

# Curriculum Vitae

## Rodrigo da Silva Guerra, Ph.D.

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### Executive summary

Prof. Guerra has a history of research in the field of service robotics, including themes such as telepresence robotics, robot soccer, humanitarian robotics and educational robotics. He is especially interested in robot-human cooperation and learning. In 2005 he led the development of a mixed-reality micro-robot system that was used all over the world for RoboCup competitions and for research on insect behavior. Since 2013 he has focused his research on issues related to humanoid robotics design. More specifically, he has been developing a low-cost modular Series Elastic Actuator to allow safer and smarter robotics, and recently he has been designing humanoid service robots that make use of this technology.

### Education

2011-2012	Post doctorate at Universidade Federal do Rio Grande do Sul (UFRGS) with scholarship from the CNPq, Brazil.
2005-2008	Doctorate at Osaka University under supervision of Prof. Minoru Asada, with MEXT scholarship, Japan. Title of the thesis: Using Insect/Robot Mixed Society as a Tool for Animal Behavior Studies
2002-2004	Masters in Electrical Engineering at Universidade Federal do Rio Grande do Sul, with scholarship from CAPES, Brazil, worked on a self-calibration algorithm for a stereo vision system.
1997-2001	Automation and Control Engineering undergrad course at Pontificia Universidade Catolica do Rio Grande do Sul, Brazil.

### Work

2016-Now	Co-Founder of Qiron Robotics
2012-Now	Professor at Universidade Federal de Santa Maria, Brazil
2018-2019	Visiting Professor at National Taiwan Normal Univ., Taipei, Taiwan (from Oct. 2018 to Oct. 2019)
2008-2011	Researcher at Japan Science and Technology Agency (JST) under guidance of Prof. Minoru Asada

### Fellowships

2017-Now	Chair of IEEE-RAS South Brazilian Chapter
2015-2017	IEEE-RAS South Brazilian Chapter Humanoid Robotics Area Coordinator

### Publications

#### Journal papers

- YU-REN, L.; CHRISTMANN, G. H. G.; GRANDO, R. B.; **GUERRA, R. S.**; BALTES, J. Dr. Eureka: A Humanoid Robot Manipulation Case Study. KNOWLEDGE ENGINEERING REVIEW, *Forthcoming (Accepted for Publication)*.
- CHRISTMANN, G. H. G.; MONTENEGRO, F. J. C.; GRANDO, R. B.; **GUERRA, R. S.** Implementação de um Modelo Bag of Features para Classificação de Frutas. COMMUNICATIONS AND INNOVATIONS GAZETTE, v. 3, n. 1, p. 70-80, 2018.
- LONDERO, F. T.; **GUERRA, R. S.** Bússola Visual para Futebol de Robôs. COMMUNICATIONS AND INNOVATIONS GAZETTE, v. 3, n. 1, p. 1-12, 2018.
- MONTENEGRO, F. J. C.; **GUERRA, R. S.** Simulador computacional para auxiliar no desenvolvimento de estratégias de comportamento para futebol de robôs. COMMUNICATIONS AND INNOVATIONS GAZETTE, v. 3, n. 1, p. 51-61, 2018.
- TATSCH, C.; AHMADI, A.; BOTTEGA, F.; TANI, J.; **GUERRA, R. S.** Dimitri: an Open-Source Humanoid Robot with Compliant Joint. JOURNAL OF INTELLIGENT & ROBOTIC SYSTEMS, v. 2017, p. 1-10, 2017.

**GUERRA, R. S.;** AONUMA, H.; HOSODA, K.; ASADA, M. Behavior Change of Crickets in a Robot-Mixed Society. *Journal of Robotics and Mechatronics*, v. 22, p. 526-531, 2010.

**GUERRA, R. S.;** AONUMA, H.; HOSODA, K.; ASADA, M. Semi-automatic behavior analysis using robot/insect mixed society and video tracking. *Journal of Neuroscience Methods*, v. 191, p. 138-144, 2010.

### Book chapters

CHRISTMANN, G. H. G.; BALTES, J.; **GUERRA, R. S.** Estudo Comparativo de Técnicas de Visão Computacional para Classificação de Frutas e Vegetais. In: Librelotto, Giovani Rubert (Ed.) *ComInG - Communications and Innovations Gazette*, 4ed. Universidade Federal de Santa Maria, CreateSpace Independent Publishing Platform, 2019, p. 101-116.

LONDERO, F. T.; **GUERRA, R. S.** Orientação baseada em uma Bússola Visual para Futebol de Robôs. In: Librelotto, Giovani Rubert (Ed.) *ComInG - Communications and Innovations Gazette*, 4ed. Universidade Federal de Santa Maria, CreateSpace Independent Publishing Platform, 2019, p. 1-22.

MONTENEGRO, F. J. C.; **GUERRA, R. S.** Desenvolvimento de um simulador computacional para auxiliar no desenvolvimento de estratégias de comportamento para futebol de robôs. In: Librelotto, Giovani Rubert (Ed.) *ComInG - Communications and Innovations Gazette*, 4ed. Universidade Federal de Santa Maria, CreateSpace Independent Publishing Platform, 2019, p. 79-100.

GERNDT, R.; BOHNEN, M.; **GUERRA, R. S.;** ASADA, M. The RoboCup Mixed-Reality League - A Case Study. In: Emmanuel Dubois, Philip Gray, Laurence Nigay. (Org.). *The Engineering of Mixed Reality Systems*. 1ed. Londres: Springer-Verlag, 2010, p. 399-419.

### Works presented at scientific events

POZZOBON, L.; **GUERRA, R. S.;** LIBRELOTTO, G. R. A Low-Cost, Compliant, Underactuated Prosthetic Hand with Custom Flex Sensors for Finger Bending Estimation. In: *Proceedings of the 19th International Conference on Advanced Robotics*, IEEE Robotics & Automation Society Belo Horizonte, Brazil, 2019. *Forthcoming (Accepted for Publication)*.

GARCIA, G. S.; CHRISTMANN, G. H. G., **GUERRA, R. S.;** LIBRELOTTO, G. R.; HIRT, E. R.; FUMAGALLI, M. R. Evaluation of Exercise Motivation Competence of a Humanoid Robot: A Case Study in Brazil. In: *Proceedings of the 19th International Conference on Advanced Robotics*, IEEE Robotics & Automation Society Belo Horizonte, Brazil, 2019. *Forthcoming (Accepted for Publication)*.

NESVERA, D.; CARDONA JR, L. A.; GUERRA, R. S.; Pepper Sagt: A Serious Game for Improving Memory and Physical Activity in Elderly People In: *Proceedings of SBGames 2019*, IEEE, Rio de Janeiro, Brazil. *Forthcoming (Accepted for Publication)*.

POZZOBON, L.; **GUERRA, R. S.** Custom made low-cost optoelectronic flex sensor and its parameterization. In: *Proceedings of the XVI Latin American Robotics Symposium and VII Brazilian Robotics Symposium (LARS/SBR)*, IEEE, Rio Grande, Brazil, 2019.

STEFFENS, C.; HUTNER, V.; MESSIAS, L.; DREWS JR, P.; BOTELHO, S.; **GUERRA, R. S.** CNN-Based Luminance and Color Correction for Ill-Exposed Images. In: *Proceedings of the IEEE International Conference on Image Processing (ICIP)*, IEEE Signal Processing Society IEEE, Taipei, Taiwan, 2019, ISBN: 978-1-5386-6249-6.

POZZOBON, L.; **GUERRA, R. S.** Projeto de Mão Protética de Baixo Custo e Estudo da Viabilidade de seu Uso Para Agarre de Objetos Cotidianos. In: *Proceedings of the II Brazilian Humanoid Robot Workshop and III Brazilian Workshop on Service Robotics*, pp. 130-135, Perico, Danilo Hernani and Aquino Jr, Plinio Thomaz and Tonidandel, Flavio and Drews Jr, Paulo Lilles Jorge and Guerra, Rodrigo S 2019, ISBN: 978-85-98123-14-1.

MONTENEGRO, F. J. C.; GRANDO, R. B.; LIBRELOTTO, G. R.; **GUERRA, R. S.** Neural Network as an Alternative to the Jacobian for Iterative Solution to Inverse Kinematics. In: *Proceedings of the XV Latin American Robotics Symposium and IV Brazilian Robotics Symposium (LARS/SBR)*, IEEE, João Pessoa, Brazil, 2018.

ZARZICKI, G.; FERREIRA, E. G.; SCHREINER, V. H.; FARIAS, V. P.; **GUERRA, R. S.;** GAMARRA, D. F. T. Utilização de um Robô Quadrúpede como Instrumento de Ensino nas Aulas de Engenharia. In: *Anais do XLVI Congresso Brasileiro de Educação em Engenharia*, 2018, ISSN: 2175-957X.

MAFALDA, M. M.; RODRIGUES, N. V.; SILVA, R. M.; GARCIA, R. T.; CUADROS, M. A. S. L.; **GUERRA, R. S.;** LEGG, A. P.; GAMARRA, D. F. T. Sistema de Navegação para um Robô Móvel usando um Sensor kinect e um Controlador Fuzzy. In: *Anais do Congresso Brasileiro de Sistemas Fuzzy*, Fortaleza, 2018.

SILVA, R. M.; GARCIA, T. R.; GAMARRA, D. F. T.; CUADROS, M. A. S. L.; **GUERRA, R. S.** Controle da Trajetória de um Robô Móvel Utilizando Odometria e Lógica Fuzzy. In: *Anais do Congresso Brasileiro de Sistemas Fuzzy*, Fortaleza, 2018.

**GUERRA, R. S.;** GARCIA, G. S.; MIOLLO, G.; BERTRANG, C. F. . Proposta de Metodologia de Aula Invertida Dividida em Seis Fases: Um Estudo de Caso. In: II SIMPOSIO INTERNACIONAL DE GAMES, GAMIFICATION E TECNOLOGIAS EDUCACIONAIS, 2017, Santa Maria - RS. ANAIS do II SIGATEC, 2016. p. 112-125.

POZZOBON, L. A.; GARCIA, G. S.; ALMEIDA, A.; LIMA, C. R.; BROLLO, T. M.; **GUERRA, R. S.;** LIBRELOTTO, G. R. . Reconhecimento de Fala para Robo Humanoide com o Auxilio de APIs. In: IV Workshop-Escola de Informatica Teorica, 2017, Santa Maria - RS. Anais do V Workshop-Escola de Informatica Teorica, 2017. p. 259-265.

GARCIA, G. S.; VALENTE, R. L.; SCHIRMER, R. D.; JESUS, J. C.; SCHUSTER, B.; SEVERO, M. B.; RICHARDS, D. R.; CONRAD, C. C.; **GUERRA, R. S.;** SILVA, R. M.; GAMARRA, D. F. T. . Construção de Um Robo Movel para Ensino das Disciplinas dos Cursos de Engenharia. In: XLV Congresso Brasileiro de Educação em Engenharia, 2017, Joinville. Anais do XLV Congresso Brasileiro de Educação em Engenharia, 2017.

SCHIRMER, R. D.; FERREIRA, E. G.; GARCIA, T. R.; PRATES JUNIOR, N. G.; **GUERRA, R. S.;** GAMARRA, D. F. T. . INTRODUCAO A ROBOTICA NAS ESCOLAS DE ENSINO MEDIO DE SANTA MARIA/RS. In: XLV Congresso Brasileiro de Educacao em Engenharia, 2017, Joinville. Anais do XLV Congresso Brasileiro de Educacao em Engenharia, 2017.

AHMADI, A.; TATSCH, C.; MONTENEGRO, F. J. C.; TANI, J.; **GUERRA, R. S.** Dimitri: A Low-Cost Compliant Humanoid Torso Designed for Cognitive Robotics Research. In: 2016 XIII Latin American Robotics Symposium and IV Brazilian Robotics Symposium (LARS/SBR), 2016, Recife. 2016 XIII Latin American Robotics Symposium and IV Brazilian Robotics Symposium (LARS/SBR). p. 67.

**GUERRA, R. S.;** GARCIA, G. S.; MIOLLO, G. Proposta de Metodologia de Aula Invertida Dividida em Seis Fases: Um Estudo de Caso. In: II Simposio Internacional de Games, Gamification e Tecnologias Educacionais, 2016, Santa Maria. Anais do II Simposio Internacional de Games, Gamification e Tecnologias Educacionais. Santa Maria: Editora UFSM, 2016.

MARTINS, L. T.; **GUERRA, R. S.;** TATSCH, C.; MACIEL, E.; GERNDT, R. Polyurethane-based Modular Series Elastic Upgrade to a Robotics Actuator. In: RoboCup 2014: Robot Soccer World Cup XVIII, 2015, Hefei, China. Proc of RoboCup 2014: Robot Soccer World Cup XVIII, 2015.

MARTINS, L. T.; **GUERRA, R. da S.;** GERNDT, R.; MACIEL, E.; TATSCH, C. A Polyurethane-Based Compliant Element for Upgrading Conventional Servos into Series Elastic Actuators. In: 11th IFAC Symposium on Robot Control, 2015, Salvador. Proc. of the 11th IFAC Symposium on Robot Control, 2015.

MARTINS, L. T.; TATSCH, C.; **GUERRA, R. S.;** GERNDT, R.; DALLASTA, V. A Polyurethane-based Series Elastic Actuator. In: Second Brazilian Workshop on Service Robotics, 2015, Salvador. Proc of the Second Brazilian Workshop on Service Robotics, 2015.

ROSA, L. W. D.; CUNHA, V. D.; WOLLMEISTER, G. P.; **GUERRA, R. S.;** GAMARRA, D. F. T. Reconstrução de um Robo Quadrupede para Aplicação em Ambientes Hostis. In: XXVI Congresso Regional de Iniciação Científica & Tecnológica em Engenharia, 2014, Alegrete, RS. Anais do XXVI Congresso Regional de Iniciação Científica & Tecnológica em Engenharia, 2014.

TEIXEIRA, C. T.; PRETTO, R. M.; FREITAS, S. N.; **GUERRA, R. S.** Grupo de Interesse em Robotica: Uma Experiencia em Programa de Enriquecimento. In: VI Encontro Nacional do ConBRaSD, 2014, Foz do Iguacu, RS. Anais do VI Encontro Nacional do ConBRaSD, 2014.

MATOSO, M. B. M.; BERWANGER, F. H.; ROSENDO, A.; **GUERRA, R. S.** Dual-stage hysteresis-based pressure control of constrained on/off pneumatic valves for McKibben actuators. In: Second Brazilian Workshop on Service Robotics, 2015, Salvador. Proc. of Second Brazilian Workshop on Service Robotics, 2015.

MARTINS, L. T.; PRETTO, R. M.; GERNDT, R.; **GUERRA, R. S.** Design of a Modular Series Elastic Upgrade to a Robotics Actuator. In: RoboCup 2014: Robot Soccer World Cup XVIII, 2014, Joao Pessoa. Proc of RoboCup 2014: Robot Soccer World Cup XVIII, 2014.

RAMOS, A. E. M.; IOCHIMS, K.; **GUERRA, R. S.** Aplicação Clínica do Robo de Telepresença. In: XXVI Congresso Regional de Iniciação Científica & Tecnológica em Engenharia, 2014, Alegrete, RS. Anais do XXVI Congresso Regional de Iniciação Científica & Tecnológica em Engenharia, 2014.

MARTINS, L. T.; GERNDT, R.; **GUERRA, R. S.** Series Elastic Actuator and Its Application For Humanoid Platform. In: First Brazilian Workshop on Service Robotics, 2013, Santa Maria. First Brazilian Workshop on Service Robotics, 2013.

**GUERRA, R. S.;** AONUMA, H.; HOSODA, K.; ASADA, M. Combining EMG Recording and Robust Tracking for Insect/Robot Mixed Society. In: 23rd SICE Symposium on Decentralized Autonomous Systems, 2011, Sapporo. Proceedings of 23rd SICE Symposium on Decentralized Autonomous Systems, 2011. v. 23.

AONUMA, H.; **GUERRA, R. S.**; ASADA, M.; HOSODA, K. Manipulation of aggressive behavior of the cricket using a small robot. In: International Symposium on Adaptive Motion in Animals and Machines, 2011, Hyogo. Proceedings of International Symposium on Adaptive Motion in Animals and Machines, 2011. p. 99-100.

**GUERRA, R. S.**; AONUMA, H.; HOSODA, K.; ASADA, M. Using Micro-robots as a Tool for Insect Behavior Studies. In: IROS Workshop on Mobiligence: Social Adaptive Functions in Animals and Multi-Agent Systems, 2009, St Louis. IROS Workshop on Mobiligence: Social Adaptive Functions in Animals and Multi-Agent Systems, 2009.

GERNDT, R.; SCHRIDDE, C.; **GUERRA, R. S.** On the Aspects of Simulation in the RoboCup Mixed Reality Soccer Systems. In: The Universe of RoboCup Simulators Workshop at the International Conference on SIMULATION, MODELING and PROGRAMMING for AUTONOMOUS ROBOTS (SIMPAN), 2008, Venice. Simulation, Modeling, and Programming for Autonomous Robots: First International Conference, SIMPAR 2008 Venice, Italy, November 3-7, 2008. Proceedings, 2008.

**GUERRA, R. S.**; BOEDECKER, J.; MAYER, N. M.; YANAGIMACHI, S.; HIROSAWA, Y.; NAMEKAWA, M.; ASADA, M. Introducing Physical Visualization Sub-league. In: RoboCup 2007: Robot Soccer World Cup XI, 2007, Atlanta. RoboCup 2007: Robot Soccer World Cup XI. Berlin: Springer, 2007. p. 496-503.

**GUERRA, R. S.**; BOEDECKER, J.; YANAGIMACHI, S.; ASADA, M. Introducing a New Minirobotics Platform for Research and Edutainment. In: International Symposium on Autonomous Minirobots for Research and Edutainment (AMiRE), 2007, Buenos Aires. Proceedings of the 4th AMiRE Symposium, 2007.

**GUERRA, R. S.**; BOEDECKER, J.; MAYER, N. M.; YANAGIMACHI, S.; ISHIGURO, H.; ASADA, M. A new minirobotics system for teaching and researching agent-based programming. In: IASTED International Conference on Computers and Advanced Technology in Education (CATE), 2007, Beijing. Proceedings of the 10th IASTED International Conference on Computers and Advanced Technology in Education. Anaheim, CA, USA: ACTA Press, 2007. p. 39-44.

**GUERRA, R. S.**; BOEDECKER, J.; ISHIGURO, H.; ASADA, M. Successful Teaching of Agent-Based Programming to Novice Undergrads in a Robotic Soccer Crash Course. In: 25th SIG-Challenge, Japanese Society for Artificial Intelligence, 2007, Osaka. Proceedings of the 25th SIG-Challenge, Japanese Society for Artificial Intelligence, 2007. p. 21-26.

**GUERRA, R. S.**; BOEDECKER, J.; ASADA, M. Physical Visualization Sub-League: A New Platform for Research and Edutainment. In: 25th SIG-Challenge, Japanese Society for Artificial Intelligence, 2007, Osaka. Proceedings of 25th SIG-Challenge, Japanese Society for Artificial Intelligence, 2007.

BOEDECKER, J.; **GUERRA, R. S.**; MAYER, N. M.; OBST, O.; ASADA, M. 3D2Real: Simulation League Finals in Real Robots. In: RoboCup 2006: Robot Soccer World Cup X, 2006, Brehmen. RoboCup 2006: Robot Soccer World Cup X, 2006. p. 25-34.

**GUERRA, R. S.**; BOEDECKER, J.; MAYER, N. M.; YANAGIMACHI, S.; HIROSAWA, Y.; YOSHIKAWA, K.; NAMEKAWA, M.; ASADA, M. CITIZEN Eco-Be! League: bringing new flexibility for research and education to RoboCup. In: 23th SIG-Challenge, Japanese Society for Artificial Intelligence, 2006, Kitakyushu. Proceedings of the 23th SIG-Challenge, Japanese Society for Artificial Intelligence, 2006. p. 13-18.

**GUERRA, R. S.**; BOEDECKER, J.; YAMAUCHI, K.; MAEKAWA, T.; ASADA, M.; HIROSAWA, Y.; NAMEKAWA, M.; YOSHIKAWA, K.; YANAGIMACHI, S.; MASUBUCHI, S.; NISHIMURA, K. CITIZEN Eco-Be! and the RoboCup Physical Visualization League. In: Micromechatronics Technical Lectures, 2006, Tokyo. Proceedings of Micromechatronics Technical Lectures 2006, 2006.

**GUERRA, R. S.**; MAYER, N. M.; ASADA, M. Using a symmetric rotor as a tool for balancing. In: RoboCup International Symposium 2005, 2005, Osaka. RoboCup International Symposium 2005, 2005.

BOEDECKER, J.; MAYER, N. M.; OGINO, M.; **GUERRA, R. S.**; KIKUCHI, M.; ASADA, M. Getting closer: How Simulation and Humanoid League can benefit from each other. In: International Symposium on Autonomous Minirobots for Research and Edutainment (AMiRE), 2005, Fukui. Proceedings of the 3rd International Symposium on Autonomous Minirobots for Research and Edutainment (AMiRE 2005). Berlin: Springer, 2005. p. 93-98.

**GUERRA, R. S.**; GONCALVES JUNIOR, H. J.; LAGES, W. F. A Digital PID Controller Using RTAI. In: Fourth Real Time Linux Workshop, 2002, Boston. Fourth Real Time Linux Workshop, 2002.

**GUERRA, R. S.**; LAGES, W. F. An Assessment Of Real-Time Robot Control Over Ip Networks. In: Fourth Real Time Linux Workshop, 2002, Boston. Fourth Real Time Linux Workshop, 2002.

## Awards and Distinctions

- 2017      NVidia GPU Grant
- 2017      RoboCup Federation Short Term Visit Funding

- 2016 RoboCup Federation Short Term Visit Funding
- 2015 RoboCup Federation Short Term Visit Funding
- 2014 RoboCup Federation Short Term Visit Funding
- 2014 Grant from the Foundation for Research Support of the State of Rio Grande do Sul, Brazil
- 2013 PROEXT Brazilian Education Ministry Grant
- 2012 Grant from Brazilian National Council for Scientific and Technological Development
- 2006 AMiRE Best Paper Award

## **Organized Events**

- 2019 XVIII Latin American Robotics Competition and XVII Brazilian Robotics Competition, Rio Grande, RS, Brazil
- 2018 Second Brazilian Workshop on Humanoid Robotics and Third Brazilian Service Robotics Workshop, Sao Bernardo do Campo, SP, Brazil
- 2017 RoboDay: Robot Demos and Seminars during the Mostratec 2017 in Novo Hamburgo, RS, Brazil
- 2016 First Brazilian Workshop on Humanoid Robotics, Sao Bernardo do Campo, SP, Brazil
- 2015 11<sup>th</sup> IFAC Symposium on Robot Control, Salvador, BA, Brazil
- 2015 Second Brazilian Service Robotics Workshop, Salvador, BA, Brazil
- 2014 XVIII Robot Soccer World Cup, Joao Pessoa, PA, Brazil
- 2013 First Brazilian Service Robotics Workshop, Santa Maria, RS, Brazil
- 2008 XII Robot Soccer World Cup, Suzhou, China
- 2007 XI Robot Soccer World Cup, Atlanta, USA
- 2006 X Robot Soccer World Cup, Bremen, Germany