Human-Machine Interaction in Surgery at The Hamlyn Symposium 2024, June 25-28, 2024, Royal Geographical Society, London, UK
- Program Committee member of the 2022 Conference on New Technologies for Computer and Robot Assisted Surgery held in Napoli, Italy, April 25-27, 2022
- Associate Editor for the 2025 IEEE International Conference on Robotics & Automation (ICRA 2025)