

Dr Giulio Dagnino, PhD - Curriculum Vitae

Current Positions

Associate Professor of Medical Robotics, University of Twente, RaM Lab, The Netherlands.
Research Coordinator Robotic Surgery, University of Turin, Dept. Surgical Sciences, Italy

Education

- Ph.D. 2013 Medical Robotics**
Italian Institute of Technology – Università degli Studi di Genova, Genoa, Italy
Dissertation: “*New Technologies for Robot-Assisted Laser Phonomicrosurgery*”
Area of specialization: Computer-Assisted Robotic Surgery
Advisors: Prof Darwin G. Caldwell, Dr Leonardo S. De Mattos
- M.Sc. 2007 Bioengineering**
Università degli Studi di Genova, Genoa, Italy
- B.Sc. 2004 Biomedical Engineering**
Università degli Studi di Genova, Genoa, Italy

Research Experience

Nov 2023 - Research Coordinator Robotic Surgery, University of Turin, Italy
present

Coordinating research on minimally invasive robotic surgery.

Oct 2022 - Associate Professor of Medical Robotics, University of Twente, RaM Lab, The Netherlands
present

Nov 2020 - Assistant Professor of Medical Robotics, University of Twente, RaM Lab, The Netherlands
Sep 2022

Leading research on *robot assisted endovascular intervention*. Closely working with clinicians, my students and I are currently developing a new robotic platform for endovascular surgery incorporating novel device designs with improved imaging based on MR. The use of robotics and computer assistance in endovascular intervention aims to address some of the current clinical challenges - such as limited intra-operative navigation - with the added benefit of allowing the operator to remotely control and manipulate devices. Main research themes include:

- Design and development of novel MR-safe robotic devices for targeted therapy.

- Optimized MR-based surgical navigation for robot-assisted procedures.
- Enhanced control framework for surgical robots.

I am also part of the RAM lab management team.

July 2022 - *Visiting Researcher, Università degli Studi di Genova, Genoa, Italy*

With Prof Maura Casadio

Conducted research on advanced simulation for haptic guidance for robot-assisted endovascular intervention within the DIBRIS Department and the SIMAV lab. This experience established student exchange between UNIGE and the University of Twente within the Erasmus programme.

Sep 2017 - *Research Associate and Assistant Supervisor*

Dec 2020 *The Hamlyn Centre for Robotic Surgery, Imperial College London, UK*

Supervisor: Prof Guang-Zhong Yang

Research focused on Robot-Assisted Endovascular Intervention.

Cardiovascular diseases are the most common cause of death worldwide. Endovascular interventions are considered as gold standard in disease treatment. Remotely operated robotic devices are employed for minimally invasive approaches. The main advantages are: shorter recovery times, improvement of clinical skills (precision, stability), and facilitation of the procedure. However, benefits are compensated by absence of haptic feedback and high doses of radiation to the patient.

I have coordinated a research team of 5 (2 postdocs, 2 PhD students, 1 clinician) and directly working on the control and real-time navigation for an image-guided robotic platform for endovascular interventions. The robotic platform presents a novel versatile robotic master-slave platform for manipulation of standard endovascular instruments in different imaging environments, such as fluoroscopy and MRI. Besides of the pneumatic actuation of all DoF to satisfy MRI safety regulations, the design targets a hands-on interventional workflow to support the introduction to the surgical theatre. The platform can be used in MRI-guided interventions, e.g., paediatric cases, with strong demand for alternative imaging with absence of ionizing radiation. Also, teleoperation enables the clinician to remotely manipulate endovascular instrumentation in conventional fluoroscopic setups with reduced exposure times for the operator and handling of instrumentation in the MRI bore. Thus, benefits of the device are twofold and contribute to patient outcome and daily routines of clinical users. More information in this [video](#).

Sep 2013 - *Postdoctoral Research Fellow, Bristol Robotics Laboratory, University of the West of England, Bristol, United Kingdom*

Sep 2017

Supervisors: Prof Chris Melhuish, Prof Sanja Dogramadzi

I have conducted research on computer-assisted robotic surgery and medical imaging, working side-to-side with orthopaedic surgeons at the Bristol Royal Infirmary, Bristol, UK. I successfully demonstrated the integration of robotic assistance and real-time image-guidance in minimally invasive orthopedic surgery. This system uses patient-specific CT images to reduce joint fractures using a robotic system. CT images of a fracture are acquired preoperatively and processed to generate 3D models of the fracture. Such models are imported into a reduction software which allows the surgeon to pre-plan the reduction of the fracture, by virtually manipulating 3D models (virtual reduction). Motion commands for the robotic system are generated based on the virtual reduction and the bone fragments

connected to robotic manipulator are repositioned accordingly, achieving the physical reduction of the fracture. Real-time updated pose of the bone fragments, provided by the navigation system, is integrated in the closed loop control of the robotic system enabling intra-operative image-guidance. The system has been successfully tested on human cadavers, paving the way to develop novel technologies for percutaneous treatment of complex fractures. Please refer to this [video](#) for more information. Achievements:

- Designed and developed a new robotic system for the percutaneous manipulation of fracture fragments, including **real-time vision-based control, force control**, new surgical strategies and protocols, and new **surgical interfaces**;
- Designed and developed an **intra-operative 3D imaging system for real-time fracture manipulation**, including 3D modelling of fractures from CT data, **image registration**, and **real-time tracking**;
- Designed a 3D navigation system for pre-operative planning and intra-operative **real-time navigation for robot-guidance** in fracture surgeries;
- Designed and developed a new system for the measurement of bone fragments manipulation forces during fracture surgeries, and conducted **clinical trials** on humans.
- **Integrated the subsystems** – imaging, control, hardware – into the final system ready for lab and cadaveric study;
- Designed lab study (phantom) and **cadaveric study** for the robotic system assessment;

May 2013 - Research Fellow, Sanremo Hospital – ASL1, Imperia, Italy

Aug 2013 Research Advisor: Dr Giuseppe Ferrea

The aim of this research was to lay the groundwork for the evaluation of drug presence (i.e. Rifampicin and AZT) in the central nervous system using MRS (Magnetic Resonance Spectroscopy). The goal is to develop a non-invasive approach (MRS) to replace the current invasive methodology which requires a lumbar puncture to collect cerebrospinal fluid for diagnostic testing. Achievements:

- Run pilot study on human;
- Performed data acquisition and analysis of MRS raw data;
- Developed algorithms enabling the comparison of MRS spectra;
- Performed qualitative evaluation of drug presence using MRS spectra data.

Jan 2010 - Doctoral Fellow, Dept. of Advanced Robotics, Italian Institute of Technology,

Apr 2013 **Genoa, Italy**

Advisors: Prof Darwin G. Caldwell, Dr Leonardo S. De Mattos

My research incorporated image-guided surgery, vision-based closed-loop system control, and user interface design and evaluation. Working on these research themes, I gained an understanding of the benefits of real-time on-site visualization of lesions and accurate laser aiming for the surgical outcome. My motivation was the potential impact of the system on the lives of patients undergoing laser phonomicrosurgery. Preliminary results from this research contributed to the development of a research proposal then funded by the EC (μ RALP project, 7th framework programme, 2012-2015). Achievements:

- Developed software tools, algorithms and GUI for controlling a system for robot-assisted laser microsurgery: system calibration, **system control in open-loop, and vision-based closed-loop control**;

- Developed software toolbox and GUI for improving on-site **visualization of laryngeal lesions through an optical surgical microscope**;
- Designed a **multispectral imaging system for intra-operative visualization of laryngeal lesions**.

May 2008 - Graduate Fellow, San Martino University Hospital, Genoa, Italy

Dec 2009 Advisor: Dr Dimitri Sossai

- Conducted research on safety protocol and test on an additional mobile unit producing laminar airflow in operating rooms with conventional turbulent air ventilation; correlation between air borne particulate and bacterial charge in Operating Room;
- Safety and quality assurance procedure in hospital;
- Administration of corporate documentation, e.g., risk assessment, fire emergency evacuation plan;
- Auditor activity in Hospital Departments according to OHSAS 18001;

Industrial Experience

Jan 2008 - Trainee Clinical Engineer, Boston Scientific, Genoa, Italy

Apr 2008

- Technical support to Business Unit Director, area managers, and business agents;
- Business statistical analysis;

Funding

Secured:

1. **HORIZON-CL4-2023-DIGITAL-EMERGING-01:** 'Intelligent Robotic Endoscopes for Improved Healthcare Services', 6.1M EUR (1.25M EUR to my group), G. Dagnino (Co-I)
2. **CMI-NEN Seed Money Grant:** 'Smart Condition Monitoring For Pneumatically-Propelled MR-Safe Endovascular Robotics', 2023, 15K EUR, G. Dagnino (PI)
3. **CMI-NEN Seed Money Grant:** 'cooPerative smaRt cOnTrol for EndovascUlar robotS (PROTEUS)', 2022, 15K EUR, G. Dagnino (PI)
4. **ICL-TUM Joint Academy of Doctoral Studies:** 'Non-fluoroscopy-based robotic catheter manipulation and tracking based on machine learning, bioelectrical localization and robotics' 2020, 3y doctoral studentship, contributed to and co-written the proposal.
5. **VC ECR Development at UWE:** 'Novel Software for real-time visualization and "virtual Histology" of colorectal lesions during colonoscopy', 2017, 15K GBP, G. Dagnino (PI).
6. **European Commission's 7th Framework Programme, FP7-ICT-2011-7 call:** 'Micro-technologies for Robot-Assisted Laser Phonomicrosurgery', 2011, 3.5M EUR in total of which 1.1M EUR to my institution. Contributed to preliminary work and proposal.
7. **Doctoral Fellowship,** 2010-2013, University of Genoa, Italy, 50K EUR
8. **Graduate Fellowship** (National Competition for Biomedical Engineers), 2008-2009, San Martino Hospital, Italy, 20K EUR

Awards and Honours

1. **IEEE Transactions on Biomedical Engineering Featured Article, June 2023 – Paper:** G. Dagnino*, D. Kundrat*, T.M.Y. Kwok, M.E.M.K. Abdelaziz, W. Chi, A. Nguyen, C. Riga, G.-Z. Yang, " In-vivo Validation of a Novel Robotic Platform for Endovascular Intervention", *IEEE Transactions on Biomedical Engineering*, 2022 (*joint first authors) - [link](#)

2. **IEEE Transactions on Biomedical Engineering Featured Article, October 2021 – Paper:** D. Kundrat*, G. Dagnino*, T.M.Y. Kwok, M.E.M.K. Abdelaziz, W. Chi, A. Nguyen, C. Riga, G.-Z. Yang, “An MR-Safe Endovascular Robotic Platform: Design, Control, and Ex-Vivo Evaluation”, *IEEE Transactions on Biomedical Engineering*, 2021 (*joint first authors) - [link](#)
3. **Best Paper Award (Robot-Assisted Endovascular Intervention project): top three best experimental papers for 2019-2020, Society for Cardiac Robotic Navigation (SCRN), 2021**
4. **Best Paper Award (Robot-Assisted Endovascular Intervention project), CURAC19, Reutlingen, Germany, 2019**
5. **Best Design Award (Robot-Assisted Endovascular Intervention project), Surgical Robot Challenge 2019, London, UK**
6. Best Innovation Award (Robot-Assisted Fracture Surgery project), Bristol & Bath Health and Care Awards, 2018
7. Excellent performance, achievements and contribution award, Imperial College London, 2018
8. VC’s Early Career Research Development Award, 2017
9. Higher Education Academy Fellowship, 2016
10. **Best Medical Robotics Paper Award (Robot-Assisted Fracture Surgery project), ICRA 2016, Stockholm, Sweden, 2016 - [link](#)**
11. Doctoral Fellowship – University of Genoa, Genoa, Italy, 2010
12. Graduate Fellowship – San Martino Hospital, Genoa, Italy, 2008

Invited Talks

1. “MR-Safe Endovascular Robotics” at the Hamlyn Symposium on Medical Robotics 2023 workshop on “Endoluminal Robots”, London, UK, June **2023**
2. “Vision-Based Sensing in Endovascular Robotics” at the ICRA2023 workshop 'Force and shape perception for surgical instruments and robots', IEEE ICRA, London, UK, May/June **2023**
3. “Vision-Based Haptic Guidance in Robot-Assisted Endovascular Applications”, 8th International Summer School of Neuroengineering, Università degli Studi di Genova, Genoa, Italy, July **2022**
4. “Image-Guided Robotic Surgery: Case Study and Future Challenges”, Institute of Mechatronic Systems, Leibniz Universität Hannover, Germany, July **2022**
5. “Image-Guided Robotic Surgery: Device Design and Clinical Applications”, Università degli Studi di Genova, Genoa, Italy, Nov **2021, 2022**
6. “Robotics and Imaging in Healthcare: History, Endovascular Intervention Case Study, and Future Challenges”, 2020 Summer School on Medical Robotics, Institute of Medical Robotics, Shanghai Jiao Tong University, Jul **2020**
7. “Image-Guidance and Robotic Assistance in Surgery”, Academic Forum 2019, Institute of Medical Robotics, Shanghai Jiao Tong University, Dec **2019**
8. “Computer and robotic assistance in orthopaedics and trauma surgery”, *9th Joint Workshop on New Technologies for Computer/Robot Assisted Surgery CRAS*, Genoa, Italy, Mar **2019**
9. “Rise of the Surgical Robots: Using Image-Guidance and Robotic Assistance to Support the Surgical Team”, *10th Workshop on Biomedical Engineering*, Faculty of Sciences of the University of Lisbon, Portugal, Apr **2018**
10. “Image-Guided Robotic Surgery: Integrating Robotics, Medical Imaging, and Sensing to Support the Surgical Team and Produce Better Outcomes”, Worcester Polytechnic Institute, Department of Biomedical Engineering & Robotics Engineering Programme, USA, Jan **2018**

Publications

Refereed International Journals

1. **G. Dagnino*** and D. Kundrat*, “Robot-Assistive Minimally Invasive Surgery: Trends and Future Directions”, *Int J Med Robotics Comput Assist Surg.*, **2023** (under review) (*joint first authors)
2. **G. Dagnino**, D. Kundrat, P. Moreria, H. Wurdemann, M. Abayazid, “Editorial: Translational Research in Medical Robotics - Challenges and Opportunities”, *Frontier in Robotics and AI*, Volume 10, **2023** - doi: [10.3389/frobt.2023.1270823](https://doi.org/10.3389/frobt.2023.1270823)
3. **G. Dagnino***, D. Kundrat*, T.M.Y. Kwok, M.E.M.K. Abdelaziz, W. Chi, A. Nguyen, C. Riga, G.-Z. Yang, " In-vivo Validation of a Novel Robotic Platform for Endovascular Intervention", *IEEE Transactions on Biomedical Engineering*, **2022**, (*joint first authors) - doi: [10.1109/TBME.2022.3227734](https://doi.org/10.1109/TBME.2022.3227734)
4. A. Gao, R. R. Murphy, W. Chen, **G. Dagnino**, P. Fischer, M. G. Gutierrez, D. Kundrat, B. J. Nelson, N. Shamsudhin, H. Su, J. Xia, A. Zemmar, D. Zhang, C. Wang, G.-Z. Yang, “Progress in robotics for combating infectious diseases”, *Science Robotics*, 6, eabf1462, DOI: 10.1126/scirobotics.abf1462, **2021**
5. D. Kundrat*, **G. Dagnino***, T.M.Y. Kwok, M.E.M.K. Abdelaziz, W. Chi, A. Nguyen, C. Riga, G.-Z. Yang, “An MR-Safe Endovascular Robotic Platform: Design, Control, and Ex-Vivo Evaluation”, *IEEE Transactions on Biomedical Engineering*, **2021** (*joint first authors) - <https://doi.org/10.1109/TBME.2021.3065146>
6. G. Z. Yang, C. Riviere, **G. Dagnino**, and P. Fiorini, “Guest Editorial Surgical Robotics: Clinical Challenges and Levels of Autonomy”, *IEEE Transactions on Medical Robotics and Bionics*. doi: [10.1109/TMRB.2020.2990783](https://doi.org/10.1109/TMRB.2020.2990783), May **2020**
7. I. Georgilas, **G. Dagnino**, B. A. Martins, P. Tarassoli, S. Morad, K. Georgilas, P. Koehler, R. Atkins, and S. Dogramadzi, “Design and Evaluation of a Percutaneous Fragment Manipulation Device for Minimally Invasive Fracture Surgery”, *Front. Robot. AI* 6:103. doi: [10.3389/frobt.2019.00103](https://doi.org/10.3389/frobt.2019.00103), Oct **2019**
8. J. Troccaz*, **G. Dagnino***, and G.-Z. Yang, “Frontiers of Medical Robotics: from concept to systems to clinical translation”, *Annual Review of Biomedical Engineering*, 21:193–218, **2019** (*joint first authors) - <https://doi.org/10.1146/annurev-bioeng-060418-052502>
9. I. Georgilas, **G. Dagnino**, P. Tarassoli, R. Atkins, and S. Dogramadzi, “Robot-Assisted Fracture Surgery: Surgical Requirements and System Design”, *Annals of Biomedical Engineering*, DOI: 10.1007/s10439-018-2005-y, Mar **2018**
10. **G. Dagnino**, I. Georgilas, S. Morad, P. Gibbons, P. Tarassoli, R. Atkins, and S. Dogramadzi, “Image-guided surgical robotic system for percutaneous reduction of joint fractures”, *Annals of Biomedical Engineering*, 45(11), 2648-2662, DOI: 10.1007/s10439-017-1901-x, Nov **2017**
11. **G. Dagnino**, I. Georgilas, S. Morad, P. Gibbons, P. Tarassoli, R. Atkins, and S. Dogramadzi, “Intra-Operative Fiducial-Based CT/Fluoroscope Image Registration Framework for Image-Guided Robot-Assisted Joint Fracture Surgery”, *International Journal of Computer Assisted Radiology and Surgery*, DOI 10.1007/s11548-017-1602-9, May **2017**
12. I. Georgilas, **G. Dagnino**, P. Tarassoli, R. Atkins, and S. Dogramadzi, “Towards Robot Assisted Fracture Surgery for Intra-Articular Joint Fractures”, *The Bone & Joint Journal* 99-B:53 Article number SUPP 9, May **2017**
13. I. Georgilas. **G. Dagnino**, and S. Dogramadzi, “Safe Human-Robot Interaction in Medical Robotics: A case study on Robotic Fracture Surgery System” *Journal of Medical Robotics Research*, DOI: <http://dx.doi.org/10.1142/S2424905X17400086>, Mar **2017**

14. **G. Dagnino**, I. Georgilas, P. Köhler, R. Atkins, and S. Dogramadzi, "Navigation system for Robot-Assisted Intra-Articular Lower-Limb Fracture Surgery" *International Journal of Computer Assisted Radiology and Surgery*, DOI 10.1007/s11548-016-1418-z, May **2016**
15. **G. Dagnino**, I. Georgilas, P. Tarassoli, R. Atkins, and S. Dogramadzi, "Force-Torque Measurement System For Fracture Surgery", *Bone Joint J*, 98-B (SUPP 5) 19, Feb **2016**
16. **G. Dagnino**, I. Georgilas, P. Tarassoli, R. Atkins, and S. Dogramadzi, "Vision-Based Real-Time Position Control of a Semi-automated System for Robot-Assisted Joint Fracture Surgery", *International Journal of Computer Assisted Radiology and Surgery*, DOI 10.1007/s11548-015-1296-9, October **2015**
17. **G. Dagnino**, L. S. Mattos, and D. G. Caldwell, "A Vision-Based System for Fast and Accurate Laser Scanning in Robot-Assisted Phonomicrosurgery", *International Journal of Computer Assisted Radiology and Surgery*, DOI 10.1007/s11548-014-1078-9, 10(2): 217-229, February **2015**
18. D. Sossai*, **G. Dagnino***, F. Sanguineti, and F. Franchin, "Mobile laminar airflow screen for additional operating room ventilation: reduction of intraoperative bacterial contamination during total knee arthroplasty", *Journal of Orthopaedics and Traumatology* 12(4): 207-211, **2011** (*equal contribution)
19. D. Sossai, V. Puro, L. Chiapparoli, **G. Dagnino**, B. Odone, *et al.*, "Using intravenous catheter system to prevent needlestick injury", *Nursing Standard* 24(29): 42-46, **2010**

Refereed Full Paper Conference Publications

1. J. Bos, D. Kundrat, and **G. Dagnino**, "Towards an Action Recognition Framework for Endovascular Surgery", IEEE EMBC 2023, Sydney, July **2023**
2. A. Nguyen, D. Kundrat, **G. Dagnino**, W. Chi, M. Abdelaziz, Y. Ma, T. Kwok, C. Riga, G.-Z. Yang, "End-to-End Real-time Catheter Segmentation with Optical Flow-Guided Warping during Endovascular Intervention", *IEEE Int. Conf. Robotics and Automation (ICRA) 2020*, Paris, May-Jun **2020**
3. W. Chi, **G. Dagnino**, T. Kwok, A. Nguyen, D. Kundrat, M. Abdelaziz, C. Riga, C. Bicknell, G.-Z. Yang, "Collaborative Robot-Assisted Endovascular Catheterization with Generative Adversarial Imitation Learning", *IEEE Int. Conf. Robotics and Automation (ICRA) 2020*, Paris, May-Jun **2020**
4. D. Kundrat, **G. Dagnino**, M. Abdelaziz, T. Kwok, W. Chi, C. Riga, G.-Z. Yang, "Towards MR-Safe Endovascular Robotics", CURAC19, Germany, Sep **2019** – **Winner of the Best Paper Award**
5. M.B. Molinero, **G. Dagnino**, J. Liu, W. Chi, M. Abdelaziz, T. Kwok, C. Riga, G.-Z. Yang, "Haptic Guidance for Robot-Assisted Endovascular Procedures: Implementation and Evaluation on Surgical Simulator", 2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Macau, China, Nov **2019** – **oral presentation**
6. M. Abdelaziz, D. Kundrat, M. Pupillo, **G. Dagnino**, T. Kwok, W. Chi, V. Groenhuis, C. Riga, S. Stramigioli, G.-Z. Yang, "Toward a Versatile Robotic Platform for Fluoroscopy and MRI-Guided Endovascular Interventions: A Pre-Clinical Study", 2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Macau, China, Nov **2019** – **oral presentation**
7. **G. Dagnino**, J. Liu, M. Abdelaziz, W. Chi, C. Riga, G.-Z. Yang, "Haptic Feedback and Dynamic Active Constraints for Robot-Assisted Endovascular Catheterization", 2018 IEEE/RSJ

- International Conference on Intelligent Robots and Systems (IROS), Madrid, Spain, Oct **2018** – **oral presentation**
8. W. Chi, J. Liu, M. Abdelaziz, **G. Dagnino**, C. Riga, C. Bicknell, G.-Z. Yang, “Trajectory Optimization of Robot-Assisted Endovascular Catheterization with Reinforcement Learning”, 2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Madrid, Spain, Oct **2018** – **oral presentation**
 9. W. Chi, **G. Dagnino**, and Guang-Zhong Yang, “Learning-based Robotic Task Planning for Endovascular Catheterization”, *The UK-RAS Network Conference On Robotics And Autonomous Systems*, Bristol, UK, December **2017** – oral presentation
 10. **G. Dagnino**, I. Georgilas, S. Morad, P. Gibbons, P. Tarassoli, R. Atkins, and S. Dogramadzi, “Intra-Operative Fiducial-Based CT/Fluoroscope Image Registration Framework for Image-Guided Robot-Assisted Joint Fracture Surgery”, *31st Annual Conference of the International Society for Computer Aided Surgery*, CARS 2017, Barcelona, Spain, June **2017** – **oral presentation**
 11. **G. Dagnino**, I. Georgilas, K. Georgilas, P. Köhler, S. Morad, P. Gibbons, R. Atkins and S. Dogramadzi, “Robot-bone attachment device for robot-assisted percutaneous bone fragment manipulation”, *17th Annual Meeting of the International Society for Computer Assisted Orthopaedic Surgery*, Aachen, Germany, June **2017** – **oral presentation**
 12. **G. Dagnino**, I. Georgilas, S. Morad, P. Gibbons, P. Tarassoli, R. Atkins, and S. Dogramadzi, “RAFS: a computer-assisted robotic system for minimally invasive joint fracture surgery, based on pre- and intra-operative imaging”, *IEEE Int. Conf. Robotics and Automation (ICRA) 2017*, Singapore, May-Jun **2017** – **oral presentation**
 13. Y. Ma, **G. Dagnino**, I. Georgilas, and S. Dogramadzi, “Automatic Tool Detection in X-Ray Images for Robotic Assisted Joint Fracture Surgery”, *IEEE International Conference on iThings, GreenCom, CPSCom, and SmartData 2017*, Exeter, UK, Jun **2017**
 14. **G. Dagnino**, I. Georgilas, P. Köhler, S. Morad, R. Atkins, and S. Dogramadzi, “Navigation system for Robot-Assisted Intra-Articular Lower-Limb Fracture Surgery”, *30th Annual Conference of the International Society for Computer Aided Surgery*, CARS 2016, Heidelberg, Germany, June **2016** – oral presentation
 15. **G. Dagnino**, I. Georgilas, P. Köhler, and S. Dogramadzi, “Image-Based Robotic System for Enhanced Minimally Invasive Intra-Articular Fracture Surgeries”, *IEEE Int. Conf. Robotics and Automation (ICRA) 2016*, Stockholm, Sweden, May **2016** – **oral presentation** – **Winner of the IEEE ICRA Best Paper Award in Medical Robotics**
 16. **G. Dagnino**, I. Georgilas, P. Tarassoli, R. Atkins, and S. Dogramadzi, “Intra-Operative 3D Imaging System for Robot-Assisted Fracture Manipulation”, *37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, EMBC 2015, Milano, Italy, August **2015** – oral presentation
 17. **G. Dagnino**, I. Georgilas, P. Tarassoli, R. Atkins, and S. Dogramadzi, “Design and Real-Time Control of a Robotic System for Fracture Manipulation”, *37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, EMBC 2015, Milano, Italy, August **2015** – poster presentation
 18. I. Georgilas, **G. Dagnino**, P. Tarassoli, R. Atkins, and S. Dogramadzi, “Preliminary Analysis of Force-Torque Measurements for Robot-Assisted Fracture Surgery”, *37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, EMBC 2015, Milano, Italy, August **2015** – poster presentation

19. D. S. Richards, I. Georgilas, **G. Dagnino**, and S. Dogramadzi, “Powered Exoskeleton with Palm Degrees of Freedom for Hand Rehabilitation”, *37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, EMBC 2015, Milano, Italy, August **2015** – poster presentation
20. **G. Dagnino**, L. S. Mattos, and D. G. Caldwell, “A Vision-Based System for Fast and Accurate Laser Scanning in Robot-Assisted Phonomicrosurgery”, *28th Annual Conference of the International Society for Computer Aided Surgery*, CARS 2014, Fukuoka, Japan, June **2014** – oral presentation
21. N. Deshpande, L. S. Mattos, G. Barresi, A. Brogni, **G. Dagnino**, L. Guastini, G. Peretti, and D. G. Caldwell, “Imaging Based Metrics for Performance Assessment in Laser Phonomicrosurgery”, *IEEE International Conference on Robotics and Automation*, ICRA 2013, Kongresszentrum Karlsruhe, Karlsruhe, Germany, May **2013** – oral presentation
22. L. S. Mattos, **G. Dagnino**, D. G. Caldwell, L. Guastini, F. Mora, and G. Peretti, “Innovations in robot-assisted laser laryngeal microsurgery”, *9th European Laryngological Society*, ELS 2012, Helsinki, June **2012** – oral presentation
23. **G. Dagnino**, L. S. Mattos, and D. G. Caldwell, “New Software Tools for Enhanced Precision in Robot-Assisted Laser Phonomicrosurgery”, *IEEE Engineering in Medicine and Biology Society*, EMBC 2012, San Diego, CA, USA, August **2012** – oral presentation
24. L. S. Mattos, **G. Dagnino**, G. Becattini, M. Dellepiane, and D. G. Caldwell, “A Virtual Scalpel System for Computer-Assisted Laser Microsurgery”, *IEEE/RSJ International Conference on Intelligent Robots and System*, IROS 2011, San Francisco, CA, USA, September **2011** – oral presentation
25. **G. Dagnino**, L. S. Mattos, G. Becattini, M. Dellepiane, and D. G. Caldwell, “Comparative Evaluation of User Interface for Robot-Assisted Laser Phonomicrosurgery”, *IEEE Engineering in Medicine and Biology Society*, EMBC 2011, Boston, MA, USA, August **2011** – poster presentation
26. **G. Dagnino**, D. Sossai, *et al.*, “Mobile LAF screen for additional operating room ventilation – Technology for reduction of bacteria and airborne particles contamination”, *52nd Annual Conference of American Biological Safety Association*, ABSA 2009, Miami, FL, USA, **2009** – poster presentation
27. **G. Dagnino**, D. Sossai, *et al.*, “Introduction of a safety catheter needle system in the prevention of occupational needlestick injuries in an Italian Hospital: retrospective study”, *51st Annual Biological Safety Conference*, ABSA 2008, Reno, NV, USA, **2008** – poster presentation

Refereed Abstract Conference Publications

1. B. Martins, **G. Dagnino**, S. Dogramadzi, “Real-time electromagnetic tracking of orthopaedic pins for robot-assisted fracture surgery”, *8th workshop on Computer/Robot Assisted Surgery (CRAS)*, London, UK, Sep **2018**, **oral presentation**
2. W. Chi, **G. Dagnino**, and G.-Z. Yang, “Learning-based Robotic Task Planning for Endovascular Catheterization”, *The UK-RAS Network Conference On Robotics And Autonomous Systems*, Bristol, UK, December **2017** – **oral presentation**
3. **G. Dagnino**, I. Georgilas, S. Morad, P. Gibbons, P. Tarassoli, R. Atkins, and S. Dogramadzi, “Image-Guided Robot-Assisted Fracture Surgery: a cadaveric study”, *Hamlyn Symposium on Medical Robotics*, London, UK, June **2017** – **oral presentation**

4. **G. Dagnino**, I. Georgilas, F. Girault, P. Tarassoli, R. Atkins, and S. Dogramadzi, “Surgical Pre-Planning for Robot-Assisted Fracture Surgery”, *Hamlyn Symposium on Medical Robotics*, London, UK, June **2016** – **oral presentation**
5. I. Georgilas, **G. Dagnino**, P. Tarassoli, R. Atkins, and S. Dogramadzi, “Towards Robot Assisted Fracture Surgery for Intra-articular Joint Fractures”, *The European Orthopaedic Research Society’s 23rd Annual Meeting*, Bristol, UK, September **2015** – oral presentation
6. **G. Dagnino**, I. Georgilas, P. Tarassoli, R. Atkins, and S. Dogramadzi, “Vision-Based Real-Time Position Control of a Semi-automated System for Robot-Assisted Joint Fracture Surgery”, *29th Annual Conference of the International Society for Computer Aided Surgery*, CARS 2015, Barcelona, Spain, June **2015** – poster presentation
7. **G. Dagnino**, I. Georgilas, P. Tarassoli, R. Atkins, and S. Dogramadzi, "Force-Torque Measurement System For Fracture Surgery", *15th Annual Meeting Of The International Society For Computer Assisted Orthopaedic Surgery*, CAOS 2015, Vancouver, CA, June **2015** – oral presentation
8. I. Georgilas, **G. Dagnino**, P. Tarassoli, R. Atkins, and S. Dogramadzi, "Robot-Assisted System For Joint Fracture Surgery", *15th Annual Meeting Of The International Society For Computer Assisted Orthopaedic Surgery*, CAOS 2015, Vancouver, CA, June **2015** – poster presentation
9. **G. Dagnino**, L. S. Mattos, G. Becattini, M. Dellepiane, and D. G. Caldwell, “New Control Device for Computer-Assisted Laser Phonomicrosurgery”, *Hamlyn Symposium on Medical Robotics*, Imperial College, London, June **2011** – **oral presentation**

Workshops

1. D. Kundrat, A. Schell, and **G. Dagnino**, “Towards Open Science in Robotic Endovascular Surgery: An Open Fluoroscopy Dataset for Data-Driven Applications”, 12th Joint Conference on New Technologies for Computer/Robot Assisted Surgery, Paris, Sep **2023** (submitted)
2. M. Pescio, D. Kundrat, M. Casadio, and **G. Dagnino**, “Model-Based Force Estimation for Robot-Assisted Endovascular Interventions” IEEE ICRA 2023 Workshop on Force and shape perception for surgical instruments and robots, London, UK, June **2023**
3. I. Georgilas, **G. Dagnino**, and S. Dogramadzi, “Safety in Medical Robotics: Hazard Analysis for a Robot-Assisted Fracture Surgery System”, *5th Joint Workshop on Computer/Robot Assisted Surgery*, Brussels, Belgium, September **2015** – oral presentation
4. A. Tsanaka, I. Georgilas, **G. Dagnino**, and S. Dogramadzi, “Intra-Operative X-Ray Dimensional Calibration Using Orthopaedic Implants”, *IEEE BioRob 2014*, Workshop on Robotic Microsurgery and Image-Guided Surgical Interventions, São Paulo, Brazil, August **2014** – oral presentation
5. **G. Dagnino**, L. S. Mattos, and D. G. Caldwell, “Toward Laryngeal Tumors Detection and Medical Images Segmentation Techniques”, *IEEE BioRob 2012*, Workshop on Robot-Assisted Laryngeal Microsurgery, Roma, Italy, June **2012** – oral presentation
6. **G. Dagnino**, L.S. Mattos, E. Grant, M. Dellepiane, and D. G. Caldwell, “Design and Control of a Novel Robotic System for Assistive LASER Phonomicrosurgery”, *North American Summer School in Surgical Robotics and Simulation*, Seattle, WA, USA, Aug. **2010** – oral presentation

Books

1. **G. Dagnino**, D. Kundrat, S. Stramigioli, book chapter “The Future of Medical Robotics” in “The Technical Principles of Endoscopic Surgery”, edited by Ivo Broeders, Sandy Kalisingh, Silvana Perretta, and Amir Szold. In press (due 2023)

2. **G. Dagnino**, Yao Guo, Guang-Zhong Yang, book “Medical Robotics – History, Challenges, and Future Directions” – In press, Springer (due 2023)

Patents

1. S. Dogramadzi, **G. Dagnino**, I. Georgilas, 2015, “Apparatus for performing fracture reductions”, GB patent application GB1513436.4, published February 2017.

Teaching and Mentoring Experience

2021 – present ***Lecturing, University of Twente, The Netherlands***

“Image Processing and Computer Vision” – MSc level (EE, BME, ME, IT)

- Lectures, practical, assessment.

“Imaging Techniques” – MSc level (Technical Medicine)

- Lectures, practical, assessment.

“M6 Cardiorespiratory System and Technologies” BSc level (Technical Medicine)

- Lectures, practical, assessment.

2021 – present ***Student Supervision/Mentoring, University of Twente, The Netherlands***

Postdoc level:

- Dr Dennis Kundrat (Robot-assisted endovascular intervention, 2022 - present)

M.Sc. Level:

- 10/15 students per year on medical robotics and medical imaging topics

2018 – 2020 ***Teaching, The Hamlyn Centre for Robotic Surgery Imperial College London, London, United Kingdom***

“Machine Learning, Robotics and Sensor Networks Summer School 2018, 2019”

- Prepared and delivered lectures and tutorials on Image Segmentation, Robotic Vision, and Robotic Vision applied to Healthcare;
- Project supervisor
- Project Assessment

2017 – 2020 ***Student Mentoring, The Hamlyn Centre for Robotic Surgery Imperial College London, London, United Kingdom***

Junior Postdoc level:

- Mr Dennis Kundrat (Robot-assisted endovascular intervention, 2018 - 2020)
- Mr Anh Nguyen (Robot-assisted endovascular intervention, 2019 - 2020)

Ph.D. level:

- Wenqiang “Bobby” Chi (Cooperative robotic catheterization based on Learning-from-Demonstration, 2017 - 2020);
- Mohamed E. M. K. Abdelaziz (MRI-compatible robotic system for endovascular procedures, 2017 - 2020);

M.Sc. level:

- Miguel Benavente Molinero (Surgical Simulator for Robot-Assisted Endovascular Procedures, 2018);

- 2015 – 2017** ***Teaching Assistant, University of the West of England, Bristol, UK***
 “Introduction to Electronics and Robotics” course, Master level, 2015-2017
- Prepared and delivered lectures on Control Theory;
 - Second marker;
- “Robotic Systems” course, Master level, 2017
- Second marker;
- “Principles of 3D environment” course (programming, 3d graphics, user interfaces), BSc level, 2015-2016
- Facilitator;
 - Responsible for laboratory sessions;
 - Prepared tutorials and exercise sessions;
 - Prepared Unity examples;
 - Prepared C# examples;
 - Held tutorials and advised students;
- 2013 – 2017** ***Student Mentoring, Bristol Robotics Laboratory, Bristol, UK***
 Junior Postdoc level:
- Dr Samir Morad (Robot-assisted fracture surgery)
- Ph.D. level:
- Kathryn Whalley (Analysis of the forces acting on distal femur bone fragments during fracture reduction surgery)
 - Asma Alzaid (Fracture reduction software by using 3D model that will be imported in 3D puzzle solving software)
 - Thekla Stefanou (Motion intent recognition using tactile sensing in stroke patients);
- M.Sc. level:
- Paul Kohler (Design of a new orthopedic pin for minimally invasive fracture manipulation; Real-time 3D imaging and image registration in computer-assisted fracture surgery);
 - Kostas Georgilas (FEM analysis of an orthopedic pin for fracture manipulation);
 - Tulio Dapper (Vision-based algorithm for head tracking using a webcam);
 - Giovanni Schiboni (Monitoring surgical workflow through surgeons’ hand tracking);
 - Alessia Capace (Trajectory planning and motion control for medical robots);
 - Antonella Melina (Developing algorithms for medical imaging and surgical registration);
- B.Sc. level:
- Corentin Bourguignat (Kinematic analysis and trajectory planning for a 2-arms robot for robot-assisted fracture surgery);
 - Francois Girault (Contact-less user interface for 3D virtual fracture manipulation);
 - Guilherme Correia (Development of an automatic 2D/3D registration software as a tool for robot-assisted fracture surgery);
 - Beatriz Martins (An evaluation of electromagnetic tracking devices for robot-assisted orthopedic surgery);
- 2008 – 2009** **San Martino University Hospital, Genoa, Italy**
 M.Sc. level:
- Giulio Raiola, Nadia Nasso

Service and Memberships

Committee Member

- Expert Committee Member for candidates' assessment and assignment of Italian National PhD Fellowships “phDRIM Ph.D. program of national interest in Robotics and Intelligent Machines”, curriculum Health (<https://drim.i-rim.it/en/>), 2022

Editorial & Chairing

- Co-organiser of the “Endoluminal Robots” workshop (full day) within the Hamlyn Symposium 2023, London, UK (with Luigi Manfredi, Andreas Melzer, Helge Wurdemann, Sara Abad Guaman)
- **Associate Editor, Surgical Robotics, for the IEEE Transactions on Medical Robotics and Bionics (TMRB), 2023 - present**
- Topic Editor, Biomedical Robotics section, Frontiers in Robotics and AI, 2022.
- Co-organiser and coordinator of the “Frontiers of Endoluminal Intervention: Clinical opportunities and technical challenges” workshop (full day) at ICRA 22, Philadelphia, USA, 23 May 2022 - with Helge Wurdemann (UCL), Arianna Menciassi (SSSA), Jessica Burgner-Kahrs (UToronto).
- Guest Editor for the Hamlyn Symposium Special Issue for IEEE Transactions on Medical Robotics and Bionics (TMRB) 2019.
- Organiser of “Endovascular Intervention” workshop (1/2 day) within the Hamlyn Symposium 2019, London, UK (with Guang-Zhong Yang, Celia Riga, and Bradley Nelson)
- Associate Editor: Hamlyn Symposium on Medical Robotics, 2019
- PC Member and Chair: *Workshop on New Technologies for Computer/Robot Assisted Surgery CRAS*, 2019, 2022
- Poster Chair, Publication Chair: UK-RAS19 conference, 2019
- PC Member: Hamlyn Symposium on Medical Robotics, 2018
- Organiser of “Endoluminal Intervention” workshop (1/2 day) within the Hamlyn Symposium 2018, London, UK (with Guang-Zhong Yang, Robert Webster, Philip Chiu, Thomas Looi).
- Review Editor in “Biomedical Robotics” - Frontiers in Robotics and AI
- Associate Editor: IEEE 19th International Conference on Advanced Robotics ICAR19, Belo Horizonte, Brazil, Dec 2019

Winter/Summer Schools

- Mentor for the Hamlyn Winter School on Surgical Imaging and Vision 2017, London, UK
- Lecturer and project supervisor for the 2018 Robotic Hamlyn Summer Schools, London, UK

Reviewer Proposals

- **European Commission – HORIZON 2023**
- Engineering and Physical Sciences Research Council, EPSRC, UK
- UK Research and Innovation, UKRI, UK

Reviewer Journals/Conferences

- Annals of Biomedical Engineering
- IEEE Robotics and Automation Letters, RA-L
- IEEE Reviews in Biomedical Engineering
- IEEE Transactions on Biomedical Engineering, IEEE TBME
- International Journal of Computer Assisted Radiology and Surgery, IJCARS
- Robotics and Computer Integrated Manufacturing

- IEEE International Conference on Robotics and Automation, ICRA
- IEEE International Conference on Intelligent Robots, IROS
- Hamlyn Symposium on Medical Robotics
- IEEE International Conference on Biomedical Robotics and Biomechatronics, BIOROB
- IEEE Engineering in Medicine and Biology Society, EMBC
- International Conf. on Information Processing in Computer-Assisted Interventions, IPCAI
- Computer-Assisted Radiology and Surgery International Conference, CARS
- Towards Autonomous Robotic Systems, TAROS
- IEEE Transactions on Robotics, T-RO
- IEEE Reviews in Biomedical Engineering, RBME

Member

- Associate Fellow of the Higher Education Academy (number PR112156), 2016 - present
- Member of the IEEE Robotics and Automation Society