Giulia Michieletto

contacts

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languages

Italian mother tongue
English fluent
(ESOL ISEE II -2008)
French fluent
(DELF B2 - 2009)
Spanish basic

programming

Matlab
Simulink
Python
ROS
LaTeX

current position

Nov 2019 Now	**ASSISTANT PROFESSOR (RTDA)** *Department of Management and Engineering, University of Padova*	Vicenza, Italy

Additional Roles

- Member of Space and Aerial Control Systems (SPARCS) team of Automatica group at University of Padova [https://sparcs.dei.unipd.it/]

- Responsible for publicity and dissemination of the Technical Committee on Multi-Robot Systems (TC MRS) of the IEEE Robotics and Automation Society [http://multirobotsystems.org/]

past positions

Jun 2019 Oct 2019	**PostDoctoral Fellow** *Department of Information Engineering, University of Padova* Research Topic: Multi-agent systems modeling and control with a special regard to networked formations of autonomous aerial vehicles and small satellites (ref. N05)	Padova, Italy
Oct 2017 May 2019	**PostDoctoral Fellow** *Department of Information Engineering, University of Padova* Research Topic: Theoretical duality and methodological interplay between control and estimation problems related to multi-agent systems in 3D space (ref. N03)	Padova, Italy

education and training

Oct 2014 Oct 2017	**PhD in Information Engineering** *Department of Information Engineering, University of Padova* Curriculum: Information and Communication Science and Technologies (ICT) Advisor: Prof. Angelo Cenedese Thesis Title: Multi-Agent Systems in Smart Environments Thesis Reviewers: Luca Zaccarian (LAAS-CNRS, France and UniTN, Italy) . Hyo-Sung Ahn (DCASL-GIST, Korea) Thesis Defence: February 22, 2018	Padova, Italy
Oct 2012 Oct 2014	**Master Degree in Automation Engineering** [110/110] *Department of Information Engineering, University of Padova* Thesis Title: Distributed Localization of a Camera Sensor Networks in SE(3) Thesis Supervisor: Prof. Angelo Cenedese Thesis Co-Supervisor: Prof. Simone Milani Final Examination: October 14, 2014	Padova, Italy
Oct 2009 Jul 2012	**Bachelor Degree in Information Engineering** [99/110] *Department of Information Engineering, University of Padova* Thesis Title: Modelling and control of an active suspension Thesis Supervisor: Prof. Maria Elena Valcher Final Examination: July 26, 2012	Padova, Italy
Sep 2004 Jun 2009	**Scientific High School Degree** [100/100] *Liceo statale Giuseppe Berto* Final Examination: July 13, 2009	Mogliano Veneto, Italy

Graduate Schools

Jun 2015	**SIDRA PhD Summer School**	Bertinoro, Italy
	Topic: Robot Control & Underwater Robotics	
	Speakers: Alessandro De Luca, Gianluca Antonelli	
Mar 2015	**EECI Graduate School in Control**	Berlin, Germany
	Topic: Non-linear Control for Physical Systems	
	Speakers: Roger W. Brockett, Alexander L. Fradkov	

International Workshops

May 2019	**Control Days Workshop**	Padova, Italy
	Topic: Control Theory Research Subjects	
Oct 2018	**IROS Workshop**	Madrid, Spain
	Topic: Future Challenges and Technological Ideas for Vision-Based Drones	
Dec 2016	**CDC Workshop**	Las Vegas, USA
	Topic: Feedback Control of Hybrid Systems	
Oct 2016	**Co^4 Workshop**	Toulouse, France
	Topic: Control subject to Computational and Communication Constraints	
Oct 2016	**GIS Micro-Drones Workshop**	Toulouse, France
	Topic: UAVs Applications	

Miscellaneous

May 2018	**24CFU for teaching** [29.75/30]	Padova, Italy
Dec 2015	**Information Engineering State Exam** [222/240]	Padova, Italy
Jul 2014	**GRE Test - Quantitative Reasoning** [159/170]	Milano, Italy

abroad research experiences

Sep 2016 Feb 2017	**LAAS-CNRS**	Toulouse, France
	Research Visitor at Laboratoire d'Analyse et d'Architecture des Systèmes	
	Supervisor: Dr. Antonio Franchi	
	Team: Robotics and InteractionS (RIS)	
Mar 2016 Jun 2016	**LAAS-CNRS**	Toulouse, France
	Research Visitor at Laboratoire d'Analyse et d'Architecture des Systèmes	
	Supervisor: Dr. Antonio Franchi	
	Team: Robotics and InteractionS (RIS)	

teaching and advisory experiences

Teaching Activity

Dec 2020	**Rigidity Theory Applied to Dynamic Systems**	Vicenza, Italy
	PhD-Mechatronic Engineering course, University of Padova	
	1 CFU [10h]: online lessons	
Feb 2017 Jun 2017	**Control Laboratory**	Padova, Italy
	1st year, LM-Automation Engineering course, University of Padova	
	Teaching Support [16h]: laboratory lessons support	
Oct 2015 Jan 2016	**Control Systems Design**	Padova, Italy
	2nd year, LM-Automation Engineering course, University of Padova	
	Tutor Junior [18h]: exercise frontal lessons and students support for final projects	

Jun 2008	**Child Care**	Scorzè, Italy
Aug 2008	*Nursery School Gianni Rodari*	
	Summer activity [160h]: gaming and educational activities organization	

Supervision Activity

1 supervised Master Degree Student: Laurea Degree final project in LM-Mechatronic Engineering

- Pietro Andrea Fratta, *Modeling and Control of a Contact- aware Aerial Robot*, ongoing

8 co-supervised Bachelor Degree Students:

Laurea Degree final project in LT-Mechatronic Engineering

- Roberto Bianchetto, *Caratteristiche e funzionalità del sistema robotico LoCoBOT*, ongoing

Laurea Degree final project in LT-Information Engineering

- Riccardo Barbiero, *Controllo di un quadrirotore: tracking di traiettoria e atterraggio*, 2020
- Alberto De Toni, *Progettazione di un controllore per la fase di atterraggio di un Quadrotor "Crazyflie 2.0"*, 2019
- Simone Tedesco, *Identificazione dei parametri inerziali di un quadrirotore*, 2018
- Pietro Iob, *Procedura di identificazione dei parametri di massa e inerzia per un veicolo aereo multirotore*, 2018
- Lorenzo Marchini, *Stima di massa ed inerzia di un quadricottero*, 2018
- Matteo Ferrarese, *Metodi di controllo per veivoli multirotore*, 2018

8 co-supervised Master Degree Students: Laurea Degree final project in LM-Automation Engineering

- Michele Franzan, *Analysis of controllability and rotor-failure robustness for a tilted octorotor*, 2020
- Bleron Preniqi, *Non-Linear model predictive control for autonomous docking of CubeSats*, 2020
- Beniamino Pozzan, *Bearing Rigidity Theory: characterization and control of mixed formations and localization*, 2020
- Alessandra Scianatico, *Development and implementation of quadrotor control system in a Simulink-ROS integrated framework*, 2019
- Marco Marsella, *Multi-UAV formation control for UGV containment and path following*, 2018
- Luca Varotto, *Distributed Localization of Visual Sensor Networks based on Quaternions and Dual Quaternions*, 2018
- Marta Pasquetti , *Bearing Rigidity Theory for Formation Control of UAVs*, 2017
- Alessia Cocco, *SO(2) Rotation Estimation in Camera Networks*, 2016

research activities

Main focus on networked control and multi-agent systems.

Principal methodological aspects involve:
- theory of pose representation
- distance and bearing rigidity theory
- distributed optimization over manifolds and over graphs
- nonlinear modeling and control of autonomous platforms
- cooperative and coordinated control of agents formations
- model predictive control theory applied to robotics

Wireless Sensor Networks

A Wireless Sensor Network is a collection of a large number of tiny devices, distributed over a vast area, linked by a wireless medium and equipped with limited computational capabilities.
Applications of interest include:
- environmental sensing, i.e., continuous measurements acquisition for a variable of interest,

- working condition monitoring and event/failure detection through the implementation of clustering strategies for the network nodes.

Multi-camera Systems

Multi-camera systems integrates a large number of spatially distributed smart visual sensors capable of processing and fusing images of a scene from a variety of viewpoints in order to perform some high-level tasks that are beyond the capacity and knowledge of each individual agent.
Applications of interest include:
- pose estimation problem in a realistic noisy environment, i.e., determination of position and attitude of each camera in the system expressed in a certain global inertial frame exploiting some noisy available measurements derived by the observed scene,
- perimeter patrolling problem, where the border of a certain area is required to be repeatedly and coordinately monitored by a set of cameras,
- tracking problem, requiring the multi-camera cooperative task assignment and decision taking in order to track a target in a constrained space.

Aerial Multi-rotor Vehicles

Unmanned Aerial Vehicles represent a wide class of autonomous aerial platforms that are rapidly increasing in popularity thanks to their versatility.
Applications of interest include:
- theoretical analysis of actuation and robustness properties for multi-rotors having a variable number of propellers arbitrarily oriented,
- failure detection and fail-safe control problem, to allow the recovery from a propeller loss,
- path-following problem, wherein the vehicle is required to chase an object or desired path in presence of obstacles and disturbances,
- determination of optimal multi-vehicle formation under resources constraints,
- bearing rigidity-based stabilization of a multi-vehicle formation and agents coordinated motion while preserving some structural system properties.

Small Satellites

Small – micro and nano – satellites are very appealing in the space community for their low complexity and high flexibility that simplify both their design and control (beyond lowering the costs for manufacturing and dispatch).
Applications of interest include:
- satellites alignment with respect to a desired orbit by exploiting relative measurements with respect to the ground or to other units,
- rendez-vous, assembly (hard/soft docking) and arrangement of two or more satellites resting upon the local agent capabilities.

Ground Robots

Unmanned ground vehicles operate while in contact with the ground and without an onboard human presence, thus becoming a key technology for many applications where it may be inconvenient, dangerous, or impossible to have a human operator present.
Applications of interest include:
- autonomous navigation in harsh and unknown environments,
- cooperative tasks, including object grasping, manipulation and transportation.

publications

In Preparation

X02 G. Michieletto, A. Cenedese, F. Formaggio, S. Tomasin. *GNSS Spoofing Detection and Robust Navigation for UAV Formations.* IEEE Transaction on Automation and Science Engineering, 2020.- **under review (1st round)**

X01 G. Michieletto, A. Cenedese, D. Zelazo. *A Unified Dissertation on Bearing Rigidity Theory.* IEEE Transactions on Control of Network Systems, 2019.- **under review (2nd round)**

Journal Papers

J06 G. Michieletto, A. Cenedese, L. Zaccarian, A. Franchi. *Hierarchical non-linear control for multi-rotor asymptotic stabilization based on zero-moment direction.* Automatica, 2020.

J05 N. Lissandrini, G. Michieletto, R. Antonello, M. Galvan, A. Franco, A. Cenedese. *Cooperative Optimization of UAVs Formation Visual Tracking.* MDPI Robotics, 2019

J04 A. Franchi, P. Robuffo Giordano, G. Michieletto. *Online Leader Selection for Collective Tracking and Formation Control: the Second Order Case.* IEEE Transactions on Control of Network Systems, January 2019

J03 A. Antonello, G. Michieletto, R. Antonello, A. Cenedese. *A Dual Quaternion Feedback Linearized Approach for Maneuver Regulation of Rigid Bodies.* IEEE Control Systems Letters, vol. 2, no. 3, pp. 327-332, July 2018

J02 G. Michieletto, M. Ryll, A. Franchi. *Fundamental Actuation Properties of Multi-rotors: Force-Moment Decoupling and Fail-safe Robustness.* IEEE Transactions on Robotics, vol. 34, no. 3, pp. 702-715, June 2018

J01 A. Cenedese, M. Luvisotto, G. Michieletto. *Distributed Clustering Strategies in Industrial Wireless Sensor Networks.* IEEE Transactions on Industrial Informatics, vol. 13, no. 1, pp. 228-237, February 2017

Conference Papers

C13 M. Fabris, G. Michieletto, A. Cenedese. *A Proximal Point Approach for Distributed System State Estimation.* IFAC World Conference 2020, 2020.

C12 G. Michieletto, N. Lissandrini, A. Antonello, R. Antonello, A. Cenedese. *Dual Quaternion Delay Compensating Maneuver Regulation for Fully Actuated UAVs.* IFAC World Conference 2020, 2020.

C11 G. Michieletto, A. Cenedese, A. Franchi. *Force-Moment Decoupling and Rotor-Failure Robustness for Star-Shaped Generically-Tilted Multi-Rotors.* IEEE International Conference on Decision and Control (CDC), 2019

C10 G. Michieletto, A. Cenedese. *Formation Control for Fully Actuated Systems: a Quaternion-based Bearing Rigidity Approach.* Proceedings of European Control Conference (ECC), 2019

C09 L. Varotto, M. Fabris, G. Michieletto, A. Cenedese. *Distributed Dual Quaternion Based Localization of Visual Sensor Networks.* Proceedings of European Control Conference (ECC), 2019

C08 M. Fabris, G. Michieletto, A. Cenedese. *On the Distributed Estimation from Relative Measurements: a Graph-Based Convergence Analysis.* Proceedings of European Control Conference (ECC), 2019

C07 F. Branz, M. Duzzi, L. Olivieri, F. Sansone, G. Michieletto, R. Antonello, A. Cenedese, A. Francesconi. *Laboratory Validation of Close Navigation, Rendezvous and Docking Technologies for Nanosats.* Proceedings of the 4S Symposium, 2018

C06 G. Michieletto, S. Milani, A. Cenedese, G. Baggio. *Improving Consensus-based Distributed Camera Calibration via Edge Pruning and Graph Traversal Initialization.* IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2018

C05 G. Michieletto, A. Cenedese, L. Zaccarian, A. Franchi. *Nonlinear Control of Multi-Rotor Aerial Vehicles Based on the Zero-Moment Direction.* IFAC World Congress 2017, pp. 13686–13691, 2017

C04 G. Michieletto, M. Ryll, A. Franchi. *Conditions for Static Hoverability and Application to Rotor-Failure Robustness for Multi-Rotor Aerial Vehicles.* IEEE International Conference on Robotics and Automation (ICRA), pp. 2747–2752, 2017

C03 G. Michieletto, A. Cenedese, A. Franchi. *Bearing Rigidity Theory in SE(3).* IEEE International Conference on Decision and Control (CDC), pp. 5950-5955, 2016

C02 G. Belgioioso, A. Cenedese, G. Michieletto. *Distributed Partitioning Strategies with Visual Optimization for Camera Network Perimeter Patrolling.* IEEE Conference on Decision and Control (CDC), pp. 5912-5917, 2016

C01 G. Bianchin, A. Cenedese, M. Luvisotto, G. Michieletto. *Distributed Fault Detection in Sensor Networks via Clustering and Consensus.* IEEE International Conference on Decision and Control (CDC), pp. 3828-3833, 2015

Posters

P01 A. Antonello, G. Michieletto, R. Antonello, A. Cenedese. *Maneuver Regulation for Fully Actuated Multi-rotor UAVs: An Improved Dual Quaternion Approach.* IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2018

research projects

National

N08 *TSTARK: Tilt-rotor Sense-To-Act Regulation feedbacK*
SEED - Department of Information Engineering (2020-22)
PI: A. Cenedese (AUT group, DEI, UniPD)
Role: participant

N07 *Contact-Aware Robotics (CAR)*
SID - Department of Management and Engineering (2020-22)
PI: G. Michieletto (AUT group, DTG, UniPD)
Role: principal investigator

N06 *Industrial inTernet of things architEctuRes and Algorithms for time-critical Cyber-physical sysTems (INTERACT)*
SID - Department of Management and Engineering (2019-21)
PI: R. Oboe (AUT group, DTG, UniPD)
Role: collaborator

N05 *Distributed Secure Navigation and Control of Quadcopter Swarms*
BIRD [MIUR Dipartimenti d'Eccellenza] - Department of Information Engineering (2019-20)
PI: S. Tomasin (TLC group, DEI, UniPD)
Role: participant (fellowship recipient 1y - junior grant)

N04 *Multi-Agent Intelligent Control of time-critical Cyber-Physical Systems over wireless (MAgIC)*
BIRD - Department of Information Engineering (2017-19)
PI: L. Schenato (AUT group, DEI, UniPD)
Role: participant

N03 *Formation control and attitude estimation in the 3D space: theoretical duality and methodological interplay with application to mobile camera networks and multiagent systems*
BIRD - Department of Information Engineering (2017-19)
PI: A. Cenedese (AUT group, DEI, UniPD)
Role: co-principal investigator (fellowship recipient 2y - junior grant)

N02 *Development of a docking system for nano and microsatellites*
BIRD - Department of Industrial Engineering (2017-18)
PI: A. Francesconi (DII, UniPD)
Role: participant

N01 *SEAL: Smart&safe Energy-aware Assisted Living*
Smart City and Communities call of Italian Ministry of University and Research - MIUR (2013-15)
PI: L. Fabbri (BTF)
Role: participant (fellowship recipient 1y - junior grant)

International

I01 *AErial RObotic system integrating multiple ARMS and advanced manipulation capabilities for inspection and maintenance (AEROARMS)*
EU H2020 project - LAAS-CNRS (2016-17)
PI: A. Ollero (University of Seville)
Role: collaborator

editorial and dissemination activities

Responsibilities and Duties

Responsible for publicity and dissemination of the Technical Committee on Multi-Robot Systems (TC MRS) of the IEEE Robotics and Automation Society

Editorial Activity

- *Guest Editor*, Special Issue on Recent Advances in Visual Sensor Networks for Robotics and Automation, MDPI Sensors, 2020
- *Review Editor*, Field Robotics section of the Frontiers in Robotics and AI, 2020

Conference Activity

- *Chair*, Regular Session on Distributed Estimation at ECC19, Napoli, Italy, Jun 2019
- *Co-Chair*, Regular Session on Aerial Systems at IROS18, Madrid, Spain, Oct 2018

Review Activity

- International Journals
  Automtica, IEEE Access, IEEE Control Systems Letters, IEEE Transactions on Automatic Control, IEEE Transactions on Control of Network Systems, IEEE Transaction on Industrial Informatics, IEEE Transaction on Mechatronics, IEEE Transaction on Mobile Computing, IEEE Transaction on Robotics
- International Conferences
  American Control Conference (ACC), International Conference on Decision and Control (CDC), International Conference on Decision and Information Technologies (CoDIT), European Control Conference (ECC), International Conference on Emerging Technologies and Factory Automation (ETFA), International Conference on Advanced Robotics and Mechatronics (ICARM), International Conference on Robotics and Automation (ICRA), International Conference on Industrial Technology (ICIT), International Conference on Unmanned Aircraft Systems (ICUAS), Annual Conference of the IEEE Industrial Electronics Society (IECON), IFAC World Conference, International Conference on Intelligent Robots and Systems (IROS), Symposium on Mathematical Theory of Networks and Systems (MTNS)

Seminars and Invited Talks

- *The Sparkling World of GTMs*, Polytechnic University of Milan, Milan, Italy, Jan 2019
- *Multi-Agent Systems in Smart Environments*, University of Padova, Padova, Italy, Jan 2018
- *9months@LAAS*, LAAS-CNRS, Toulouse, France, Feb 2017
- *Bearing Rigidity Theory in SE(3)*, We-RoMe at LAAS-CNRS, Toulouse, France, Feb 2017
- *On the Rotation Estimation Problem for Camera Networks*, LAAS-CNRS, Toulouse, France, Apr 2017

Conference Talks

- *On the Actuation Properties of Generically-tilted Multi-rotor UAVs: Force-Moment Decoupling and Fail-Safe Robustness*, Oral Session at Automatica.it2019, Ancona, Italy, Sep 2019
- *Formation Control for Fully Actuated Systems: a Quaternion-based Bearing Rigidity Approach*, Regular Session at ECC19, Napoli, Italy, Jun 2019
- *On the Distributed Estimation from Relative Measurements:a Graph-Based Convergence Analysis*, Regular Session at ECC19, Napoli, Italy, Jun 2019
- *Maneuver Regulation for Fully Actuated Multi-rotor UAVs: An Improved Dual Quaternion Approach*, Late Breaking Results Poster Session at IROS18, Madrid, Spain, Oct 2018
- *Bearing Rigidity Theory in SE(3)*, Regular Session at CDC16, Las Vegas, USA, Dec 2016

Workshop Talks

- *The Mathematics of Actuation, Decoupling, Robustness Properties for Generically Tilted Multi-rotor Platforms*, Control Days 2019, Padova, Italy, May 2019

Other Dissemination Activities - Terza Missione

- *KIDS University*, Padova, Italy, Oct 2019
- *KIDS University*, Padova, Italy, Oct 2018
- *KIDS University*, Padova, Italy, Oct 2017

grants and fundings

Jun 2019 May 2020	**Junior Research Grant (ref. NO5)** Department of Information Engineering, University of Padova Project: Distributed Secure Navigation and Control of Quadcopter Swarms
Jun 2017 May 2019	**Junior Research Grant (ref. N03)** Department of Information Engineering, University of Padova Project: Formation control and attitude estimation in the 3D space: theoretical duality and methodological interplay with application to mobile camera networks and multiagent systems
Sep 2016 Feb 2017	**Eiffel Scholarship Program of Excellence** Campus France, French Ministry of Foreign Affairs and International Development
Jan 2016	**Short-Term Industrial Collaboration (ref. N01)** BFT S.p.A. Objective: Study of a Solution for the Integration of a Video Recognition System within an Access Control System
Dec 2014 Nov 2015	**Junior Research Grant (ref. N01)** Department of Information Engineering, University of Padova Project: Optimization for Multi-agent Systems in Noisy Environment - Distributed Fault-detection and Localization Problem

awards

Sep 2019	**finalist of `Fabrizio Flacco' Young Author Best Paper Award** IEEE Robotics & Automation Society Italian Chapter