Guido Manni
Curriculum Vitae

Professional experience

2024–2025   **Research fellowship**

Department of Engineering, Università Campus Bio-Medico di Roma, SSD ING-INF/05 (Computer Science and Computer Engineering).

Research Project: "AI techniques for augmented reality in robotic surgery".

Education and training

2021-2026   **PhD in Artificial Intelligence**

XXVII cycle, Health and Life Sciences – Università Campus Bio-Medico di Roma.

2019–2021   **Master's Degree in Biomedical Engineering**

Final mark: 110/110 – Sapienza University of Rome.

Thesis: "Application of deep learning in plastic-reconstructive practice for facial reconstruction".

2016–2019   **Bachelor's Degree in Clinical Engineering**

Final mark: 104/110 – Sapienza University of Rome.

Thesis: "A markerless video system for staging facial palsy".

Research activity

My research activity focuses on artificial intelligence applied to computer-assisted surgery and medical imaging. The research combines methodological development and practical applications, with particular emphasis on robust visual perception, data-efficient learning, and objective quantitative assessment in real surgical and clinical contexts.

Main research lines include:

- **Computer vision for surgical applications:** development of robust visual perception methods for surgical environments, including monocular visual SLAM for minimally invasive surgery combining unsupervised pose estimation with monocular depth prediction [S1]. Generative deep learning frameworks for preoperative surgical planning, integrating facial inpainting and depth estimation to predict outcomes from 2D clinical photographs [J1]. Objective automated assessment systems for quantitative clinical measurements, utilizing machine learning for automatic anatomical landmark detection without markers [J2].
- **Data-efficient learning for medical imaging:** semi-supervised and few-shot learning frameworks capable of learning from very limited labeled data (5-50 samples per class)

while leveraging unlabeled medical images [S2]. GAN-based architectures for image-to-image translation preserving authentic anatomical structures. Training strategies with dynamic alternation between supervised and unsupervised learning, combined with ensemble-based pseudo-labeling.

Research projects

2024–2025 Research fellowship: "AI techniques for augmented reality in robotic surgery" at Università Campus Bio-Medico di Roma.

2021–2026 PhD research: "AI applied to robotic surgery" at Università Campus Bio-Medico di Roma.

Teaching activity

2026-current **Lecturer**
Course "Information Processing Systems", Medicine and Surgery, Faculty of Medicine and Surgery, SSD IINF-05/A – Saint Camillus International University of Health Sciences, Rome, Italy.

2025–current **Lecturer**
Course "Introduction to Image Processing", Bachelor's Degree in Medical Imaging and Radiotherapy Techniques, Faculty of Medicine and Surgery, SSD ING-INF/05 – University Campus Bio-Medico of Rome.

2022–2024 **Teaching Assistant**
Course "Introduction to Image Processing", Bachelor's Degree in Medical Imaging and Radiotherapy Techniques, Faculty of Medicine and Surgery – University Campus Bio-Medico of Rome.

Supervision activity

Supervision of 2 Master's theses in the following areas: Deep Reinforcement Learning, surgical path planning, robotic surgery, computer vision, segmentation.

2024–2025 Master's Degree in Biomedical Engineering.
Thesis: "Development of a Deep Learning Framework for Blood Perfusion Classification with ICG-FI in Laparoscopic Colorectal Surgery".

2021–2022 Master's Degree in Biomedical Engineering.
Thesis: "Comparative Study of Deep Reinforcement Learning Algorithms for Path Planning in Robotic Surgery".

PhD schools and post-graduate courses

11/10/23–20/10/23   **3D Geometry Representation and Processing for Deep Learning**
Consiglio Nazionale delle Ricerche.

25/09/23–29/09/23   **PhD School on AI in Health and Life Sciences**
Università Campus Bio-Medico di Roma.

23/05/23–07/06/23   **Developing in Human-Robot Interaction**
Università Cattolica del Sacro Cuore.

26/06/23–30/06/23   **Effective Habits and skills for successful young scientists**
University of Genova.

17/10/22–10/11/22   **Can we trust XAI? Opening the black box**
Università Campus Bio-Medico di Roma.

26/09/22–30/09/22   **PhD School on AI in Health and Life Sciences**
Università Campus Bio-Medico di Roma.

Scholarships and awards

2021–2026   **PhD Scholarship**
Grant for the XXVII cycle of the National PhD in Artificial Intelligence, Health and Life Sciences at Università Campus Bio-Medico di Roma.

Personal skills

Mother tongue: Italian

Other languages: English – Excellent spoken and written knowledge (Cambridge B2 Certificate)

Computer skills: Development of machine and deep learning models, C, Python, MATLAB; use of advanced libraries such as PyTorch, TensorFlow, OpenCV

Publications

International journals

[J1] Bini F, **Manni G**, Marinozzi F. Deep learning framework for facial reconstruction outcome prediction: integrating image inpainting and depth estimation for computer-assisted surgical planning. Appl Sci. 2025 Nov 21;15(23):12376. doi: 10.3390/app152312376.

[J2] Monini S, Ripoli S, Filippi C, Fatuzzo I, Salerno G, Covelli E, Bini F, Marinozzi F, Marchelletta S, **Manni G**, Barbara M. An objective, markerless videosystem for staging facial palsy. Eur arch otorhinolaryngol. 2021 mar 15. doi: 10.1007/s00405-021-06682-z. epub ahead of print. pmid: 33721067.

Submitted works

[S1] **Manni G**, Lauretti C, Prata F, Papalia R, Zollo L, Soda P. BodySLAM: A Generalized Monocular Visual SLAM Framework for Surgical Applications. arXiv preprint arXiv:2408.03078. 2024 Aug 7.

[S2] **Manni G**, Lauretti C, Zollo L, Soda P. SPARSE data, rich results: few-shot semi-supervised learning via class-conditioned image translation. arXiv preprint arXiv:2508.06429. 2025.

International conferences

[C1] Guarrasi V, Tronchin L, Caruso CM, Rofena A, **Manni G**, Aksu F, Paolo D, Iannello G, Sicilia R, Cordelli E, Soda P. Building an AI-enabled metaverse for intelligent healthcare: opportunities and challenges. Ital-IA 2023.

[C2] Aksu F, Bria A, Caragliano AN, Caruso CM, Chen W, Cordell E, Coser O, Francesconi A, Furia L, Guarrasi V, Iannello G, Lauretti C, **Manni G**, Marino G, Paolo D, Ruffini F, Shen L, Sicilia R, Soda P, Tamantini C, Tortora M, Wu Z, Zollo L. Towards AI-driven next generation personalized healthcare and well-being. Ital-IA 2024.

[C3] Sicilia R, Aksu F, Bria A, Caragliano AN, Caruso CM, Cordelli E, Francesconi A, Guarrasi V, Iannello G, **Manni G**, Mantegna M, Marino G, Molino D, Mulero Ayllón E, Ruffini F, Shen L, Tortora M, Soda P. Next-gen health: from multimodal AI to foundation models. Ital-IA 2025.

[C4] Morfino R, Lauretti C, **Manni G**, Soda P, Zollo L. Robotic-assisted flexible colonoscopy: a comparison of tele-operated control strategies. GNB2025, June 16-18, 2025, Palermo, Italy.

[C5] Prata F, Lauretti C, Morfino R, **Manni G**, Capillo A, Di Noto D, Chessari M, Massenzi M, Soda P, Zollo L, Papalia R. Real-Time Image-Guided Robot-Assisted Partial Nephrectomy: Design and Methodology of the BISTOURY-CLINICAL Prospective Trial. European Association of Urology Congress, 2026.