Claudio Roberto Gaz

Address	-
Contacts	-
Born	

Research Interests

Mathematical modeling, parameter identification and control of industrial and biological systems. In detail, dynamic parameters identification for robotic manipulators and physical human-robot interaction (safety and collaboration issues); modelling of the glucose-insulin system, physiological parameters identification and control of glycemia for insulin-resistant patients.

Qualifications

In 2019, I obtained the **Qualification as *Maître de conférences*** (MCF) for the class 61 -*Génie informatique, automatique et traitement du signal* (French National Qualification).

Work Experience

03/2016 – today	Research Fellow (Assegnista di Ricerca) for the project “Dynamic modeling and control of lightweight robot manipulators” at the Department of Computer, Control and Management Engineering (DIAG). Topic: Dynamic modeling, parameters identification and control of lightweight manipulators. • Participation in the European Project SYMPLEXITY (www.symplexity.eu). Dynamic identification of robots for allowing the physical collaboration between humans and robots during industrial polishing operations.
07/2015 – 11/2015	Visiting researcher at Deutsches Zentrums für Luft- und Raumfahrt (*DLR*), Oberpfaffenhoffen (Munich), Germany
04/2015 – 05/2015	Visiting researcher at Airbus (Airbus Group), Paris (France)
01/2014 – 08/2015	Università Cattolica del Sacro Cuore and CNR-IASI, Laboratorio di Biomatematica, Rome.

	• Participation in the European Projects EDEN (https://www.eden-security-fp7.eu/), IMPRESS, PULSE. Realization of the webservice supplying the Physiological Model for a patient infected by a chemical agent. Collaboration within the modelling phase. Supervisor: Dr. Andrea De Gaetano and Prof. Daniele Gui.
11/2012 – 11/2015	Ph.D. Student in Automatic Engineering in Sapienza Università di Roma (winner of a scholarship fund) • Participation in the European Project SAPHARI (www.saphari.eu). Dynamic identification for allowing safe and autonomous human-robot collaboration.
06/2012 – 01/2014	WLAB srl wireless ideas, Rome. In collaboration with Sapienza Università di Roma • Participation of the FP7 European Project "Pleased", PLants Employed As SEnsing Devices (http://pleased-fp7.eu/). Signal analysis and classification with Machine Learning techniques. Supervisor: Prof. Andrea Vitaletti.
03/2012 – 11/2012	Sapienza Università di Roma, Rome. • Research fellow for the project "Optimization of the camera-calibration procedure on the field" (Machine Learning techniques adopted, as Artificial Neural Networks). Supervisor: Prof. Luca Iocchi.
06/2011 – 07/2011	CNR-IASI (Consiglio Nazionale delle Ricerche – Istituto di Analisi dei Sistemi ed Informatica), Rome • Development of a web-service performing collaboration between software packages developed in Matlab, R and C++, by means of a GUI developed in php, allowing a remote user to perform several computations, such as data fitting and parameter estimation on compartmental models. The results are shown by means of a Matlab-produced-graph or a Gnuplot-produced-graph. The system is maintained on a server with LAMP architecture. Reference: Dr. Andrea De Gaetano.
04/2011 – 05/2011	CNR-IASI (Consiglio Nazionale delle Ricerche – Istituto di Analisi dei Sistemi ed Informatica), Rome • Realization of the website of the Biomathematics Laboratory of CNR-IASI (http://www.biomatematica.it/), by means of the CMS Joomla. Reference: Dr. Andrea De Gaetano.
09/2009 – 06/2010	CNR-IASI (Consiglio Nazionale delle Ricerche – Istituto di Analisi dei Sistemi ed Informatica), Rome • Regarding the participation of CNR-IASI to the European project "SICMA" ("Simulation of crises management activities") co financed in FP7 (Sec) (www.sicmaproject.eu): mathematical modeling and implementation (in C++ language) of the physiology of the virtual patient and his/her management in the instants immediately following the simulated accident, that is the cures on the accident location and the transport to the hospital. Supervisor: Dr. Andrea De Gaetano.
09/2009	CNR-IASI (Consiglio Nazionale delle Ricerche – Istituto di Analisi dei Sistemi ed Informatica), Rome • Co-organization role (13-26 September 2009) of the International Biomathematics Summer School held in Lipari (Italy) (September 2009) (http://www.biomatematica.it/lipari2009/index.html).

	Supervisor: Dr. Andrea De Gaetano.
06/2009-09/2009	CNR-IASI (Consiglio Nazionale delle Ricerche – Istituto di Analisi dei Sistemi ed Informatica), Rome – in collaboration with 3M Deutschland GmbH. • Realization of a web-service for storing data related to a multicentric efficacy study of the 3M™ Tegaderm™ CHG Chlorhexidine Gluconate IV Securement Dressing. In detail, database design and implementation of the related structures for insert and retrieve data by means of a user-interface (used languages: SQL, Asp). Reference: Dr. Andrea De Gaetano.

Teaching Experience

A.Y. 2019 – 2020 and 2020 – 2021	Teacher for the course of Robotics (*Fondamenti di Robotica Industriale*) for the students of the Master course of Ingegneria Informatica (Computer Engineering). Università Telematica Internazionale UNINETTUNO (I have also recorded the videolessons for the course)
A.Y. 2018 – 2019, 2019 – 2020 and 2020 – 2021	Teacher for the course of *Control of Electromechanical Systems* for the students of the Erasmus Mundus Master Course in Sustainable Transportation and Electrical Power Systems. Sapienza University of Rome
A.Y. 2016 – 2017 and 2017 – 2018	Teaching assistant (tutor) for the course of *Mathematical Analysis 2* (*Analisi Matematica 2*) for the students of Management Engineering (Ingegneria Gestionale) at Sapienza University of Rome. Reference: Prof. Daniele Andreucci
From A.Y. 2014 – 2015 to present	Assistance to students of Robotics courses (bachelor and master deg.), especially for projects and theses. Teaching assistant for Robotics classes. Reference: Prof. Alessandro De Luca.

Seminars

12/04/2019	CNRS – IRISA (Institut de Recherche en Informatique et Systèmes Aléatoires), Rennes (France).

Active Collaborations

- CNRS – IRISA (Institut de Recherche en Informatique et Systèmes Aléatoires), Rennes (France) with Dr. Paolo Robuffo Giordano.
- CNR – IASI (Istituto di Analisi dei Sistemi ed Informatica), Rome (Italy) with Dr. Andrea De Gaetano and Dr. Pasquale Palumbo.
- Università dell'Aquila, L'Aquila (Italy) with Prof. Costanzo Manes.

Education

05/2016	PhD in Automation and Operational Research at Sapienza – Università di Roma (winner with scholarship)
12/2011	Sapienza – Università di Roma (Rome, Italy). Master Degree in Systems Engineering (*Laurea Specialistica in Ingegneria dei Sistemi*). Thesis title: A controllers population model for the pancreatic insulin production. Score: 110/110
03/2006	Università Roma Tre (Rome, Italy) Bachelor Degree in Computer Engineering (*Laurea in Ingegneria Informatica*). Thesis title: Control of a robot with flexible forearm by means of a nonlinear observer. Score: 110/110
07/2001	Liceo Cornelio Tacito, Rome. High school qualifications on classical literature (*Diploma di maturità classica*) . Score: 100/100

Known languages

Italian	mother tongue
English	Estimated level: C1
French	Estimated level: B1 (currently studying)
German	Estimated level: A2 (currently studying). B1 level class attended during the period spent at the DLR in Oberpfaffenhofen (DE)
Russian	Level A1 certified by the Pushkin State Russian Language Institute

Skills and expertise

Programming Languages	Very good knowledge of the following software and programming languages: • C/C++ • Matlab • Php • Asp • Java • Jsp • SQL (MySQL databases)
Operating Systems	Experience of use of the following O.S.s • Windows (XP, 7)

- Linux (Ubuntu Desktop distribution)

March 24, 2021

Claudio Roberto Gaz

List of Publications

- Journal papers
  - J1. C. Gaz, M. Cognetti, A. Oliva, P. Robuffo Giordano and A. De Luca, "Dynamic Identification of the Franka Emika Panda Robot With Retrieval of Feasible Parameters Using Penalty-Based Optimization," in IEEE Robotics and Automation Letters, vol. 4, no. 4, pp. 4147-4154, Oct. 2019.
  - J2. A. De Gaetano, C. Gaz, S. Panunzi, "Consistency of compact and extended models of glucose-insulin homeostasis: The role of variable pancreatic reserve," PLOS ONE 14(2), 2019.
  - J3. C. Gaz, E. Magrini, A. De Luca, "A model-based residual approach for human-robot collaboration during manual polishing operations," Mechatronics, 55, pp. 234-247. 2018.
  - J4. C. Gaz, A. De Gaetano, C. Manes, P. Palumbo, A. Borri, S. Panunzi, "Effective control of glycemia using a simple discrete-delay model," IFAC PapersOnLine, 50(1), pp 13526-13531, 2017.
  - J5. A. Borri, S. Panunzi, R. Brancaleoni, D. Gui, S. Magalini, C. Gaz, A. De Gaetano, "Simulation of trauma incidents: modelling the evolution of patients and resources," Journal of Medical Systems, 40(11), 234. 2016.
  - J6. A. De Gaetano, C. Gaz, P. Palumbo, S. Panunzi, "A unifying organ model of pancreatic insulin secretion," PLoS ONE, 10(11). 2015.
  - J7. A. Pennisi, D. Bloisi, C. Gaz, L. Iocchi, D. Nardi, "Novel patterns and methods for zooming camera calibration," Journal of WSCG, 21(1), pp. 59-67. 2013.
  - J8. C. Gaz, G. Cremona, S. Panunzi, B. Patterson, A. De Gaetano, "A geometrical approach of PKPD of inhaled bronchodilators," Journal of Pharmacokinetics and Pharmacodynamics, 39(5), pp. 415-428. 2012.

- Book chapters
  - B1. A. De Gaetano, S. Panunzi, P. Palumbo, C. Gaz, T. Hardy, "Data-driven modeling of diabetes progression". In: Marmarelis V., Mitsis G. (eds) Data-driven Modeling for Diabetes. Lecture Notes in Bioengineering. Springer, Berlin, Heidelberg. 2014.

- Conference papers
  - C1. M. Capotondi, G. Turrisi, C. Gaz, V. Modugno, G. Oriolo, A. De Luca, "Learning Feedback Linearization Control without Torque Measurements", I-RIM Conference, 2020.
  - C2. C. Gaz, A. Cristofaro, A. De Luca, "Detection and isolation of actuator faults and collisions for a flexible robot arm". Proc. of the IEEE International Conference on Decision and Control (CDC), 2020.
  - C3. M. Capotondi, G. Turrisi, C. Gaz, V. Modugno, G. Oriolo, A. De Luca, "An Online Learning Procedure for Feedback Linearization Control without Torque Measurements". Proc. of the International Conference on Robot Learning (CoRL), 2019.
  - C4. N. Cacciotti, A. Cifonelli, C. Gaz, V. Paduano, AV. Russo, M. Vendittelli, "Enhancing force feedback in teleoperated needle insertion through on-line identification of the needle-tissue interaction

parameters". Proc. IEEE RAS and EMBS International Conference on Biomedical Robotics and Biomechatronics, 2018.

C5. C. Gaz, A. De Luca, "Payload estimation based on identified coefficients of robot dynamics – with an application to collision detection". Proc. IEEE Conference on Intelligent Robots and Systems, 2017.

C6. C. Gaz, F. Flacco, A. De Luca, "Extracting feasible robot parameters from dynamic coefficients using nonlinear optimization methods". Proc. IEEE International Conference on Robotics and Automation, 2016.

C7. A. Borri, C. Dimopoulos, S. Panunzi, R. Brancaleoni, C. Gaz, D. Gui, S. Magalini, A. De Gaetano, "Modelling trauma physiology for large crisis management". Proc. International Conference on Modeling and Applied Simulation, 2016.

C8. E. Pacciani, A. Borri, PM. Soave, D. Gui, S. Magalini, S. Panunzi, C. Gaz, P. Gaudio, A. Malizia, A. De Gaetano, "Modelling and simulation for major incidents". Proc. 9th International Conference on Pervasive Computer Technologies for Healthcare, 2015.

C9. C. Gaz, F. Flacco, A. De Luca, "Identifying the dynamic model used by the KUKA-LWR: a reverse engineering approach". Proc. IEEE Conference on Robotics and Automation, 2014.

C10. A. De Gaetano, C. Gaz, C. Gori Giorgi, P. Palumbo, "An islet population model of pancreatic insulin production". Proc. IEEE Conference on Decision and Control, 2013.

C11. V. Manzella, C. Gaz, A. Vitaletti, E. Masi, L. Santopolo, S. Mancuso, D. Salazar, JJ. De Las Heras, "Demo abstract: Plants as Sensing Devices: The PLEASED experience". Proc. 11th ACM Conference on Embedded Networked Sensor Systems, 2013.

Roma, March 2, 2021 Claudio Roberto Gaz