

Virginia Ruiz Garate

Associate Professor in Assistive Robotics

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Experience

- Jan. 2021 – Present **Associate Professor in Assistive Robotics/Wallscourt Fellow in Intelligent Assistive Robotics**, Bristol Robotics Laboratory/University of the West of England (UWE), United Kingdom.
- Assistive Robotics Theme Leader at the Bristol Robotics Laboratory
 - Co-leader of the Robotics Engineering And Computing for Healthcare (**REACH**) research group
 - Robotics Programme Cluster Coordinator for Open day, Offer holder day & Induction
 - EDM (Engineering, Design and Mathematics department) representative for the Faculty of Environment and Technology RKE (Research and Knowledge Exchange) Research Culture Working Group.
 - Module leader of the MSc Assistive Robotics module.
- Jan. 2017 – Dec. 2020 **PostDoc researcher**, Human-Robot Interfaces and Physical Interaction Research Line (HRII), Italian Institute of Technology (IIT), Genova, Italy. Projects involved:
- **SOPHIA** (EU Horizon 2020 No. 871237)
 - **ErgoLean** (ERC Starting Grant; Principal Investigator: Arash Ajoudani)
 - **SOMA** (EU Horizon 2020 No. 645599).
- July 2011– Dec. 2011 **Project engineer**, TASS international, Wiesbaden, Germany.
- Developing software for the integrated safety problems in the automotive area.
- Feb. 2011 – June 2011 **Research assistant**, Morelab laboratory, DeustoTech, Spain.
- Assist in the “Internet of things” projects in sensor integration and electronics.
- July 2010 – Aug. 2010 **Research assistant (Internship)**, Keio University, Japan.
- Research subject: “Study of singularity avoidance methods and disturbance influence in flexible spacecraft controlled by CMG”.

Education

- Feb. 2012 – June 2016 **Research assistant / PhD Student**, Center for Research in Energy and Mechatronics (CEREM), Université catholique de Louvain (UCL), Belgium.
- Thesis: “Bio-inspired motor primitives for controlling leg exoskeletons”.
 - Research and development in the EU **CYBERLEGS** project (FP7-ICT-287894).
- June 2015 – Nov. 2015 - Period abroad at The BioRobotics Institute, Scuola Superiore Sant'Anna, Italy
- Sep. 2008 – June 2010 **EMARO (European Master in Advanced Robotics)**, Ecole Centrale de Nantes, France /Politechnika Warszawska, Poland.
- Thesis: “Inverse dynamic analysis of human gait - Investigation for robotics application”.
- Sep. 2006 – Sep. 2008 **Engineering in Automation and Electronics**, Escuela Técnica Superior de Ingeniería (UPV/EHU), Spain.
- Project: “Prototype of mobile service robot for aiding people with restricted mobility”.
- Sep. 2002 – Dec. 2005 **Industrial Technical Engineering specialized in Industrial Electronics**, Escuela Universitaria de Ingeniería Técnica Industrial (UPV/EHU), Spain.

Journal papers

- May. 2022 T. Bennett, P. Kumar, and V. Ruiz Garate. **“A machine-learning model for predicting sit-to-stand trajectories of people with and without stroke: towards adaptive robotic assistance”**, *Sensors*, 2022 (Under Review).
- Sep. 2021 W. Kim, V. Ruiz Garate, J. M. Gandarias, M. Lorenzini, and A. Ajoudani. **“A Directional Vibrotactile Feedback Interface for Ergonomic Postural Adjustment”**, *IEEE Transactions on Haptics*, vol. 15, no. 1, pp. 200-211, 1 2022
- May 2021 V. Ruiz Garate, S. Gholami, A. Ajoudani. **“A Scalable Framework for Multi-Robot Tele-Impedance Control”**, *IEEE Transactions on Robotics (T-RO)*.
- Aug. 2020 V. Ruiz Garate, A. Ajoudani. **“An approach to object-level stiffness regulation of hand-arm systems subject to under-actuation constraints”**, *Aut. Robots*.
- July 2018 V. Ruiz Garate, M. Pozzi, D. Prattichizzo, A. Ajoudani. **“A Bio-inspired Grasp Stiffness Control for Robotic Hands”**, *Frontiers in Robotics and AI*.
- July 2018 V. Ruiz Garate, M. Pozzi, D. Prattichizzo, N. Tsagarakis and A. Ajoudani. **“Grasp Stiffness Control in Robotic Hands Through Coordinated Optimization of Pose and Joint Stiffness”**, *IEEE Robotics and Automation Letters*, vol. 3, no. 4, pp. 3952-3959.
- March 2017 V. Ruiz Garate, A. Parri, T. Yan, M. Munih, R. Molino Lova, N. Vitiello, R. Ronsse. **“Experimental Validation of Motor Primitive-Based Control for Leg Exoskeletons during Continuous Multi-Locomotion Tasks”**, *Frontiers in Neurorobotics*.
- May 2016 T. Yan, A. Parri, V. Ruiz Garate, M. Cempini, R. Ronsse, N. Vitiello. **“An oscillator-based smooth real-time estimate of gait phase for wearable robotics”**, *Autonomous Robots* 41 (3), 759-774
- Feb. 2016 V. Ruiz Garate, A. Parri, T. Yan, M. Munih, R. Molino Lova, N. Vitiello, R. Ronsse. **“Walking Assistance Using Artificial Primitives: A novel bio-inspired framework using motor primitives for locomotion assistance through a wearable cooperative exoskeleton”**, *IEEE Robotics & Automation Magazine*, 23(1), pp. 83–95.

Conferences

- 11-15 July 2022, Virtual E. Nunez Sardinha, V. Ruiz Garate, A. Jafari, and A. Etoundi **“Embedding Soft Synergies into Soft Materials for Intrinsic Compliant Robotic Hand Grasping”**, *IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM 2022)*
- 26-27 July 2021, Virtual A. Van Maris, L. Sumpter, V. Ruiz Garate, P. Kumar, C. harper, P. Caleb-Solly. **“The case for an intervention scale to design the balance of authority for robotic assistance”**, *6th International Conf. on Robot Ethics and Standards (ICRES)*.
- 31 Aug. – 04 Sep. 2020, Virtual S. Gholami, V. Ruiz Garate, DM. Elena, A. Ajoudani. **“A Shared-Autonomy Approach to Goal Detection and Navigation Control of Mobile Collaborative Robots”**, *The 29th IEEE International Conference on Robot and Human Interactive Communication (Ro-man)*

- 25 – 29 Nov. 2020, Virtual S. Gholami, V. Ruiz Garate, DM. Elena, A. Ajoudani. **“A Probabilistic Shared-Control Framework for Mobile Manipulators”**, *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*
- 1 – 5 Oct. 2018, Madrid, Spain. V. Ruiz Garate, M. Pozzi, D. Prattichizzo, N. Tsagarakis and A. Ajoudani. **“Grasp Stiffness Control in Robotic Hands Through Coordinated Optimization of Pose and Joint Stiffness”**, *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2018)*. Accepted for an oral communication.
- 15 – 17 Nov. 2017, Birmingham, UK V. Ruiz Garate, N. Tsagarakis, A. Bicchi, A. Ajoudani. **“On the Common-Mode and Configuration-Dependent Stiffness Control of Multiple Degrees of Freedom Hands”**, *IEEE RAS International Conference on Humanoid Robots, At Birmingham (UK)*. Accepted for an oral communication.
- 26 – 29 June 2016, Singapore. V. Ruiz Garate, A. Parri, T. Yan, M. Munih, R. Molino Lova, N. Vitiello, R. Ronsse. **“Motor primitive-based control for lower-limb exoskeletons”**, *6th IEEE RAS & EMBS International Conference on Biomedical Robotics and Biomechatronics (BioRob 2016)*. Accepted for an oral communication
- 23 – 24 Oct. 2014, Pontedera, Italy. V. Ruiz Garate, J.F. Collard, R. Ronsse. **“Bio-Inspired Model for Locomotion Assistance exoskeletons”**, *7th International Workshop on Human-Friendly Robotics (HFR2014)*. Accepted for an oral communication.
- 14 – 19 Sep. 2014 L. Flynn, F. Giovacchini, L. Ambrozic, M. Gorsic, M. Munih, V. Ruiz Garate, et al. **“Introduction to CYBERLEGS: Hardware and Control”**, *International Workshop on Wearable Robotics (WeRob 2014)*
- 16 – 19 Jan. 2013 R.C.H. Bours, K. Kietlinski, V. Ruiz Garate, **“Numerical Modeling of ADA System for Vulnerable Road Users Protection Based on Radar and Vision Sensing”**, *SAE Technical Paper*
- 3 – 7 June 2012, Alcalá de Henares, Spain. V. Ruiz Garate, R. Bours, K. Kietlinski. **“Numerical Modeling of ADA System for Vulnerable Road Users Protection Based on Radar and Vision Sensing”** *IEEE. Proceedings of the IEEE Intelligent Vehicles Symposium (IV), 2012*, ISBN: 978-1-4673-2119-8, pp. 1150-1155. Poster presentation.
- 2 – 4 Sep. 2009. Valladolid, Spain. V. Ruiz Garate , I. Cabanes, A. Zubizarreta, E. Portillo, M. Marcos. **“Buggy: Prototipo de robot móvil de servicio para asistencia a personas con movilidad restringida”**, *Proceedings of “XXX Jornadas de Automática”*, ISBN: 13-978-84-692-2387-1. Poster presentation.

Editorial Activity, Workshops, and Talks

- 23-24 June 2022 Bristol, U.K. **Workshop Organizer:** “Past and Future of Assistive Technologies”, University of the West of England, Bristol Robotics Laboratory.
- 23 June 2019/31 May 2021, Freiburg, Germany/Virtual **Workshop Organizer:** “Emerging Paradigms for Robotic Manipulation: from the lab to the productive world.” 1st Edition - *Robotics Science and Systems Conference (RSS) 2019*. 2nd Edition - *Int. Conference on Robotics and Automation (ICRA 2021)*”.
- 12 March / 10 Sep. 2021, Mérida, México (Virtual) **Talk:** “Robots de asistencia: de exoesqueletos a robots sociales”, *AAAIMX Women's Month / 2nd National Symposium on Bioengineering and Artificial Intelligence (SINABIA 2021)*, Instituto Tecnológico de Mérida
- 23 June 2019, Freiburg, Germany. **Associate Editor** for 30th *IEEE International Conference on Robot and Human Interactive Communication (RO-MAN 2021)*.
- 10 Dec. 2020 Virtual **Workshop Organizer:** “Human factors in the design and control of robots: What are we missing?” *Italian Conference on Robotics and Intelligent Machines (I-RIM) 3D Workshop, 2020*

- 15 Sep. 2020 - Present **Review Editor on the Editorial Board** of Field Robotics (specialty section of Frontiers in Robotics and AI)
- 06/2021 **Special Issue Organizer and Associate Editor:** “Emerging Paradigms for Robotic Manipulation: from the Lab to the Productive World”, *IEEE Robotics and Automation Magazine* (RAM), 2021.
- 2012 – Present Reviewer for several international journals and conferences such as RA-L, ICRA, IROS, ICORR, BioRob, CASE, TII, TNSRE, T-RO, Frontiers in Neurorobotics, and Frontiers in Computational Neuroscience

Teaching and Supervision

- June – July 2022 Supervise 4 summer interns working on diverse topics of Assistive Technologies
- June 2022 – Sep. 2022 Co-Supervising 7 Master thesis from the MSc in Robotics and Health Technology.
- Sep. 2021-Present PhD supervision. Emanuel Nunez Sardinha. “*The Pupil System: Augmented Reality System for Gaze-control of Devices for Tetraplegid*”.
- June 2021 – Sep. 2021 Co-Supervising 6 Master thesis from the MSc in Robotics and Health Technology..
- June – July 2021 Supervise 3 summer interns working on the topics of Biomechanical Analysis and Machine Learning for data obtained from physically assistive robots.
- Feb 2021 –Present Teaching “**Assistive Robotics**” for MSc students, UWE and University of Bristol.
- Supervise practical lessons with the Pepper robot (11 groups of 4-6 students)
 - Organizing lecture sessions (~60 students).
 - Marking and feedback reports.
- 2018 – Dec. 2020
- Supervise students. IIT, Genova, Italy.
 - One **PhD student** final project (2019-2020): research on shared-teleoperation for control of mobile manipulators.
 - One **master student** final project (2018): study brain interfaces to decode user intention for robotic grasping control.
- 2014 – 2015 First year civil engineering: **LFSAB1501 Project 1**. UCL, Belgium (in French)
- Guide students during the construction and programming of their first Lego robot. Follow their progress through regular reports.
 - More than 8-10 groups of 5-6 students each, during two semesters.
- 2014 – 2015 Master course **LMECA2732: Introduction to robotics, Laboratoire NAO**. UCL, Belgium (in English).
- Guide laboratory groups on their first approach to programming robot NAO.
 - Total of 10 groups of 2 students each, during two semesters.

Skills

- Computer skills
- Good knowledge of Matlab, Ubuntu, Microsoft Office
 - Medium knowledge of LateX, ROS, LabView, C++, Inkscape
 - Basic notions of MPLAB, CATIA, ADAMS, Pro-Engineer
- Languages
- Spanish (mother tongue), English (fluent), Italian (medium), French (medium), Basque (basic)

Honours and awards

- 2022-2024 **Project lead for UWE** (£227,126) as partner of the collaborative Fitbees Project (£1,843,330 awarded under the Innovate UK Competition: Healthy Ageing Challenge - Designed for Ageing)
- 2022-2023 **Vice Chancellor’s Challenge Fund** for 2022-23. £24.960 award to co-lead a project on “4D printing of soft hands for smart actuation and sensing of robotic prosthetic hands” and £24,426.50 to co-lead a project on “Enhancing self-directed

- arm exercise practice using GripAble gaming device integrated with wearable (accelerometer and Lycra arm Sleeve) technologies in chronic stroke survivors”
- 2021-2022 **Vice Chancellor’s Early Career Researcher Development Award** for 2021-22. £14,910 award to develop a study on: “Adaptive home robotic assistance for people with stroke using the CHIRON robot”.
- 2020 **Marie Skłodowska-Curie Seal of Excellence** on the H2020-MSCA-IF-2020 call.
- 2009-2010 Basque Country scholarship to carry studies of specialization in a foreign country. Awarded during the EMARO master for the interest and relevance of the carried studies for the Basque Country.
- 2007-2008 Basque Country collaboration scholarship to develop studies under the Automatic Control and Systems Engineering laboratory of the Escuela Técnica Superior de Ingeniería, Spain.

Other competences and interests

- Additional certificates - **SD2905.1x: Human Spaceflight:** an introduction. EdX online course offered by KTH Royal Institute of Technology. March 16, 2017.
- Competences - Team spirit and ability to coordinate with international partners.
 - Good communication skills and adaptability to multicultural environments.
 - Very good capacity to self-organize and elaborate short/long term schedules.