# JORGE SOLIS-ALFARO, PhD.

Assistant Professor

Waseda University, Research Institute for Science and Engineering


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**MULTICULTURAL | CROSS-FUNCTIONAL BACKGROUND | ACADEMIC ORIENTATION | EXPERIENCE IN INDUSTRY**

## PROFESSIONAL OBJECTIVE

As a cross-functional professional, to hold a strategic academic-level leadership position, implementing initiative and vision to consistently attract potential national and/or international graduate students; to promote collaboration among different academic departments; to promote novel approaches to research and to apply for national as well as international sources for research funding.

## PROFESSIONAL SUMMARY

International experience at different research centers and universities, educational content improvement that has taken into account different cultural backgrounds, and the potential to manage international research projects. Strong technical knowledge in different application fields in mechatronics and robotics such as: Haptic Interfaces, Humanoid Robots, Medical Robots, Mobile Robots, Human Motor Control Learning, and similar areas. Experience in the management and contribution toward different kinds of projects (both scientific and industrial research oriented) within the EU as well as in Japan. Strong multicultural background and initiative to promote research in collaboration with different research centers and universities in Asia (Japan, Singapore and Korea), Europe (Germany, Italy, England and France), America (USA and Mexico). Effective interpersonal skills to communicate knowledge and research methodologies, in the role of project leader.

## QUALIFICATIONS

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| **2001 – 2004** | **PhD in Robotics** (graduated with honors)<br>Scuola Superiore Sant'Anna, Pisa, Italy |
| **1994 – 1998** | **BS in Electronic Systems (EE)** (graduated with honors)<br>ITESM, Toluca, Mexico |
| **1998 – 2000** | **Professional Development Program** (program designed for high-level potential industry leaders in Mexico)<br>IBM of Mexico |

## RESEARCH INTERESTS

Humanoid Robots, Human/Robot Interaction, Educational Robotics, Medical Robots and Systems, Rehabilitation Robots, Mechatronic Systems for Educational Purposes, Human Motor Control and Learning, Computer Vision, Haptic Interface Control and Force Rendering, Tele-operation Systems, Gesture Recognition Systems, Biped Walking Control.

## WORK EXPERIENCE

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| **2009 –** | Assistant Professor, Research Institute for Science and Engineering, Waseda University, Tokyo, Japan |
| **2006 – 2008** | Research Associate, Department of Modern Mechanical Eng., Waseda University, Tokyo, Japan |
| **2004 – 2005** | Post-Doctoral Researcher at Humanoid Robotics Institute, Waseda University, Tokyo, Japan |
| **2000** | Visiting Researcher at Cybernetics Division, Mechanical Engineering Laboratory, Tsukuba, Japan |
| **2003 – 2004** | Research Associate, Perceptual Robotics Laboratory, Scuola Superiore Sant'Anna, Pisa, Italy |
| **2002 – 2003** | Research Assistant, Perceptual Robotics Laboratory, Scuola Superiore Sant'Anna, Pisa, Italy |
| **2001 – 2002** | Control Engineer, Perceptual Robotics Laboratory, Scuola Superiore Sant'Anna, Pisa, Italy |
| **1998 – 2000** | Hardware Support Engineer at IBM of Mexico |
| **1997** | Visiting Researcher, Laboratoire d'Analyse et Architecture de systèmes (LAAS/CNRS), Toulouse, France |

## SELECTED ACADEMIC ACHIEVEMENTS

- One book chapter (plus two in review), 11 International Journals (plus six under-review) and 79 International Conferences (plus four in review) have been published as author and/or co-author.

- Invited to present 17 lectures in well recognized universities in America (CMU, Georgia Tech, McGill Univ., and similar institutions), Europe (Leeds University, Karlsruhe University), Asia (Japan, Taiwan, and other countries), and Oceania (University of Technology in Sydney)
- Three finalist awards at IROS 2007, AIM 2009, IROS 2009.
- Supervision of research carried out by five doctoral students, 15 masters students, and 20 undergraduate students.
- Implementation of a new curriculum and textbook for the Mechatronics Laboratory 1 and 2 at the undergraduate level at the Department of Modern Mechanical Engineering of Waseda University; responsible for this class for four years, during which time my students gave me highly favorable evaluations for the content and presentation of lectures and experiments.

## RESEARCH PROJECTS

- Anthropomorphic Flutist Robot, Project Leader, 2004–2010
  - Research supported (in part) through a grant in aid from Gifu Prefecture for the WABOT-HOUSE Project
  - (http://www.wabot-house.waseda.ac.jp/html/e-house.htm)
  - Total Funding (2004–2008): 10 million JPY
  - Humanoid Robot consisting of 41 DOFs that mechanically emulate the physiology and anatomy of the organs of the body involved in playing the flute
- Anthropomorphic Saxophonist Robot, Project Leader, 2007–2010
  - Project supported (in part) by HRI (http://www.humanoid.waseda.ac.jp/)
  - Total Funding (2007–2009): 7 million JPY
  - Humanoid Robot consisting of 15 DOFs that mechanically emulate the physiology and anatomy of the organs involved in playing the saxophone.
- Two-Wheeled Type Inverted Pendulum Mobile Robot, Project Leader, 2008–2010
  - Project supported by a grant in Aid from the Robotics Industry Development Council (http://www.joho-fukuoka.or.jp/robot/english/).
  - Total Funding (2008–2010): 10 million JPY
  - Mechatronic system designed as an educational tool to introduce undergraduate students the principles of robot technology (sensor, control, and actuator).
- Airway Management and Suture/Ligature Training Systems, Scientific Leader, 2006–2008
  - Project supported by the Knowledge Cluster Initiative, a project of the Ministry of Education, Culture, Sports, Science, and Technology (http://www.mext.go.jp/english/) coordinated by Prof. Atsuo Takanishi.
  - Total Funding (2006–2008): 20 million JPY
  - Medical Training systems designed toward enhancing the understanding of the learning process while performing medical procedures by developing a Patient Robot (Active Training).
- Musical-Based Interaction System (MbIS), Scientific Leader, 2008–2009
  - Project supported by Waseda University program on Global Center of Excellence (http://www.rt-gcoe.waseda.ac.jp/) coordinate by Prof. Atsuo Takanishi.
  - Total Funding: 1.3 million JPY
  - The MbIS is designed to enable musical robots to interact with musicians and aural processing is based on harmony/rhythm pattern tracking and visual processing is based on motion/particle tracking
- Oral Rehabilitation Robot, Scientific Leader, 2006–2008
  - Project supported by the Knowledge Cluster Initiative, a project of the Ministry of Education, Culture, Sports, Science and Technology (http://www.mext.go.jp/english/) coordinated by Prof. Atsuo Takanishi..
  - Total Funding: 70 million JPY
  - Robot designed to provide massage of the maxillofacial region as a form of therapy for patients with temporomandibular joint disorders
- General Transfer Skill System (GTSS), Project Leader, 2004–2006
  - Project supported by the Japanese Society for the Promotion of Science (http://www.jsps.go.jp/english)
  - Total Funding (2004–2006): 2.4 million JPY
  - The GTSS is designed to enable MPRs to transfer skills to unskilled subjects and includes a melody recognition system (based on HMM), an evaluation module (based on harmonic analysis), and an interaction module to maintain eye contact with the robot's partner.
- Handwriting Transfer Skill System, Project Leader, 2001–2004
  - Project supported under a Ph.D. fellowship
  - Total Funding (2001–2004): 3,000 EUR
  - The proposed handwriting transfer skill system is based on a desktop haptic interface and the proposed system has been designed to provide multimodal feedback to unskilled users

- BODY EXTENDER, Research Collaborator, 2004
  - Project supported by the Italian Ministry of Defense coordinated by Prof. Massimo Bergamasco (http://www.percro.org/index.php?pageId=BodyExtender_0)
  - Total Funding (2003–2005): 3,000 EUR
  - Development of a teleoperation system composed by a manipulator controlled by a master interface
- ENACTIVE, Research Collaborator, 2004
  - Project supported by European Union under the IST 6th European Framework Program, (http://www.percro.org/index.php?pageId=ENACTIVENetwork) coordinated by Prof. Massimo Bergamasco
  - Total Funding (2004–2007): 5 million EUR
  - Development of teleoperation systems using a haptic interface and development of the control system for a 2-DOF novel haptic desktop oriented to automation of office procedures and education
- VIRTUAL, Research Collaborator, 2002
  - Project supported by European Commission "GROWTH" Program Research Project "Virtual" (http://www.percro.org/index.php?pageId=VIRTUAL) under contract 1999-RD. 11 030 coordinated by Prof. Massimo Bergamasco
  - Total Funding (2000-2002): 4 million EUR
  - The main goal of the "Virtual" project was to develop and test different kinds of virtual reality (VR)-driving simulators for the purpose of performing ergonomic evaluations and training of novice drivers based on haptic interface technology
- SINTESIS, Research Collaborator, 2002–2003
  - Project supported by Centre Richerce Fiat (http://www.crf.it/en-us/pages/default.aspx) coordinated by Prof. Massimo Bergamasco
  - Total Funding (2002–2003): 5,000 EUR
  - Technical management of the motion capture subsystem and development of an acquisition system for a driving simulator for the FIAT Company.
- Tele-operation System, Research Assistant, 2000
  - Project supported by the Japan International Cooperation Agency (www.jica.go.jp/english/) coordinated by Prof. Kiyoshi Komoriya.
  - Total Funding (2000): 2.5 million JPY
  - Development of a teleoperation system for a noholomic mobile base based on a haptic interface

## TEACHING

- Mechatronics Laboratory 1 (2006–2009)
- Mechatronics Laboratory 2 (2006–2009)

## CONFERENCES ACTIVITIES

**2009** Associate Editor, IEEE-RAS International Conference on Robotics and Automation
Session Chairman, Eighteenth International IEEE Symposium on Robot and Human Interactive Communication: Robots in Art, Education, and Entertainment. Toyama, Japan, September 27–October 1
Co-Organizer, IEEE International Conference on Intelligent Robots and Systems, Workshop: Biologically-Inspired Robotics, St. Loius, USA, October 11
Session Chairman, International IEEE Conference on Intelligent Mechatronics: Service Robots. Singapore, July 13–17
Co-Orgnizer, IEEE International Conference on Robotics and Automation, Workshop: Robo Ethics, Kobe, Japan, May 17
Co-Chair, IEEE-RAS TC on Biologically Inspired Robots
Chair, 5th Asia-Pacific Computing and Philosophy Conference, Robo Ethics Session, Tokyo, Japan, October 1–2

**2008** Session Chairman, BIOROB 2008: Human-Machine Interaction I, Scottsdale, Arizona, USA. October 21, 2008
Session Chairman, BIOROB 2008: Surgery and Diagnosis II, Scottsdale, Arizona, USA. October 21, 2008.
Reviewer, ASME Journal of Mechanisms and Robotics
Reviewer, Autonomous Robot Journal

**2007** Organizer, Special Session on Musical Performance Robots, 2007 Sixteenth International IEEE Symposium on Robot and Human Interactive Communication, Jeju Island, Korea, August 26–29
Reviewer, IEEE International Conference on Intelligent Robots and Systems

Reviewer, IEEE International Symposium on Robot and Human Interactive Communication
Reviewer, IEEE Transactions on Biomedical Engineering

**2006** Organizer, 2006 IEEE/RSJ International Conference on Intelligent Robots and Systems Workshop: Musical Performance Robots and Its Application, Beijing, China, October 9–15 .
Organizer, Humanoid Robotics Workshop, ITESM (Monterrey Institute of Technology), Toluca Campus, Toluca, Mexico, May 19
Organizer, Workshop on Robotics and Mechatronics Research, Engineering Center and Industrial Development (CIDESI), Querétaro, Mexico, May 20
Reviewer, International Conference on Mechatronics and Automation
Reviewer, Computer Music Journal

**2005** Vice-chair of local planning and hosting committee, 2005 Italy–Japan Workshop, Tokyo, Japan, September 7–8t

**2004** Session Chairman, ICRA 2004: Humanoids I, New Orleans, Louisiana, USA, April 28

## AWARDS AND RECOGNITIONS

**2009**
- **Finalist for the Best Paper Conference Award - IROS 2009, St. Louis, October 11-15**

**Paper Title:** Development of Anthropomorphic Musical Performance Robots: From Understanding the Nature of Music Performance to Its Application to Entertainment Robotics
Authors: Solis, J., Petersen, K., Ninomiya, T., Takeuchi, M., Takanishi, A.

- **Finalist for the Award on Entertainment Robots and Systems – IROS 2009 / New Technology Foundation, St. Louis, October 11– 15**

**Paper Title:** Development of Anthropomorphic Musical Performance Robots: From Understanding the Nature of Music Performance to Its Application to Entertainment Robotics
Authors: Solis, J., Petersen, K., Ninomiya, T., Takeuchi, M., Takanishi, A.

- **Best Paper Award Nomination – IROS2009, St. Louis, Missouri (USA), October 11–15**

**Paper Title:** Development of Anthropomorphic Musical Performance Robots: From Understanding the Nature of Music Performance to Its Application in Entertainment Robotics
**Authors:** Solis J., Petersen K., Ninomiya T., Takeuchi M., Takanishi A.

- **Best Student Paper Award – AIM2009, Singapore, July 14–17**

**Paper Title:** Development of a Robotic Carotid Blood Measurement WTA-1RII: Mechanical Improvement of the Gravity Compensation Mechanism and Optimal Link Position of the Parallel Manipulator Based on GA.
**Authors:** Nakadate, R., Uda, H., Hirano, H., Solis, J., Takanishi, A., et al.

**2007**
- **Finalist for the Award on Entertainment Robots and Systems – IROS 2007 / New Technology Foundation, San Diego, October 29–November 2**

**Paper Title:** The Waseda Flutist Robot No. 4 Refined IV: Enhancing the sound clarity and the articulation between notes by improving the lips and tonguing mechanisms
Authors: Solis, J., Taniguchi, K., Ninomiya, T., Yamamoto, T., Takanishi, A.

**2004 – 2006**
- **Postdoctoral Fellowship**

Japan Society for Promotion of Science (JSPS)
Tokyo, Japan

**2001 – 2004**
- **Scholarship for Ph.D. Research**

Scuola Superiore Sant'Anna / Perceptual Robotics Laboratory
Pisa, Italy

**2000**
- **Scholarship for postgraduate studies**

Embassy of Japan in Mexico / JICA
Mexico City, Mexico

**1994 – 1998**
- **Scholarship for Academic Excellence and Achievement**

Monterrey Institute of Technology, Toluca Campus
Toluca, Mexico

## PUBLICATIONS (INTERNATIONAL, PEER REVIEWED)

**Book Chapters**

1. (*in press*) Solis, J., Takanishi, A., (2009) "Robotic-Assisted Technology for Medical Training Purposes: Current Research Approaches Towards Developing Active Training Systems," Biomechatronics in Medicine and Health Care

**Journals**

1. (*In review*) Solis, J., Nakadate, R., Takanishi, A. (2009) "Development of a Two-Wheeled Type Inverted Pendulum for Educational Purposes," Mechanism and Machine Theory Journal.
2. (*In review*) Carbone G., Nakadate R., Solis J., Ceccarelli M., Takanishi A., Minagawa E., Sugawara M., Niki K., (2009). "Workspace Analysis and Design Improvements on a Carotid Blood Flow Measurement System," submitted to Proceedings of the Institution of Mechanical Engineers, Part H, Journal of Engineering in Medicine.
3. (*In review*) Petersen, K., Solis, J., Takanishi, A., (2009) "Implementation of a Particle Filter-Based Tracking Method to Enable an Anthropomorphic Flutist Robot to Actively Interact with Musicians," submitted to International Journal of Social Robotics.
4. (*In review*) Petersen, K., Solis, J., Takanishi, A., (2009). "Musical-Based Interaction System for the Waseda Flutist Robot: Implementation of the Visual Tracking Interaction Module," Autonomous Robots Journal.
5. (*In review*) Petersen, K, Solis, J., Takanishi, A., (2009). "Musical Interaction Experiments between Human Musicians and the Anthropomorphic Flutist Robot", In the Computer Music Journal.
6. (*In review*) Solis, J., Takanishi, A., (2009) "The Waseda Flutist Robot: A Musical Teaching Tool to Transfer Skills to Unskilled Human Players", to International Journal of Social Robotics.
7. (*In press*) Solis, J., Takeshi, N., Petersen, K., Takeuchi, M., Takanishi, A., (2009). "Development of the Anthropomorphic Saxophonist Robot WAS-1: Mechanical Design of the Simulated Organs and Implementation of Air Pressure," Advanced Robotics Journal.
8. (*In press*) Solis, J., Taniguchi, K., Ninomiya, T., Petersen, K., Yamamoto, T., Takanishi, A. (2009) "Implementation of an Auditory Feedback Control System on an Anthropomorphic Flutist Robot Inspired by the Performance of a Professional Flutist," Advanced Robotics Journal.
9. Solis, J., Taniguchi, K., Ninomiya, T., Takanishi, A. (2008) "Understanding the Mechanisms of the Human Motor Control by Imitating Flute Playing with the Waseda Flutist Robot WF-4RIV," Mechanism and Machine Theory (Special Issue on Bio-Inspired Mechanism Engineering), Vol. 44 (3), pp. 527—540.
10. Solis, J., Oshima, N., Ishii, H., Matsuoka, N., Hatake, K., Takanishi, A. (2008). "Towards an understanding of the suture/ligature skills during the training process by using the WKS-2RII," International Journal of Computer Assisted Radiology and Surgery, Vol. 3(3-4), pp. 231–239.
11. Ishii H., Koga H., Obokawa Y., Solis J., Takanishi A., Katsumata A. (2009). "Path generator control system and virtual compliance calculator for maxillofacial massage robots," International Journal of Computer Assisted Radiology and Surgery, 10.1007/s11548-009-0383-1.
12. Noh, Y., Segawa, M., Shimomura, A., Ishii, H., Solis, J., Hatake, K., Takanishi, A. (2008). "WKA-1R robot-assisted quantitative assessment of airway management," International Journal of Computer Assisted Radiology and Surgery, Vol. 3(6), pp. 543-550.
13. Ishii, H., Koga, H., Obokawa, Y, Solis, J., Takanishi, A., Katsumata, A. (2008). "Development and Experimental Evaluation of Oral Rehabilitation Robot That Provides Maxillofacial Massage to Patients with Oral Disorders," International Journal of Robotics Research, Vol. 28(9), pp. 1228–1239.
14. Solis, J., Marcheschi, S., Frisoli, A., Avizzano, C.A., Bergamasco, M. (2007). "Reactive Robots System: an active human/robot interaction for transferring skill from robot to unskilled persons, International Advanced Robotics Journal, Vol. 21(3), pp. 267–291.
15. Solis, J., Suefuji, K.; Takanishi, A. (2006). "The Waseda Flutist Robot: from a musical partner to a musical tutor," Journal of the Society of Biomechanisms, Vol. 30(1), February, pp. 23–27**.**
16. Solis, J., Chida, K.; Suefuji, K., Taniguchi, K., Hashimoto, S.M., Takanishi, A. (2006). "The Waseda Flutist Robot WF-4RII in Comparison with a Professional Flutist," Computer Music Journal, Vol. 30(4), pp. 12–24.
17. Solis, J., Chida, K.; Suefuji, K., Takanishi, A. (2006). "The Development of the anthropomorphic flutist robot at Waseda University," International Journal of Humanoid Robots (IJHR), Vol. 3(2), June, pp. 127–151.

**Conferences**

1. (*In review*) Solis J., Petersen, K., Yamamoto, T., Takeuchi, M., Ishikawa, S., Takanishi, A., Hashimoto, K. (2010). "Design of New Mouth and Hand Mechanisms of the Anthropomorphic Saxophonist Robot and Implementation of an Air Pressure Feed-Forward Control with Dead-Time Compensation," Proceedings of the International Conference on Robotics and Automation.
2. (*In review*) Petersen, K., Solis J., Takanishi, A. (2010). "Interaction with the Waseda Flutist Robot: Two-Level Mapping of Audio-Visual Sensor Input to Musical Performance Output based on a Sequential Bayesian Filtering Approach," in Proc. of the International Conference on Robotics and Automation.
3. (*In review*) Nakadate, R., Tokunaga, Y., Solis, J., Takanishi, A., Minagawa, E., Sugawara, M., Niki, K. (2010). "Development of the Assisted-Robotic System WTA-2 for Ultrasound for Abdominal Diagnosis," in Proceedings of the International Conference on Robotics and Automation.
4. (*In review*) Nakadate, R., Solis, J., Takanishi, A., Minagawa, E., Sugawara, M., Niki, K. (2010). "Interaction with the Waseda Flutist Robot: Two-Level Mapping of Audio-Visual Sensor Input to Musical Performance Output Based on a Sequential Bayesian Filtering Approach," Proceedings of the International Conference on Robotics and Automation.
5. (*In press*) Solis J., Petersen K., Ninomiya T., Takeuchi M., Takanishi A., (2009) "Mechanism Design and Air-Pressure Feedback Control Implementation of the Anthropomorphic Waseda Saxophonist Robot," in Proceedings of the Ninth IEEE-RAS International Conference on Humanoid Robots.
6. (*In press*) Solis J., Petersen K., Ninomiya T., Takeuchi M., Takanishi A., "Development of Anthropomorphic Musical Performance Robots: From Understanding the Nature of Music Performance to Its Application in Entertainment Robotics," Proceedings of the 2009 IEEE/RSJ International Conference on Intelligent Robots and Systems.

7. (*In press*) Solis J., Nakadate R., Yoshimura Y., Hama Y., Takanishi A., "Development of the Two-Wheeled Inverted Pendulum Type Mobile Robot WV-2R for Educational Purposes," Proceedings of the 2009 IEEE/RSJ International Conference on Intelligent Robots and Systems.
8. (*In press*) Petersen K., Solis J., Takanishi. A, "Development of a Aural Real-Time Rhythmical and Harmonic Tracking to Enable the Musical Interaction with the Waseda Flutist Robot," Proceedings of the 2009 IEEE/RSJ International Conference on Intelligent Robots and Systems.
9. (*In press*) Nakadate R., Uda H., Hirano H., Solis J., Takanishi A., Minagawa E., Sugawara M., Niki K. "Development of Assisted-Robotic System Designed to Measure the Wave Intensity with an Ultrasonic Diagnostic Device," Proceedings of the 2009 IEEE/RSJ International Conference on Intelligent Robots and Systems.
10. (*In press*) Obokawa, Y., Solis, J., Ishii, H., Koga, H., Takanishi, A., Katsumata, A. "Clinical Massage Therapy with the Oral-Rehabilitation Robot in Patients with Temporomandibular Joint Disorders ," Proceedings of the International Special Topic Conference on Information Technology in Biomedicine.
11. Solis, J., Takanishi, A. (2009). "Development of an Inverted Pendulum Type Mobile Robot for Educational Purposes," in Proceedings of the 1st IFToMM International Symposium on Robotics and Mechatronics, pp.1-6.
12. Solis, J., Takanishi, A. (2009). "Development of the Waseda Flutist Robot: Particle Filter Implementation for Instrument Tracking," First International Conference on Smart IT Applications, ID40.
13. Solis, J., Takanishi, A. (2009). "Practical Issues on Robotic Education and Challenges for Robo Ethics Education," Proceedings of the Eighteenth IEEE International Symposium on Robot and Human Interactive Communication, pp. 561-565.
14. Solis, J., Takanishi, A. (2009). "Introduction of Mechatronics for Undergraduate Students Based on Robotic Platforms for Education Purposes," in the Proceedings of the Eighteenth IEEE International Symposium on Robot and Human Interactive Communication, pp 693-698.
15. Solis, J., Takanishi, A. (2009). "Understanding the mechanisms of the human motor control by imitating saxophone playing with the Waseda Saxophonist Robot WAS-1," Proceedings of the IROS 2009 Workshop on Biologically-Inspired Robotics, pp. 49–54.
16. Solis, J., Takanishi, A. (2009). "Toward Enhancing the Understanding of Human Motor Learning," Proceedings of the IEEE Conference on Automation Science and Engineering, pp. 591-596.
17. Solis J., Oshima N., Ishii, H., Matsuoka N, Takanishi A., Hatake K., (2009). "Quantitative Assessment of the Surgical Training Methods with the Suture/Ligature Training System WKS-2RII," Proceedings of the International Conference on Robotics and Automation, pp. 4219–4224.
18. Solis, J., Nakadate, R., Yamamoto, T., Takanishi A., (2009). "Development of Mechatronic and Embedded Systems and Their Applications for Introducing Robot Technology Principles," 2009 IEEE/ASME Conference on Advanced Intelligent Mechatronics, pp. 911–917.
19. Solis, J., Obokawa, Y., Ishii, H., Koga, H., Takanishi, A., Katsumata, A., (2009). "Development of Oral Rehabilitation Robot WAO-1R Designed to Provide Various Massage Techniques", Proceedings of the IEEE Eleventh International Conference on Rehabilitation Robotic, pp. 457–462.
20. Solis, J., Ninomiya, T., Petersen, K., Yamamoto, T., (2009). "Anthropomorphic Musical Performance Robots at Waseda University: Increasing Understanding of the Nature of Human Musical Interaction," Proceedings of the 9th International Conference New Interfaces for Musical Expression, pp. 64–69.
21. Solis, J., Takanishi, A., (2009). "Introducing Robot Technology to Undergraduate Students at Waseda University," Proceedings of the ASME Asia-Pacific Engineering Education Congress, 10004.
22. Solis, J., Takanishi, A. (2009). "New Challenges for the implementation of Robo Ethics Education in Japan," Proceedings of the ICRA2009: Workshop on Robo Ethics, pp. 26-30.
23. Nakadate R., Uda H., Hirano, H., Solis, J., Takanishi, A., Minagawa, E., Sugawara, M., Niki, K., (2009). "Development of a Robotic Carotid Blood Measurement WTA-1RII: Mechanical Improvement of Gravity Compensation Mechanism and Optimal Link Position of the Parallel Manipulator based on GA," 2009 IEEE/ASME Conference on Advanced Intelligent Mechatronics, pp. 717–722.
24. Noh, Y., Shimomura, A., Segawa, M., Ishii, H., Solis, J., Takanishi, A., (2009). "Development of Airway Management Training System WKA-1RII that Embeds New Force Detection Sensor System (FDSS) and New Tactile Detection Sensor System (TDSS)," 2009 IEEE/ASME Conference on Advanced Intelligent Mechatronics, pp. 1264–1269.
25. (*In press*) Carbone G., Nakadate R., Solis J., Ceccarelli M., Takanishi A., Minagawa E., Sugawara M., Niki K., (2009). "Design Improvements on a Carotid Blood Flow Measurement System," Proceedings of the 20009 Computational Kinematics
26. Ishii, H., Noh, Y., Solis, J., Takanishi, A., Park Y.K., Umezu, M., "Development of advanced medical training system using robot technology," in Proc. of the 23rd International Congress and Exhibition in Computer Assisted Radiology and Surgery, S237–S238.
27. Ishii, H., Koga, H., Obokawa, Y., Solis, J., Takanishi, A., Katsumata, A. (2009). "Proposal of novel control system that consists of massage path generator and virtual compliance calculator for maxillofacial massage robot," in Proc. of in Proc. of the 23rd International Congress and Exhibition in Computer Assisted Radiology and Surgery, S211–S212.
28. Petersen K., Solis J., Ninomiya T., Yamamoto T., Takeuchi M, Takanishi A. (2009). "Development of the Anthropomorphic Saxophonist Robot WAS-1: Mechanical Design of the Lip, Tonguing, Fingers and Air Pump Mechanisms," Proceedings of the International Conference on Robotics and Automation, pp. 3043–3048.
29. Noh Y., Segawa M., Shimomura A., Ishii H., Solis J., Takanishi, A., Hatake K., (2009). "Development of the Airway Management Training System WKA-2 that can reproduce the Cases of Difficult Airway," Proceedings of the International Conference on Robotics and Automation, pp. 3843–3838.
30. Solis, J., Taniguchi, K., Nimomiya, T., Petersen, K., Yamamoto, T., Takanishi, A. (2008). "The Waseda Flutist Robot No.4 Refined IV: From a Musical Partner to a Musical Teaching Tool," Proceedings of the Second IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics, pp. 427–432.

31. Solis, J., Oshima, N., Ishii, H., Matsuoka, N., Hatake, K., Takanishi, A. (2008). "Development of a Sensor System Toward the Acquisition of Quantitative Information of the Training Progress of Surgical Skills", Proceedings of the Second IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics, pp. 959–964.
32. Petersen, K., Solis, J., Takanishi, A. (2008). "Development of the Waseda Flutist Robot No. 4 Refined IV: Implementation of a Real-Time Interaction System with Human Partners", Proceedings of the Second IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics, pp. 421–426.
33. Solis J., Takanishi, A., (2008). "Can an anthropomorphic flutist robot display musical skills?," International Conference on Intelligent Robots and Systems, Workshop on Art and Robots, pp. 13-18.
34. Petersen, K., Solis, J., Takanishi, A. (2008). "Development of a Real-Time Instrument Tracking System for Enabling the Musical Interaction with the WF-4RIV," IEEE/RSJ International Conference on Intelligent Robots and Systems, pp. 3654–3659.
35. Noh, Y., Segawa, M., Shimomura, A., Ishii, H., Solis, J., Hatake, K., Takanishi, A. (2008). "Development of the Evaluation System for the Airway Management Training System WKA-1R," Proceedings of the Second IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics, pp. 574–579.
36. Koga, H., Usuda, Y., Matsuno, M., Ogura, Y., Ishii, H., Solis, J., Takanishi, A., Katsumata, A. (2008), "Development of an Oral-Rehabilitation Robot Designed to Provide Massage Therapy for Maxillofacial Tissues," Proceedings of the Second IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics, pp. 556–561.
37. Solis, J., Takanishi, A. (2008). "Approaches to Enable Autonomous Systems to Perceptually Detect Human Performance Improvements and their Applications," IEEE Conference on Automation Science and Engineering, pp. 259–264.
38. Solis, J., Taniguchi, K., Ninomiya, T., Petersen, K., Yamamoto, T., Takanishi, A., (2008). Improved Musical Performance Control of WF-4RIV: Implementation of an expressive music generator and an automated sound quality detection, Seventeenth International Symposium on Robot and Human Interactive Communication, pp. 334–339.
39. Petersen, K., Solis, J., Takanishi, A. (2008). "Toward enabling a natural interaction between human musicians and musical performance robots: Implementation of a real-time gestural interface," Seventeenth International Symposium on Robot and Human Interactive Communication, pp. 340–345.
40. Petersen, K., Solis, J., Takanishi, A. (2008). "Development of a real-time gestural interface for hands-free musical performance control." International Computer Music Conference, pp. 356–359
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### Other Publications

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### Patents

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## INVITED LECTURES

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2. The Development of Anthropomorphic Musical Performance Robots and Their Applications (http://calendar.cs.cmu.edu/scsEvents/oneMonth/2009-06.html), Carnegie Mellon University, Pittsburgh, Pennsylvania, USA, June 4, 2009.
3. From Understanding the Nature of Human Skills to Their Applications to Robotics in Japan, National Taiwan University of Science and Technology, Taipei, Taiwan, April 9, 2009.
4. Embedded Systems for Robotics Applications. International Conference of Embedded Systems (http://www.uaq.mx/informatica/congreso/), The Autonomous University of Querétaro, Querétaro, Mexico, March 20, 2009.
5. Can a Humanoid Robot Display Motor Skills for Playing Instruments Like Musicians? Karlsruhe University, Karlsruhe, Germany, September 2008.
6. Current Robotics Research Topics in Japan: From Medical Robotics to Humanoid Robots (http://www.cim.mcgill.ca/Members/manager/seminar.2008-10-21.1825020331/), McGill University, Montreal, Canada, October 2008.
7. The Development of the Flutist Robot and its Applications (http://robotics.gatech.edu/index.php/academics/eventsseminars/26-rim-seminar-august-22-jorge-solis.html), Georgia Institute of Technology, Atlanta, Georgia, USA, August 2008.
8. Working or Living with Robots? Current Robotics Research Topics in Japan, The Autonomous University of Querétaro, Quéretaro, Mexico, May 19$^{t}$, 2008.
9. Development of the Waseda Flutist Robot, Twenty-fifth Annual Conference of the Robotics Society of Japan, Chiba, Japan, September 14$^{t}$, 2007.
10. Can Robots Teach us Human Skills? Waseda University, Tokyo, Japan, June 29, 2006.
11. Development of the Waseda Flutist Robot, The Monterrey Institute of Technology, Toluca, Mexico, May 19, 2006.
12. Humanoid Robotics Research. Engineering Center and Industrial Development (CIDESI), Querétaro, Mexico, May 20, 2006.
13. JSPS Fellows on Their Experiences of Doing Research in Japan, Tokyo, Japan, October 5, 2005.
14. The Anthropomorphic Flutist Robot: Teaching Beginning Flutists, Italy-Japan Student Workshop. Waseda University. Tokyo, Japan, October 16, 2004.
15. Haptic Interfaces: Collocation and Coherence Issues. Multipoint interaction in Robotics and Virtual Reality, Workshop given at the 2004 IEEE International Conference on Robotics and Automation (ICRA), New Orleans, Louisiana, USA, April 27, 2004.
16. Human/Robot Interaction Using Haptic Interfaces and Humanoid Robots, The Monterrey Institute of Technology, Toluca, Mexico, August 16–21, 2003
17. Teaching Japanese Handwriting Using a Haptic Interface, Waseda University. Tokyo, Japan, March 17, 2003

## LANGUAGES

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| Spanish – | Native | English – | Advanced Level |
| Japanese – | Intermediate Level | Italian – | Intermediate Level |
| Portuguese – | Basic Level | French – | Basic Level |