Ricardo **Vilela de Godoy**

PhD Mechatronics Engineer · Postdoc researcher

São Carlos, Brazil

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| Ricardo Vilela de Godoy | Ricardo Vilela de Godoy | 0000-0002-5323-9299

Summary

I am currently a postdoc at the University of São Paulo. I got my PhD from The University of Auckland, New Zealand, where my research focused on the applications of advanced **machine learning techniques** for the development of **human-machine interfaces** to efficiently **decode discrete and continuous human motions** using biosignal-based interfaces and external sensors for implementing shared control frameworks. Before this, I was a MSc student at the University of Sao Paulo, Brazil, and a member of the **robotic surgery group**. At the University of Sao Paulo, my work focused on developing and implementing machine learning **frameworks for predicting epileptic seizures** using electroencephalography signals. My main interest is in employing machine learning techniques for **intuitive and robust control for applications in robotics, prostheses, rehabilitation, and automation**.

Professional Experience

University of São Paulo
São Carlos, Brazil

Graduate Research Associate — *Sep. 2024 - Present*

- Mechatronics engineer working on the development of robotic tools for inspection and maintenance in oil facilities.
- Research in computer vision and machine learning applications.

Faculdade Israelita de Ciências da Saúde, Hospital Israelita Albert Einstein
São Paulo, Brazil

Assistant Professor — *Jan. 2025 - Jul. 2025*

- Assistant professor in the Biomedical Engineering Bachelor program.
- Course: Processing of Biomedical Signals and Images.

New Dexterity Research Group, The University of Auckland
Auckland, New Zealand

Graduate Research Associate — *Dec. 2021 - Aug. 2024*

- Mechatronics engineer working on the development of novel human-machine interfaces solutions
- Development of novel bionic devices and deep learning algorithms

Research associate - Collaboration with Acumino (USA), part-time — *Dec. 2021 - Aug. 2024*

- Data collection and analysis of grasping and manipulation strategies using wearable human machine interfaces
- Development of machine learning-based algorithms for automated annotation of videos

Research associate - Collaboration with Prowood Limited (NZ), part-time — *Sep. 2022 - Mar. 2023*

- Funded by the 2022/23 R&D Experience Grants from Callaghan Innovation New Zealand's Innovation Agency
- Development of an automated framework for assembling beehive frames

University of São Paulo
São Carlos, Brazil

Graduate Research Associate — *Jul. 2019 - Jul. 2021*

- Mechatronics engineer working on the development of novel deep learning and deep reinforcement learning techniques
- Member of the robotics surgery group
- Research in neurology, epilepsy, machine learning, and brain-machine interface

University of São Paulo
São Carlos, Brazil

Undergraduate researcher - Fundação de Apoio à Física e à Química (FAFQ) and SENA Project — *Jul. 2016 - Dec. 2019*

- Engineering undergraduate researcher responsible for the development and implementation of an algorithm based on Dynamic Movement Primitive in a robotic arm
- Simulation of the autonomous vehicle using V-REP and ROS

MULTITTECH Engineering
São Carlos, Brazil

Engineering Intern — *Jan. 2019 - Jul. 2019*

- Intern in the modelling and simulation of dynamic systems group
- Development of technical procedures for train testing based on international standards
- Knowledge in modelling the primary and secondary suspension of a train and developing simulations using ADAMS and VI-Rail

Education

University of São Paulo — *São Carlos, Brazil*
Postdoc in Mechanical and Mechatronics Engineering — *Sep. 2024 - Present*
- Research in loco-manipulation and machine learning techniques.

The University of Auckland — *Auckland, New Zealand*
PhD in Mechanical and Mechatronics Engineering — *Dec. 2021 - Aug. 2024*
- Thesis on analysis and development of novel human-machine interfaces for the control of bionic devices
- Research in robotics, human-machine interfaces, and machine learning techniques

University of São Paulo — *São Carlos, Brazil*
Master in Mechanical Engineering — *Jan. 2020 - Jul. 2021*
- Thesis Title: Epileptic Seizure Prediction using Deep Learning Techniques
- Research in machine learning techniques, brain-computer interfaces, neuroscience, neuroimaging, and robotics

University of São Paulo — *São Carlos, Brazil*
Bachelor in Mechatronics Engineering — *Feb. 2015 - Dec. 2019*
- Senior Thesis Title: Comparison of Deep Reinforcement Learning Control Methods of Autonomous Robot in a Competition Task

Honors and Awards

2009-2014	**1 gold medal, 2 bronze medals, and 1 honorable mention**, Paulista Physics Olympiad (OPF) - 2009, 2011, 2013, 2014	*Brazil*
2007-2014	**1 gold medal and 6 plate medals**, Brazilian Astronomy Olympiad (OBA) - 2007, 2008, 2009, 2010, 2011, 2012, 2014	*Brazil*
2011	**Honorable mention**, Brazilian Physics Olympiad (OBF)	*Brazil*
2010	**Gold medal**, Brazilian Robotics Olympiad (OBR)	*Brazil*

Skills

Programming	Python, Matlab, C/C++, C#, ROS, Git, Tensorflow, PyTorch, Keras, Scikit, OpenCV, Unity
CAD Softwares	SolidEdge, SolidWorks
Languages	Portuguese (native), English (fluent), German (intermediary)
Others	Robotics, human-machine interfaces, deep learning, deep reinforcement learning, cloud computing services, biosignal analysis, wearable sensors

Qualifications and Certifications

2022	**Deep Learning Specialization**, DeepLearning.AI - Coursera	*160 hours*
2021	**Test of English as a Foreign Language (TOEFL)**, TOEFL iBT®	*Score: 108*
2021	**Natural Language Processing with Deep Learning**, Udemy	*10 hours*
2020	**Crash Course on Python**, Google - Coursera	*28 hours*
2020	**Introductory Human Physiology**, Duke University - Coursera	*33 hours*
2020	**Fundamental Neuroscience for Neuroimaging**, Johns Hopkins University - Coursera	*9 hours*
2017	**Matlab and Excel**, Organizer and participant in the courses held by Academic Secretariat of Mechatronics Engineering (SAdEM)	*20 hours*

Service

Peer reviewer — *International*
Scientific Reports - Nature, Neural Networks, Journal of Bionic Engineering, npj Robotics - Nature, IEEE Journal of Biomedical and Health Informatics, IEEE Robotics and Automation Letters (RA-L), IEEE International Conference on Intelligent Robots and Systems (IROS), IEEE International Conference on Robotics and Automation (ICRA), IEEE Access, Computers in Biology and Medicine, IEEE Conference on Biomedical Robotics and Biomechatronics (BioRob)
2020 - Today

The University of Auckland — *Auckland, New Zealand*

Liaison of the Mechatronics Laboratory at the University of Auckland — *2023 - 2024*

The University of Auckland — *Auckland, New Zealand*

Teaching Assistant for Engineering Courses — *2022 - 2024*

- Courses: Biomechatronics (MECHENG 736), Advanced Biomechatronics (MECHENG 730), Part IV Research Projects (MECHENG 700)
- Grade projects and reports to provide feedback to the students
- Organize lab sessions and provided students with theoretical and practical guidance

Hospital Albert Einstein — *Sao Paulo, Brazil*

Invited talk: Human-Machine Interfaces: Applications of Biological Signals in Robotics — *Aug. 2024*

University of Waikato — *Hamilton, New Zealand*

Invited talk: Analysis and Development of Human-Machine Interfaces for the Control of Robotic and Bionic Devices — *Jan. 2024*

IEEE International Conference on Automation Science and Engineering (CASE) — *Auckland, New Zealand*

Tutorial: Biosignal-Based Design Approaches for the Development of Human-Machine Interfaces for Shared Control of Computer Applications and Robotic Devices — *Aug. 2023*

- Tutorial focused on approaches for development of interfaces that facilitate intuitive interactions with different devices
- Different types of biosignals and associated analytical methods, classical machine learning and deep learning methods were discussed

IEEE International Conference on Automation Science and Engineering (CASE) — *Auckland, New Zealand*

Volunteer at the 2023 International Conference on Automation Science and Engineering — *Aug. 2023*

Museum of Transport and Technology Auckland (MOTAT) Stem Fair 2023 — *Auckland, New Zealand*

Specialist exhibitor at the 2023 MOTAT Stem Fair — *Apr. 2023*

- Demonstrations and displays of my research to engage the next generation of kids to consider careers in Science, Technology, Engineering, and Mathematics (STEM)

2022 Conference on Robot Learning — *Auckland, New Zealand*

Audio Visual Equipment Chair at the 2022 Conference on Robot Learning — *Dec. 2022*

2022 World Robot Olympiad — *Auckland, New Zealand*

Judge in the 1st New Zealand Finals of the World Robot Olympiad — *Oct. 2022*

IEEE-RAS Student Chapter — *Sao Carlos, Brazil*

Co-founder, vice president, and webmaster of the Robotics and Automation Student Chapter at the University of Sao Paulo — *2019 - 2021*

Animal shelter assistant at NGOs — *Sao Carlos, Brazil*

Volunteer — *2019 - 2021*

University of Sao Paulo — *Sao Carlos, Brazil*

Manager of the educational group at SAdEM — *2016 - 2017*

Interests

Martial arts; volunteering; international politics; meliponiculture; gardening; hiking

Publications

Journal Publications

B. Guan, **R. V. Godoy**, M. Shahmohammadi, A. Dwivedi, and M. Liarokapis, "Offline Versus Real-Time Grasp Prediction Employing a Wearable High-Density Lightmyography Armband: On the Control of Prosthetic Hands", in IEEE Access, 2025.

J. Buzzatto, H. Jiang, J. Liang, B. Busby, A. Lynch, **R. V. Godoy**, S. Matsunaga, R. Haraguchi, T. Mariyama, B. A. Macdonald, M. Liarokapis, "Multi-Layer, Sensorised Kirigami Grippers for Delicate yet Robust Robot Grasping and Single-Grasp Object Identification", in *IEEE Access*, 2024.

R. V. Godoy, B. Guan, F. Sanches, A. Dwivedi and M. Liarokapis, "Electromyography Based Gesture Decoding Employing Few-Shot Learning, Transfer Learning, and Training From Scratch", in *IEEE Access*, 2023.

M. Shahmohammadi, B. Guan, **R. V. Godoy**, A. Dwivedi, P. Nielsen, and M. Liarokapis, "On lightmyography based muscle-machine interfaces for the efficient decoding of human gestures and forces", in *Nature Scientific Reports*, 2023.

R. V. Godoy et al., "Electromyography-Based, Robust Hand Motion Classification Employing Temporal Multi-Channel Vision Transformers", in *IEEE Robotics and Automation Letters (RA-L)*, 2022.

R. V. Godoy, A. Dwivedi and M. Liarokapis, "Electromyography Based Decoding of Dexterous, In-Hand Manipulation Motions With Temporal Multichannel Vision Transformers", in *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 2022.

R. V. Godoy et al., "On EMG Based Dexterous Robotic Telemanipulation: Assessing Machine Learning Techniques, Feature Extraction Methods, and Shared Control Schemes", in *IEEE Access*, 2022.

Conference Publications

R. V. Godoy, B. Guan, A. Dwivedi, M. Owen, and M. Liarokapis, "A Video Dataset of Everyday Life Grasps for the Training of Shared Control Operation Models for Myoelectric Prosthetic Hands ", in *International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, 2024.

R. V. Godoy, B. Guan, A. Dwivedi, and M. Liarokapis, "An Affordances and Electromyography Based Telemanipulation Framework for Control of Robotic Arm-Hand Systems ", in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2023.

R. V. Godoy, B. Guan, A. Dwivedi, M. Shahmohammadi, M. Owen, and M. Liarokapis, "Multi-Grasp Classification for the Control of Robot Hands Employing Transformers and Lightmyography Signals", in *International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, 2023.

B. Guan, **R. V. Godoy**, F. Sanches, A. Dwivedi, and M. Liarokapis, "On Semi-Autonomous Robotic Telemanipulation Employing Electromyography Based Motion Decoding and Potential Fields", in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2023.

M. Shahmohammadi, B. Guan, **R. V. Godoy**, and M. Liarokapis, "An Adaptive, Humanlike Prosthetic Hand Equipped with a Series Elastic Differential and a Lightmyography Based Control Interface", in *IEEE International Conference on Automation Science and Engineering (CASE)*, 2023.

B. Guan, **R. V. Godoy**, F. Sanches, A. Dwivedi, Y. Kwon, and M. Liarokapis, "Electromyography and Potential Fields Based Shared Control Framework for Robotic Telemanipulation", in *IEEE International Conference on Robotics and Automation (ICRA)*, 2023.

N. Elangovan, **R. V. Godoy**, F. Sanches, K. Wang, T. White, P. Jarvis, and M. Liarokapis, "On Human Grasping and Manipulation in Kitchens: Automated Annotation, Insights, and Metrics for Effective Data Collection", in *IEEE International Conference on Robotics and Automation (ICRA)*, 2023.

J. Liang, J. Buzzatto, B. Busby, **R. V. Godoy**, S. Matsunaga, R. Haraguchi, T. Mariyama, B. Macdonald, M. Liarokapis, "Employing Multi-Layer, Sensorised Kirigami Grippers for Single-Grasp Based Identification of Objects and Force Exertion Estimation", in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2023.

F. Sanches, G. Gao, N. Elangovan, **R. V. Godoy**, J. Chapman, K. Wang, P. Jarvis, M. Liarokapis, "Scalable, Intuitive Human to Robot Skill Transfer with Wearable Human Machine Interfaces: On Complex, Dexterous Tasks", in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2023.

R. V. Godoy et al., "Electromyography-Based, Robust Hand Motion Classification Employing Temporal Multi-Channel Vision Transformers", in *IEEE RAS/EMBS International Conference for Biomedical Robotics and Biomechatronics (BioRob)*, 2022.

R. V. Godoy, A. Dwivedi, M. Shahmohammadi and M. Liarokapis, "Lightmyography Based Decoding of Human Intention Using Temporal Multi-Channel Transformers", in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2022.

N. Elangovan, C. Chang, **R. V. Godoy**, F. Sanches, K. Wang, P. Jarvis, and M. Liarokapis, "Comparing Human and Robot Performance in the Execution of Kitchen Tasks: Evaluating Grasping and Dexterous Manipulation Skills", in *IEEE-RAS International Conference on Humanoid Robots (Humanoids)*, 2022.

R. V. Godoy et al., "Redundant Robot Kinematics Error Analysis for Neurosurgical Procedures", in *IEEE International Conference on Industry Applications (INDUSCON)*, 2021.

L. A. Marão, L. Casteluci, **R. V. Godoy**, H. Garcia, D. V. Magalhães and G. Caurin, ”Deep Reinforcement Learning Control of an Autonomous Wheeled Robot in a Challenge Task: Combined Visual and Dynamics Sensoring”, in *International Conference on Advanced Robotics (ICAR)*, 2019.

Preprint Publications

T.H. Segreto, J. Negri, P. H. Polegato, J. M. H. Pinheiro, **R. V. Godoy**, and M. Becker, ”A Leaf-Level Dataset for Soybean-Cotton Detection and Segmentation”, in ArXiV, 2025.

G. J. Lahr, **R. V. Godoy**, T. H. Segreto, J. O. Savazzi, A. Ajoudani, T. Boaventura, and G. A. Caurin, ”Improving Failure Prediction in Aircraft Fastener Assembly Using Synthetic Data in Imbalanced Datasets”, in ArXiv, 2025.

R.R. Baptista, N.R. Gerszberg, **R. V. Godoy**, G. J. Lahr, ”MIHRaGe: A Mixed-Reality Interface for Human-Robot Interaction via Gaze-Oriented Control”, in ArXiv, 2025.

R. V. Godoy et al., ”EEG-Based Epileptic Seizure Prediction Using Temporal Multi-Channel Transformers”, in *ArXiv*, 2022.