Massimo Cefalo, Ph.D.
Control and Robotics Engineering

PERSONAL INFORMATION

Name   **MASSIMO CEFALO**

PROFILE   Senior researcher in robotics, motion and path planning and advanced control systems for robotic applications. Consolidated experiences in motion planning and advanced control systems for robotic applications. Significant experiences in software design for parallel scientific computing spanning from algorithm design in C/C++ and Matlab to implementation and custom device driver development for real time applications and design of power electronics boards for proof of concept and prototyping.

Expert skills in mathematical modeling. Active researcher in the field of applied mathematics, in particular in the design and implementation of numerical solvers for partial differential equations and mesh algorithms.

Numerous and significant university and high school teaching experiences Extensive experiences in scientific research with good track record of published papers and peer reviews.

Currently owner of an individual metalworking business. Complete management of daily operations, including production, human resources management, customer service and supplier relations. Development and implementation of strategies to increase production efficiency and product quality. Collaboration with customers for customized projects, ensuring satisfaction and loyalty.

SKILLS	– Computer programming experiences in the following domains:

- parallel computing
- computer vision (video capture, image filtering and post-processing)
- multithread and inter-process communications techniques for scientific computing
- communication protocols (TCP/IP)
- remote control of robotic systems
- design and implementation of numerical solvers for differential equations
- graphical applications based on the OpenGL framework and the OpenCV library

— Programming languages:

– C/C++ (professional usage)	- IDL (good)
– JAVA (professional usage)	- VISUAL BASIC (good)
– VRML (very good)	- MATLAB (professional usage)
– PROLOG (good)	- ASSEMBLY of INTEL 80x86 and MICROCHIP PIC
– JSP (professional usage)	- PHP (professional usage)
– VISUAL BASIC (good)	- HTML (professional usage)
– PASCAL (good)	- COBOL (very good)
– BASIC (good)	- FORTRAN (good)

— Programming experiences on the following Operating Systems:
Windows, Unix/Linux, RTAI Linux, ROS

— Excellent knowledge of the following professional software applications:

– Matlab/Simulink	- Comsol
– Elmer	- Kite, V-Rep, Gazebo
– Matematica	- Maple
– Orcad/PSpice	- CAD environments
– LaTex	- Fatwire (an enterprise-class Content Management System)

— Design experiences with UML

— Linux device drivers development experience

MAIN WORKING EXPERIENCES

Date	November 2024 -> until today
Employer	Kingston University of London
Position	Senior Lecturer in Mechatronics, Control and Autonomous Systems
Main activities and responsibilities	Module leader and lecturer of the modules Advanced Control Systems (ME7025), Human-Robot Interaction (ME7028), Introduction to Robotics (ER4004), Control Systems with Embedded Implementation (ME7731) and Robot Design and Build Project (ME5073)
Date	September 2018 -> until today
Employer	Owner of an individual craft business with production workshop
Position	Owner
Main activities and responsibilities	Specialization in metalworking (iron, stainless steel, aluminium), with a focus on carpentry, structures, armoured doors, grates, fixtures, furnishing elements.
Date	September 2019 -> until today
Employer	"Sapienza" University of Rome
Position	Postdoctoral Researcher
Main activities and responsibilities	Research activities in robotics and applied mathematics, involving multiple postdoctoral research collaborations. Key contributions include:

– design and implementation of a MATLAB-based graphic simulator for controlled epidemic spreading
– modelling of human-robot contact forces in CoppeliaSim for a medical electromagnetic resonance device
– development of numerical solvers for PDEs on fractal domains
- ongoing work on machine-learning techniques for optimizing passenger ship boarding times.

Date	July 2023 -> August 2023
Employer	Università Telematica Internazionale UniNettuno - Faculty of Engineering
Position	Senior Lecturer
Main activities and responsibilities	Module leader of "FUNDAMENTALS OF ROBOTICS "
	Author of 12 video-lectures for distance learning classes

Date	January 2023 -> October 2025
Employer	Università Telematica Internazionale UniNettuno - Faculty of Engineering
Position	Senior Lecturer
Main activities and responsibilities	Module leader of "SYSTEMS THEORY AND AUTOMATIC CONTROLS "

Date	September 2022 -> February 2023 (1° semester a.y. 2022/2023)
Employer	"Sapienza" University of Rome - Faculty of Electro Technical Energy
Position	Senior Lecturer
Main activities and responsibilities	Module leader of "CONTROL OF ELECTROMECHANICAL SYSTEMS"

Date	October 2020 → January 2021
Employer	IROS 2020
Position	Chair for IROS 2020 - TuCT16 session - Motion and Path Planning III

Date	October 2011 → September 2019
Employer	"Sapienza" University of Rome - Dipartimento di Ingegneria Informatica, Automatica e Gestionale (DIAG)
Position	Postdoctoral researcher
Main activities and responsibilities	Research on the design, development and implementation of control laws, as well as motion and path-planning algorithms, for autonomous robots operating under constraints and involving human–robot interaction. Teaching activities in control theory, including supervision of coursework, term projects and undergraduate and master's theses.

Date	October 2017 → June 2018
Employer	Liceo Scientifico Statale 'Manfredi Azzarita' (High scool)
Main activities and responsibilities	Computer science teacher

Date	September 2014 → December 2017
Employer	University of Rome "Niccolò Cusano"
Position	Adjunct professor
Main activities and responsibilities	Module leader of Computer Science (A.Y. 14/15 and 15/16) and Foundations of Automatic Control (A.Y. 15/16 and 16/17) in Civil Engineering and Industrial Engineering

Date	March 2014 → April 2014
Employer	Worcester Polytechnic Institute (WPI) - Worcester, Boston (MA) USA
Position	Visiting Research Fellow
Main activities and responsibilities	Short-term research visit at Worcester Polytechnic Institute (WPI), Boston (MA) USA, focused on collaborative research with Prof. Umberto Mosco from Math Science Department in mesh algorithms design for fractal domains and with Prof. Dmitry Berenson from Computer Science Department in design of robot motion planning algorithms

Date	October 2009 → September 2010
Name of the employer	"Sapienza" University of Rome - Dipartimento di Scienze di Base e Applicate per l'Ingegneria (SBAI) - mathematics section
Type of job	Postdoctoral researcher fellow/Scientific programmer
Main activities and responsibilities	Study, design and development of mesh algorithms. Numerical analysis of second order PDEs defined over non-convex domain with internal boundary of fractal type.

Date	July 2009 → December 2009
Employer	"Sapienza" University of Rome - Dipartimento di Informatica e Sistemistica (DIS)
Position	Postdoctoral researcher fellow/Scientific programmer
Main activities and responsibilities	Java developer for educational applications. Supervisor of laboratory activities for control experiments of robotic systems.
Date	May 2008 → June 2009
Employer	IRI (Institut de Robòtica i Informàtica industrial) of CSIC (Consejo Superior de Investigaciones Cientificas) and Universitat Politecnica de Catalunya - Barcelona, SPAIN
Position	Research scientist
Main activities and responsibilities	Full-time research position in robotics at IRI (Institut de Robòtica i Informàtica industrial) of CSIC (Consejo Superior de Investigaciones Cientificas) and Universitat Politecnica de Catalunya, Barcelona, SPAIN. Research activities in modeling and control of dynamic systems. Study, analysis and development of mathematical models and control laws for a special class of underactuated mechanical systems (Tensegrity systems).
date	October 2007 → April 2008
Name of the employer	Relactions s.r.l.
Type of job	Project consultant
Main activities and responsibilities	Design and development of web applications based on a Content Management Systems of enterprise category.
date	February 2007 → December 2007
Name of the employer	Araneum s.r.l.
Type of job	Project consultant at ENEL s.p.a.
Main activities and responsibilities	Technical team leader for the design of integrated wireless systems for video surveillance, access control and anti-intrusion. The systems have been successfully installed in several powerhouses in Italy.
date	May 2006 → July 2007
Name of the employer	Tecnologia e Sistemi s.r.l.
Type of job	Project consultant
Main activities and responsibilities	Design of wireless data networks for outdoor applications. Design and implementation of software applications.

EDUCATION AND TRAINING

14 November 2025	**AdvanceHE Fellow - FHEA**
Name of the institute	Kingston University
27 February 2023	**Certificate in ESOL International (B2 CEFR)**
Name of the institute	British Institutes
	Final mark: 80/100
28 July 2022	**Specialization Course in 'New Language Didactics: the CLIL Methodology' - 60 ECTS**
Name of the institute	Università telematica e-Campus
12 July 2022	**Eligible non-winner in the selection competition for call 33/2021**
Name of the institute	ASI - Italian Space Agency
9 November 2021	**Training course for teachers (Ministerial Decree 616) – 24 credits**
Name of the institute	Università telematica e-Campus
Subject	

Exam name	Date	Marks
Antropologia culturale	16.12.2020	30/30
Pedagogia generale sociale	30.06.2021	30/30
Psicologia dell'educazione	19.07.2021	30/30
Metodologie e teconologie didattiche	27.09.2021	30/30

February 2020	**Maitre de Conference" in GÉNIE INFORMATIQUE, AUTOMATIQUE ET TRAITEMENT DU SIGNAL**
21 May 2013	**Forum**
Name of the institute	Borsa della Ricerca 2013/ Research Scholarship 2013
Subject	Technology transfer and collaboration between industry and academic research
June 2011	**Training course**
Name of the institute	Next Ville and Rete Ambiente
Subject	Photovoltaic systems: technology, authorization processes, incentives, legislative changes
December 2009	**Seminar**
Name of the institute	CASPUR - Consorsio Universitario per le Applicazioni del Supercalcolo per Università e Ricerca (University Consortium for the Application of the Supercomputing for University and Research)
Subjects	Introduction to multi-physics modelling using the finite element method
November 2002 - December 2005	<mark>**Doctor of Philosophy (PhD) in "Systems Engineering" (Robotics)**</mark>
Name of the institute	Dipartimento di Informatica e Sistemistica, "Sapienza" University of Rome
Main research subjects	Study of automatic control laws for underactuated mechanical systems. Design and realization of the prototype of a new robotic system. Design and development of a software framework for the remote control of robotic systems.
Attained qualification	Doctor of Philosophy
July 2005	**National doctoral school in automation**
Name of the institute	CIRA
Main subjects	"Self Organizing Networks" and "Adaptive Control"
November 2003 → Sept. 2006	**High training triennal school - NewMinE – New media in education**
Name of the institute	University of Milan and University of Italian Switzerland
Main subjects	E-learning
July 2003	<mark>**CEng - Chartered Engineer**</mark>
Name of the institute	"Sapienza" University of Rome
Attained qualification	Professional Engineering License - Chartered Engineer full grade 120/120
July 2003	**National doctoral school in automation**
Name of the institute	CIRA
Main courses	"Control of Robotic Systems" and "Analysis and Control of Hybrid Systems"
A.Y. 2000/2001	<mark>**Laurea degree in Computer Engineering (master's degree)**</mark>
Name of the institute	"Sapienza" University of Rome
Majors	Automation and Industrial Robotics; Master thesis title: "Design and realization of a telelaboratory for experiments on robotic systems"
Attained qualification	Computer Engineer - full grade **110/110**

International Journals

- "Dynamic Identification and Control Issues for Collaborative Robots: The KUKA LWR 4+ Case", C. R. Gaz, M. Cefalo, A. De Luca - Submitted for publication in Robotica on 27 October 2025 - manuscript ID is ROB-2025-0641

- "Fractal mixture for optimal heat draining", M. Cefalo, S. Creo, M.R. Lancia, J. Rodriguez-Quadrado - 1 July 2023 - Chaos, Solitons and Fractals - Vol. 173, 113750

- "An Opportunistic Strategy for Motion Planning in the Presence of Soft Task Constraints", M.Cefalo, P.Ferrari, G.Oriolo - 4 August 2020 - IEEE Robotics and Automation Letters, Vol. 5, Issue 4, Pages 6294-6301

- "Approximation of 3D Stokes flows in fractal domains", M.Cefalo, S.Creo, M.Gallo, M.R.Lancia, P.Venole - 21 December 2020 - Fractals in engineering: Theoretical Aspects and Numerical Approximations - Sema Simai Springer series

- "Enforcing Constraints over Learned Policies via Nonlinear MPC: Application to the Pendubot", G.Turrisi, B.B.Carlos, M.Cefalo, V.Modugno, L.Lanari, G.Oriolo - 14 April 2021, 21st IFAC 2020 Word Congress, Berlin, Germany, Pages 9637-9642

- "A General Framework for Task-Constrained Motion Planning with Moving Obstacles", M.Cefalo, G.Oriolo - Marzo 2019 Robotica, Cambridge University Press, Vol. 37, Issue 3, Pages 575-598

- "Nonlocal Venttsel' diffusion in fractal-type domains: regularity results and numerical approximation", M.Cefalo, S.Creo, M.R.Lancia, P.Vernole - 5 June 2019, Mathematical Methods in the Applied Sciences, Vol. 42, Issue 14, Pages 4712-4733

- "Sensor-Based Task-Constrained Motion Planning using Model Predictive Control", M.Cefalo, E.Magrini, G.Oriolo - 12 December 2018, 2018 IFAC symposium on robot control (SYROCO 2018), Budapest, Hungary, Vol. 51, Issue 22, Pages 220-225

- "Repeatable Motion Planning for Redundant Robots Over Cyclic Tasks", G.Oriolo, M.Cefalo, M. Vendittelli - IEEE Trans. on Robotics, 17 July 2017, Vol. 33, Issue 5, Pages 1170-1183

- "An optimal mesh generation algorithm for domains with Koch type boundaries", M.Cefalo, M.R.Lancia - Mathematics and Computers in Simulation; 6 June 2014, Vol. 106, Pages 133-162;

- "Heat flow problems across fractal mixtures: regularity results of the solutions and numerical approximation", M.Cefalo, M.R.Lancia, H.Lyang - Differential and Integral Equations, 1 September 2013, Vol. 26, Number 9/10, Pages 1027-1054

- "Numerical approximation of transmission problems across Koch-type highly conductive layers", M.R.Lancia, M.Cefalo, G.Dell'Acqua - Applied Mathematics and Computation, 30 November 2012, Vol. 218, Issue 9, Pages 5453-5473

- "A comprehensive dynamic model for class-1 tensegrity systems based on quaternions", M.Cefalo, J.M.Mirats Tur - International Journal of Solids and Structures, 16 November 2010, Vol. 48, Issue 5, Pages 785-802

- "Real-Time self collision detection algorithms for tensegrity systems", M.Cefalo, J.M.Mirats Tur - International Journal of Solids and Structures, 19 March 2010, Vol.47, Issue 13, Pages 1711-1722

- "Energy-based control of the Butterfly robot", M.Cefalo, L.Lanari, G.Oriolo - IFAC symposium on robot control (SYROCO 2006), Bologna - Italy, September 2006, Vol. 39, Issue 15, Pages 1-6

International Conferences

- "On the role of fractals in heat transfer", M.R.Lancia, S.Creo, M.Cefalo and J.Rodriguez-Cuadrado - 2022 International Conference on Nonlinear Solid Mechanics (ICoNSoM 2022), Alghero (Sassari)

- "Parallel Collision Check for Sensor Based Real-Time Motion Planning", M.Cefalo, E.Magrini, G.Oriolo - 2017 IEEE Int. Conf. on Robotics and Automation (ICRA 2017), Singapore

- "Residual-Based Interaction Force Estimation for Haptic Feedback in Teleoperated Neddle Insertion", D.Evangelista, M.Cefalo, E.Magrini, M.Anzidei, M.Vendittelli - 2016 Computer/Robot Assisted Surgery - CRAS, Pisa

- "Safe Planning of Feasible Smooth Motion-Force Transition Tasks", M.Cefalo, A.DeLuca, G.Oriolo Selected contribution at workshop session at IROS 2016, Daejon, Korea

- "Task-constrained motion planning for underactuated robots", M.Cefalo, G.Oriolo - 2015 IEEE Int. Conf. on Robotics and Automation (ICRA 2015), Seattle, USA

- "KUKA LWR4 dynamic modeling in V-REP and remote control via Matlab/Simulink", M.Cefalo, M.Cognetti, Selected contribution at workshop session at IROS 2014, Chicago, USA

- "Boundary design for fast diffusion across (pre)fractal boundaries", M.Cefalo, M.R.Lancia - 8th European Conference on Elliptic and Parabolic Problems, Gaeta - Italy, May 2012

- "Dynamically Feasible Task-Constrained Motion Planning with Moving Obstacles", M.Cefalo, G.Oriolo - 2014 IEEE Int. Conf. on Robotics and Automation (ICRA 2014), Hong Kong, China, June 2014

- "Task Constrained Motion Planning with Moving Obstacles", M.Cefalo, G.Oriolo, M.Vendittelli - 2013 IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS 2013), Tokyo, Japan, pp. 5758-5763, 2013

- "Planning Safe Cyclic Motions under Repetitive Task Constraints", M.Cefalo, G.Oriolo, M.Vendittelli - 2013 IEEE Int. Conf. on Robotics and Automation (ICRA 2013), Karlsruhe, Germany, pp. 3807-3812, 2013

- "Numerical approximation of evolution problems in (pre)fractal domains", M.Cefalo, M.R.Lancia, H. Liang - 7th European Conference on Elliptic and Parabolic Problems, Gaeta - Italy, May 2012

- "An optimal mesh generation for domains with Koch-type boundaries", M.Cefalo, M.R.Lancia, Mascot11 - 11th Meeting on Applied Scientific Computing and Tools, Rome - Italy, October 2011

- "Numerical approximation of some conditioned heat flow problems across fractal layers", M.Cefalo, G.Dell'Acqua, M.R.Lancia; SIMAI 2010 Biannual Congress, Cagliari - Italy, June 2010

- "The REAL Lab: Remote Experiments for Active Learning", M.Cefalo, L.Lanari, G.Oriolo, M.Vendittelli; XLI AICA Annual Congress, Trento - Italy, September 2003