

Personal information

Surname, First name

Email

Nationality

Date of birth

Gender

Education and training

Dates

Title of qualification awarded

Name and type of organization

Dates

Title of qualification awarded

Name and type of organization

Academic appointments

Dates

Occupation or position held

Name and type of organization

Dates

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Occupation or position held

Name and type of organization

Dates

Occupation or position held

Name and type of organization

Freddi, Alessandro

a.freddi@univpm.it

Italian

14th April 1980

Male



28th February 2012

Ph.D. in "Computer, Management and Automation Engineering"

Università Politecnica delle Marche (Ancona, Italy)

17th July 2008

Master's degree in "Electronic Engineering" with specialization in "Automatic Control"

Università Politecnica delle Marche (Ancona, Italy)

1st November 2021 - present

Associate Professor

Università Politecnica delle Marche (Ancona, Italy)

1st November 2018 - 31st October 2021

Assistant Professor

Università Politecnica delle Marche (Ancona, Italy)

1st July 2017 - 31st October 2018

Postdoc research fellow

Università Politecnica delle Marche (Ancona, Italy)

22nd April 2014 - 21st April 2017

Research associate

Università degli Studi eCampus (Novedrate, Italy)

1st January 2013 - 21st April 2014

Postdoc research fellow

Università Politecnica delle Marche (Ancona, Italy)

1st January 2012 - 31st December 2012

Postdoc research fellow

Università Politecnica delle Marche (Ancona, Italy)

1st January 2009 - 31st December 2011

Ph.D. student

Università Politecnica delle Marche (Ancona, Italy)

Research activities

Research interests

Fault diagnosis and prognosis:

- ▷ model-based fault detection and isolation in dynamical systems, with applications to unmanned vehicles and robotic systems;
- ▷ disturbance observer-based fault estimation in dynamical systems, with applications to unmanned vehicles and robotic systems;
- ▷ data/signal-driven fault diagnosis, with applications to rotating machinery, automation systems and unmanned vehicles;
- ▷ data-driven fault prognosis, with application to automation systems.

Control:

- ▷ model-based active fault-tolerant control of dynamical systems, with applications to unmanned vehicles;
- ▷ kinematic control of robotic manipulators subject to faults and/or joint constraints.

Development and applications of assistive technologies:

- ▷ assistive robotics for mobility and monitoring;
- ▷ human-machine interfaces for ambient assisted living.

Cyber physical system:

- ▷ sensor networks for data monitoring of automation systems;
- ▷ edge and cloud monitoring algorithms for automation systems.

Collaborations

Universities and research centres:

- ▷ Prof. Sauro Longhi and Prof. Andrea Monteriù, Dipartimento di Ingegneria dell'Informazione, Università Politecnica delle Marche (Ancona, Italia) on fault diagnosis, fault-tolerant control, autonomous vehicles, robotics and assistive technologies, 2009 - present;
- ▷ Prof. Vicente Ferreira de Lucena Junior, Faculty of Technology, Universidade Federal Do Amazonas (Manaus, Amazonas, Brazil), on robots in assisted living environments, 2020 - 2023;
- ▷ Prof. Ville Kyrki, Department of Electrical Engineering and Automation, Aalto University (Helsinki, Finland), on kinematic control of robotic manipulators, 2014 - 2018;
- ▷ Prof. Alexander Lanzon, School of Electrical and Electronic Engineering, University of Manchester (Manchester, England), on fault-tolerant control of Unmanned Aerial Vehicles, 2010 - 2018;
- ▷ founder member of the "SMART Engineering Solutions and Technologies (SMARTEST)" research centre, Università degli Studi eCampus (Novedrate, Italy), 2015 - 2018.

Companies and startups:

- ▷ founder member of "Syncode", a startup operating in the field of industrial automation, 2018 - present;
- ▷ collaboration with several Italian companies in the field of automation, especially on the aspects of diagnosis and predictive maintenance.

Publications

More than 120 papers in the fields of fault diagnosis, fault-tolerant control and assistive technologies, whose list is available on [Scopus](#), [Google Scholar](#) and [Researchgate](#).

Research projects

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| Dates | 1st July 2022 - present |
| Role | Team member |
| Project details | Vitality – Innovative solutions for Active & Assisted Living (AAL) (Italian national project) |
| Name and type of partner | Università Politecnica delle Marche (Ancona, Italy) |
| Dates | 11th May 2022 - present |
| Role | Team member |
| Project details | FocAAL – FOG Computing in Ambient Assisted Living (Italian national project) |
| Name and type of partner | Università Politecnica delle Marche (Ancona, Italy) |
| Dates | 1st February 2022 - 31st January 2024 |
| Role | Team member |
| Project details | INTELLIGENCE 5.0 – From cyber-physical systems to innovative models of advanced industrial services (Italian national project) |
| Name and type of partner | Università Politecnica delle Marche (Ancona, Italy) |
| Dates | 1st January 2021 - 31st December 2023 |
| Role | Team member |
| Project details | ChAALenge – Human monitoring technologies and smart user interaction in ambient assisted living environments (Italian national project) |
| Name and type of partner | Università Politecnica delle Marche (Ancona, Italy) |
| Dates | 10th March 2019 - 28th February 2023 |
| Role | Team member |
| Project details | VASO – IR drying methods for olive by-products (Marche region project) |
| Name and type of partner | Università Politecnica delle Marche (Ancona, Italy) |
| Dates | 1st January 2019 - 30 June 2022 |
| Role | Team member |
| Project details | SI-ROBOTICS – Active and healthy aging with social robotics (Italian national project) |
| Name and type of partner | Università Politecnica delle Marche (Ancona, Italy) |
| Dates | 1st March 2014 - 21st April 2014, 1st July 2017 - 31st October 2018 |
| Role | Team member |
| Project details | SHELL – Shared interoperable Home Ecosystems for a green, comfortable and safe Living (Italian national project) |
| Name and type of partner | Università Politecnica delle Marche (Ancona, Italy) |
| Dates | 1st January 2014 - 21st April 2014 |
| Role | Team member |
| Project details | HICMO – Home and building automation technologies for elderly people (Marche region project) |
| Name and type of partner | Università Politecnica delle Marche (Ancona, Italy) |
| Dates | 1st January 2013 - 31st December 2013 |
| Role | Team member |
| Project details | SMILING – SMart In home LiviNG: innovative sensor and automation technologies towards domotics (Italian national project) |
| Name and type of partner | Università Politecnica delle Marche (Ancona, Italy) |
| Dates | 1st January 2011 - 31st December 2012 |

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| Role | Team member |
| Project details | JADE - Joining innovative Approaches for the integration and Development of transnational knowledge of clusters policies related to independent of Elderly (European FP7 project) |
| Name and type of partner | Università Politecnica delle Marche (Ancona, Italy) |
| Conference and editorial activities | |
| Conference activities | <p>Associate editor:</p> <ul style="list-style-type: none"> ▷ <i>63rd IEEE Conference on Decision and Control (CDC)</i>, 16–19 December 2024, Milan, Italy ▷ <i>American Control Conference (ACC)</i>, 8–12 July 2024, Toronto, Canada ▷ <i>International Conference on Unmanned Aircraft Systems (ICUAS)</i>, 4–7 June 2024, Chania, Greece ▷ <i>International Conference on Unmanned Aircraft Systems (ICUAS)</i>, 6–9 June 2023, Warsaw, Poland ▷ <i>30th Mediterranean Control Conference (MED)</i>, 28 June – 1-July 2022, Athens, Greece <p>Committee member:</p> <ul style="list-style-type: none"> ▷ <i>11th European Conference on Mobile Robotics (ECMR)</i>, 4-7 September 2023, Coimbra, Portugal (Program Committee) ▷ <i>AUTOMATICA.IT 2019</i>, 11-13 September 2019, Ancona, Italy (Local Organizing Committee) ▷ <i>10th Ambient Assisted Living: Italian Forum</i>, 19-21 June 2019, Ancona, Italy (Local Committee Chair) ▷ <i>8th European Conference on Mobile Robots (ECMR)</i>, 6-8 September 2017, Paris, France (International Program Committee) ▷ <i>5th Ambient Assisted Living: Italian Forum</i>, 2-5 September 2014, Catania, Italy (Scientific Committee) ▷ <i>4th Ambient Assisted Living: Italian Forum</i>, 23-25 October 2013, Ancona, Italy (Organizing Committee) <p>Chair/Co-chair:</p> <ul style="list-style-type: none"> ▷ <i>22nd IFAC World Congress</i>, 11 July 2023, Yokohama, Japan (chair of “UAVs” regular session) ▷ <i>30th Mediterranean Control Conference (MED)</i>, 30 June 2022, Athens, Greece (chair of “Autonomous Systems I” regular session) ▷ <i>4th Conference on Control and Fault Tolerant Systems (SysTol)</i>, 18 September 2019, Casablanca, Morocco (co-chair of “UAV” regular session) ▷ <i>8th European Conference on Mobile Robots (ECMR)</i>, 7 September 2017, Paris, France (chair of “UAV Exploration” oral session) ▷ <i>13th ASME/IEEE International Conference on Mechatronic & Embedded Systems & Applications (MESA)</i>, 7 August 2017, Cleveland, USA (co-chair of “Autonomous Systems and Ambient Intelligence” session) ▷ <i>18th IFAC World Congress</i>, 30 August 2011, Milan, Italy (co-chair of “Control design” interactive session). |

Journals:

- ▷ Associate Editor of *Transactions on Automation Science and Engineering (T-ASE)*, *IEEE (USA)*, November 2024 – present
- ▷ Associate Editor of *Mechatronics Technology, ESLP (China)*, February 2023 – present
- ▷ Guest Editor of “Fault Diagnosis and Fault-Tolerant Control with Applications to Robotics and Automation Systems”, a Special Issue of *Sensors, MDPI (Switzerland)*, July 2022 – August 2024
- ▷ Guest Editor of “Advancements in ambient assisted living: integrating technology and human-centered design for enhancing user well-being and care”, a Special Issue of *Journal of Ambient Intelligence and Humanized Computing, Springer Nature (Germany)*, April 2024
- ▷ Associate editor of *Intelligent Service Robotics, Springer Nature (Germany)*, January 2018 - January 2021, December 2021 - present
- ▷ Guest Editor of “Robots in Assisted Living Environments: Enhancements, Challenges and Future Perspectives”, a Research Topic of *Frontiers in Robotics and AI (Switzerland)*, May 2021 - April 2022
- ▷ Guest Editor of “Algorithms for Fault Detection and Diagnosis”, a Special Issue of *Algorithms, MDPI (Switzerland)*, May 2019 - December 2020
- ▷ Guest Editor of “Smart Homes”, a Special Issue of *Sensors, MDPI (Switzerland)*, May 2018 - July 2018

Books:

- ▷ “Ambient Assisted Living: Italian Forum (ForItAAL)”, *ser. Lecture Notes in Electrical Engineering*, vol. 725, edited by A. Monteriù, A. Freddi, S. Longhi, *Springer Nature (Switzerland)*, February 2021
- ▷ “Fault Diagnosis and Fault-tolerant Control of Robotic and Autonomous Systems”, edited by A. Monteriù, A. Freddi, S. Longhi, *IET (UK)*, July 2020
- ▷ “The First Outstanding 50 Years of Università Politecnica delle Marche - Research Achievements in Life Sciences”, *Springer Nature (Switzerland)*, edited by S. Longhi, A. Monteriù, A. Freddi, L. Aquilanti, M. G. Ceravolo, O. Carnevali, M. Giordano, G. Moroncini, January 2020
- ▷ “The First Outstanding 50 Years of Università Politecnica delle Marche - Research Achievements in Social Sciences and Humanities”, *Springer Nature (Switzerland)*, edited by S. Longhi, A. Monteriù, A. Freddi, G. Bettin, S. Cardinali, M. S. Chiucchi, M. Gallegati, January 2020
- ▷ “The First Outstanding 50 Years of Università Politecnica delle Marche - Research Achievements in Physical Sciences and Engineering”, *Springer Nature (Switzerland)*, edited by S. Longhi, A. Monteriù, A. Freddi, E. Frontoni, M. Germani, G. M. Revel, December 2019
- ▷ “Human Monitoring, Smart Health and Assisted Living: Techniques and Technologies”, *IET (UK)*, edited by S. Longhi, A. Monteriù, A. Freddi, June 2017

Teaching Activities

Dates

Occupation or position held

Name and type of organization

26th September 2023 – present

Professor of “Fault Diagnosis and Predictive Maintenance”, graduate degree in Green Industrial Engineering (English)

Università Politecnica delle Marche (Pesaro, Italy)

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| Dates | 2nd March 2022 – present |
| Occupation or position held | Professor of “Systems for Automation”, undergraduate degree in Industrial and Information Systems (Italian) |
| Name and type of organization | Università Politecnica delle Marche (Pesaro, Italy) |
| Dates | 20th September 2021 – present |
| Occupation or position held | Professor of “Preventive Maintenance for Robotics and Smart Automation”, graduate degree in Computer and Automation Engineering (Italian) |
| Name and type of organization | Università Politecnica delle Marche (Ancona, Italy) |
| Dates | 1st November 2018 – 19th September 2021 |
| Occupation or position held | Professor of “Instrumentation and Measurements for Automation”, graduate degree in Computer and Automation Engineering (Italian) |
| Name and type of organization | Università Politecnica delle Marche (Ancona, Italy) |
| Dates | 3rd October 2013 – 31st October 2018 |
| Occupation or position held | Adjunct Professor of “Instrumentation and Measurements for Automation”, graduate degree in Computer and Automation Engineering (Italian) |
| Name and type of organization | Università Politecnica delle Marche (Ancona, Italy) |
| Dates | 1st August 2014 – 21st April 2017 |
| Occupation or position held | Professor of “Instrumentation for Automation”, graduate degree in Computer and Automation Engineering (Italian) |
| Name and type of organization | Università degli Studi eCampus (Novedrate, Italy) |
| Dates | 1st August 2014 – 21st April 2017 |
| Occupation or position held | Professor of “System Modelling and Simulation”, undergraduate degree in Computer and Automation Engineering (Italian) |
| Name and type of organization | Università degli Studi eCampus (Novedrate, Italy) |
| Dates | 1st August 2013 – 31st July 2014 |
| Occupation or position held | Adjunct Professor of “Instrumentation for Automation”, graduate degree in Computer and Automation Engineering (Italian) |
| Name and type of organization | Università degli Studi eCampus (Novedrate, Italy) |
| Dates | 26th March 2013 – 28th May 2013 |
| Occupation or position held | Teaching assistant of “Modelling and Optimization of Industrial Processes”, undergraduate degree in Management Engineering (Italian) |
| Name and type of organization | Università Politecnica delle Marche (Fermo, Italy) |
| Professional appointments | |
| Dates | 11th October 2011 - 10th January 2012 |
| Occupation or position held | Coordinated and continuous collaboration |
| Main activities and responsibilities | Research of the state of the art of home and building automation solutions, ambient assisted living solutions and choice of a possible set of features to be integrated into near future homes to achieve active aging and independent living |
| Name and address of employer | INRCA - Via Santa Margherita 5, 60125 Ancona, Italy National Institute of Health and Science on Aging |
| Type of business or sector | |

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| Dates | 1st January 2009 - 31st December 2011 |
| Occupation or position held | Consultant engineer (as a part of the Ph.D studies) |
| Main activities and responsibilities | Development of a framework for porting high-level programming language algorithms (MATLAB and Simulink) to embedded architectures database oriented, using C language and SQLite interfaces, and applications within FP7-KBBE-CAFE project |
| Name and address of employer | SPES S.c.p.a. - Via Lamberto Corsi 43, 60044 Fabriano, Italy |
| Type of business or sector | Hardware and software development for industrial, environmental and home automation |
| Roles in scientific and professional societies | <p>Volunteer positions:</p> <ul style="list-style-type: none"> ▷ IEEE Robotics and Automation, Technical Committee on Rehabilitation and Assistive Robotics (Member), 2023 – present ▷ IEEE Control Systems Society, Technical Committee on Aerospace Controls (Member), 2021 – present ▷ IEEE Consumer Technology Society, Technical Committee on Consumer Systems for Healthcare and Wellbeing (Member), 2021 – present ▷ IEEE Robotics and Automation Society, Technical Committee on Aerial Robotics and Unmanned Aerial Vehicles (Member), 2021 – present ▷ IEEE Consumer Technology Society, Technical Committee on Consumer Systems for Healthcare and Wellbeing (Secretary), 2021 – 2022 ▷ IEEE Consumer Electronics Society, Italian Section Chapter (Vice Chair), 2017 <p>Memberships:</p> <ul style="list-style-type: none"> ▷ Institute of Electrical and Electronic Engineers (IEEE) Senior Member, 2023 – present ▷ IEEE Consumer Technology Society (CTSoc), 2016 – 2023 ▷ IEEE Robotics and Automation Society (RAS), 2013 – present ▷ International Federation of Automatic Control (IFAC), 2013 – present ▷ IEEE Control Systems Society (CSS), 2011 - present ▷ Institute of Electrical and Electronic Engineers (IEEE), 2011 – 2023 |