

João Bimbo

Faculdade de Ciências
Universidade de Lisboa
Campo Grande
1749-016 Lisboa - Portugal

Email: jmbimbo@fc.ul.pt
Scopus Author ID: [55512143700](https://orcid.org/0000-0002-4720-9026)
ORCID: orcid.org/0000-0002-4720-9026
Google Scholar ID: [jjX9JIQAAAAJ](https://scholar.google.com/citations?user=jjX9JIQAAAAJ)

Research Interests: Robotic manipulation, sensing, teleoperation, haptics, human-robot interaction.

Education

- 2011-2016 **Ph.D.** in Robotics [King's College London](#), United Kingdom
Thesis title: "Touch based object pose estimation for robotic grasping"
Supervisors: Dr. Hongbin Liu and Prof. Kaspar Althoefer
London, June 1st 2016
- 2004-2011 **MSc.** Electrical and Computer Engineering, [Universidade de Coimbra](#), Portugal
Specialization in Automation
Thesis title: "Improved tactile sensing for robot grasping"
Supervisors: Dr. Jorge Lobo and Prof. Kaspar Althoefer
Coimbra, July 22nd 2011

Academic Experience

- Feb 2023 - **Invited Assistant Professor** [Universidade de Lisboa](#)
Department of Informatics – Faculty of Sciences
- Sep 2021 - Feb 2023 **Assistant Professor** [Universidade Lusófona](#)
Electrical Engineering and Biomedical Engineering
- Oct 2019 - Aug 2021 **Postdoctoral Researcher** [Yale University](#)
Setting up a VR environment for the testing of arm prosthetic devices.
Methods for autonomous grasping in cluttered environments
- Mar 2016 - Jul 2019 **Postdoctoral Researcher** [Istituto Italiano di Tecnologia](#)
Development of manipulation systems and approaches that exploit environmental constraints – [SoMa \(Soft Manipulation\)](#) project
- Sep 2011 - May 2015 **Research Assistant** [King's College London](#)
Control of a 6-DOF manipulator arm for trocar insertion during robotic surgery ([STIFF-FLOP](#)) Design and implementation of algorithms for augmenting tactile perception and grasp stability on a dexterous hand ([GSC](#)) Formulation of an iterative inverse kinematics method for geometric inspection of wind turbines ([COSMOS](#)) Development of methods for tactile sensing in robot grasping using tactile arrays and force-torque sensors ([HANDLE](#))

Teaching Experience:

Teaching

- Feb 2023 - **Invited Assistant Professor** Universidade de Lisboa
 • Data Mining (Practical) • Programming II (Practical) • Mobile Robots (Practical)
- Sep 2021 - Feb 2023 **Assistant Professor** Universidade Lusófona
 • Programming in C (Lectures and Practical) • Circuit Analysis (Lectures)
 • Signals and Systems (Practical) • Signal Acquisition and Processing (Practical)
 • Automatic Control I (Practical) • Automatic Control II (Practical)
- Sep 2012 - Dec 2014 **Teaching Assistant** King's College London
 • Programming Practice (Labs and tutorials) • Computer Systems (Labs and tutorials)
 • Prog. Applications (Labs and tutorials) • Data Structures (Labs and tutorials)

Thesis Supervision

- 2016-2019 Olmo Moreno **PhD** University of Genova
 Title: “The Shape of Damping: Optimizing Damping Coefficients to Improve Transparency on Bilateral Telemanipulation” ([Link](#))
 Co-supervisor: Prof. Domenico Prattichizzo
- 2019 Mehrdad Tavassoli **MSc** Politecnico di Torino
 Title: “Robot manipulation models to exploit environmental constraints” ([Link](#))
 Co-supervisors: Prof. Domenico Prattichizzo, Prof. Paolo Prinetto
- 2019 Giandomenico Martucci **Msc** University of Siena
 Title: “Maintaining stable grasps during highly dynamic robot trajectories”
 Co-supervisors: Prof. Domenico Prattichizzo, Prof. Monica Malvezzi

Other

- 2023 Associate Editor for IROS 2023
- 2022 Secretary for the Robotics and Automation Society, Portuguese Chapter of the IEEE
- Editor for the Frontiers in Robotics and AI Research Topic “Robotic Grasping and Manipulation of Deformable Objects”
- 2021 – Review Editor in Soft Robotics for Frontiers in Robotics and AI
- 2020 Main organizer for the workshop “Why robots fail to grasp? Failure ca(u)ses in robot manipulation” at IROS 2020
- Editor for the Frontiers in Robotics and AI Research Topic “ViTac: Integrating Vision and Touch for Multimodal and Cross-modal Perception”
- 2020 – Review Editor in Field Robotics for Frontiers in Robotics and AI
- 2019 Co-organiser of the workshop “ViTac: Integrating Vision and Touch for Multimodal and Cross-modal Perception” at ICRA 2019
- 2017 Member of the PhD examination commission for HRI and Haptics at IIT/UniGe
- 2015/2016 Member of Program Committee for the 1st and 2nd Workshops on “Multimodal sensor-based robot control for HRI and soft manipulation” at IROS 2015 and 2016
- 2013/2014 Member: Department of Informatics’ Student-Staff Liaison Committee at King’s College London

Publications

Journal Papers

- 2022 • **Joao Bimbo**, A. S. Morgan, and A. M. Dollar, “Force-based simultaneous mapping and object reconstruction for robotic manipulation,” *IEEE Robotics and Automation Letters*, vol. 7, no. 2, pp. 4749–4756, 2022
- Y. Gloumakov, **Joao Bimbo**, and A. M. Dollar, “Trajectory control – an effective strategy for controlling multi-dof upper limb prosthetic devices,” *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, vol. 30, pp. 420–430, 2022
- 2021 • A. Naceri, D. Mazzanti, **Joao Bimbo**, Y. T. Tefera, D. Prattichizzo, D. G. Caldwell, L. S. Mattos, and N. Deshpande, “The vicarios virtual reality interface for remote robotic teleoperation,” *Journal of Intelligent & Robotic Systems*, vol. 101, no. 4, pp. 1–16, 2021
- 2020 • M. M. Ghazaei Ardakani, **Joao Bimbo**, and D. Prattichizzo, “Quasi-static analysis of planar sliding using friction patches,” *The International Journal of Robotics Research*, vol. 39, no. 14, pp. 1775–1795, 2020
- M. Pozzi, S. Marullo, G. Salvietti, **Joao Bimbo**, M. Malvezzi, and D. Prattichizzo, “Hand closure model for planning top grasps with soft robotic hands,” *The International Journal of Robotics Research*, vol. 39, no. 14, pp. 1706–1723, 2020
- 2019 • **Joao Bimbo**, E. Turco, M. Ghazaei Ardakani, M. Pozzi, G. Salvietti, V. Bo, M. Malvezzi, and D. Prattichizzo, “Exploiting robot hand compliance and environmental constraints for edge grasps,” *Frontiers in Robotics and AI*, vol. 6, p. 135, 2019
- 2018 • A. Faragasso, **Joao Bimbo**, A. Stilli, H. A. Wurdemann, K. Althoefer, and H. Asama, “Real-time vision-based stiffness mapping,” *Sensors (Basel, Switzerland)*, vol. 18, no. 5, 2018
- F. Chinello, C. Pacchierotti, **Joao Bimbo**, N. G. Tsagarakis, and D. Prattichizzo, “Design and evaluation of a wearable skin stretch device for haptic guidance,” *IEEE Robotics and Automation Letters*, vol. 3, no. 1, pp. 524–531, Jan 2018
- M. Pozzi, G. Salvietti, **Joao Bimbo**, M. Malvezzi, and D. Prattichizzo, “The closure signature: A functional approach to model underactuated compliant robotic hands,” *IEEE Robotics and Automation Letters*, vol. 3, no. 3, pp. 2206–2213, July 2018
- 2017 • S. Luo, **Joao Bimbo**, R. Dahiya, and H. Liu, “Robotic tactile perception of object properties: A review,” *Mechatronics*, vol. 48, pp. 54–67, 2017
- 2016 • T. Nanayakkara, A. Jiang, M. d. R. A. Fernández, H. Liu, K. Althoefer, and **Joao Bimbo**, “Stable grip control on soft objects with time-varying stiffness,” *IEEE Transactions on Robotics*, vol. 32, no. 3, pp. 626–637, 2016
- **Joao Bimbo**, S. Luo, K. Althoefer, and H. Liu, “In-hand object pose estimation using covariance-based tactile to geometry matching,” *IEEE Robotics and Automation Letters*, vol. 1, no. 1, pp. 570–577, 2016
- Y. Noh, **Joao Bimbo**, S. Sareh, H. Wurdemann, J. Fraś, D. S. Chathuranga, H. Liu, J. Housden, K. Althoefer, and K. Rhode, “Multi-axis force/torque sensor based on simply-supported beam and optoelectronics,” *Sensors*, vol. 16, no. 11, p. 1936, 2016
- 2015 • **Joao Bimbo**, P. Kormushev, K. Althoefer, and H. Liu, “Global estimation of an object’s pose using tactile sensing,” *Advanced Robotics*, vol. 29, no. 5, pp. 363–374, 2015
- H. Liu, K. C. Nguyen, V. Perdereau, **Joao Bimbo**, J. Back, M. Godden, L. D. Seneviratne, and K. Althoefer, “Finger contact sensing and the application in dexterous hand manipulation,” *Autonomous Robots*, vol. 39, no. 1, pp. 25–41, 2015

Papers in Peer-Reviewed Conferences

- 2020 • Y. Gloumakov, **Joao Bimbo**, and A. M. Dollar, “Trajectory control for 3 degree-of-freedom wrist prosthesis in virtual reality: A pilot study,” in *8th IEEE RAS/EMBS International Conference for Biomedical Robotics and Biomechanics (BioRob)*. IEEE, 2020, pp. 765–772
- G. Martucci, **Joao Bimbo**, D. Prattichizzo, and M. Malvezzi, “Maintaining stable grasps during highly dynamic robot trajectories,” in *IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS)*. IEEE, 2020
- Y. Gloumakov, **Joao Bimbo**, and A. M. Dollar, “Trajectory control for a myoelectric prosthetic wrist,” in *MEC Symposium Conference*, 2020
- 2019 • **Joao Bimbo**, C. Pacchierotti, N. Tsagarakis, and D. Prattichizzo, “Collision detection and isolation on a robot using joint torque sensing,” in *IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS)*. IEEE, 2019
- A. Naceri, D. Mazzanti, **Joao Bimbo**, D. Prattichizzo, D. G. Caldwell, L. S. Mattos, and N. Deshpande, “Towards a virtual reality interface for remote robotic teleoperation,” in *2019 19th International Conference on Advanced Robotics (ICAR)*, 2019, pp. 284–289
- 2018 • O. A. Moreno F., **Joao Bimbo**, C. Pacchierotti, D. Prattichizzo, D. Barcelli, and G. Bianchini, “Transparency-optimal passivity layer design for time-domain control of multi-dof haptic-enabled teleoperation,” in *IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS)*. IEEE, 2018
- A. Faragasso, **Joao Bimbo**, A. Yamashita, and H. Asama, “Disposable stiffness sensor for endoscopic examination,” in *2018 40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*. IEEE, 2018, pp. 4309–4312
- G. Bianchini, **Joao Bimbo**, C. Pacchierotti, D. Prattichizzo, and O. A. Moreno F., “Transparency-oriented passivity control design for haptic-enabled teleoperation systems with multiple degrees of freedom,” in *IEEE Conference on Decision and Control (CDC)*. IEEE, 2018
- 2017 • **Joao Bimbo**, C. Pacchierotti, M. Aggravi, N. Tsagarakis, and D. Prattichizzo, “Teleoperation in cluttered environments using wearable haptic feedback,” in *IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS)*, 2017
- 2016 • Y. Noh, **Joao Bimbo**, A. Stilli, H. Wurdemann, H. Liu, R. Housden, K. Rhode, and K. Althoefer, “A new miniaturised multi-axis force/torque sensors based on optoelectronic technology and simply-supported beam,” in *IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS)*. IEEE, 2016
- 2015 • A. Faragasso, A. Stilli, **Joao Bimbo**, H. Wurdemann, and K. Althoefer, “Multi-axis stiffness sensing device for medical palpation,” in *IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS)*. IEEE, 2015
- 2014 • J. Back, **Joao Bimbo**, Y. Noh, L. Seneviratne, K. Althoefer, and H. Liu, “Control a contact sensing finger for surface haptic exploration,” in *IEEE Int. Conf. on Robotics and Automation (ICRA)*. IEEE, 2014, pp. 2736–2741
- A. Faragasso, **Joao Bimbo**, Y. Noh, A. Jiang, S. Sareh, H. Liu, T. Nanayakkara, H. Wurdemann, and K. Althoefer, “Novel uniaxial force sensor based on visual information for minimally invasive surgery,” in *IEEE Int. Conf. on Robotics and Automation (ICRA)*. IEEE, 2014, pp. 1405–1410
- A. Faragasso, A. Stilli, **Joao Bimbo**, Y. Noh, H. Liu, T. Nanayakkara, P. Dasgupta, H. Wurdemann, and K. Althoefer, “Endoscopic add-on stiffness probe for real-time soft surface characterisation in mis,” in *36th Annual Int. Conf. of the IEEE Engineering in Medicine and Biology Society (EMBC)*. IEEE, 2014, pp. 6517–6520
- 2013 • **Joao Bimbo**, L. D. Seneviratne, K. Althoefer, and H. Liu, “Combining touch and vision for the estimation of an object’s pose during manipulation,” in *IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS)*. IEEE, 2013, pp. 4021–4026

- 2012
- A. Jiang, **Joao Bimbo**, S. Goulder, H. Liu, X. Song, P. Dasgupta, K. Althoefer, and T. Nanayakkara, “Adaptive grip control on an uncertain object,” in *IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS)*. IEEE, 2012, pp. 1161–1166
 - X. Song, H. Liu, **Joao Bimbo**, K. Althoefer, and L. D. Seneviratne, “A novel dynamic slip prediction and compensation approach based on haptic surface exploration,” in *IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS)*. IEEE, 2012, pp. 4511–4516
 - H. Liu, X. Song, **Joao Bimbo**, L. Seneviratne, and K. Althoefer, “Surface material recognition through haptic exploration using an intelligent contact sensing finger,” in *IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS)*. IEEE, 2012, pp. 52–57
 - X. Song, H. Liu, **Joao Bimbo**, K. Althoefer, and L. D. Seneviratne, “Object surface classification based on friction properties for intelligent robotic hands,” in *World Automation Congress (WAC), 2012*. IEEE, 2012, pp. 1–5
 - **Joao Bimbo**, S. Rodriguez-Jimenez, H. Liu, X. Song, N. Burrus, L. D. Seneviratne, M. Abderrahim, and K. Althoefer, “Object pose estimation and tracking by fusing visual and tactile information,” in *IEEE Conf. on Multisensor Fusion and Integration for Intelligent Systems (MFI)*. IEEE, 2012, pp. 65–70
 - H. Liu, X. Song, **Joao Bimbo**, K. Althoefer, and L. Seneviratne, “Intelligent fingertip sensing for contact information identification,” *Advances in Reconfigurable Mechanisms and Robots I*, pp. 599–608, 2012
 - H. Liu, J. Greco, X. Song, **Joao Bimbo**, L. Seneviratne, and K. Althoefer, “Tactile image based contact shape recognition using neural network,” in *IEEE Conf. on Multisensor Fusion and Integration for Intelligent Systems (MFI)*. IEEE, 2012, pp. 138–143

Other

- 2022
- **Joao Bimbo**, A. S. Morgan, and A. M. Dollar, “Using contacts during robot manipulation to map and reconstruct a scene,” in *The Science of Bumping Into Things, Workshop at RSS 2022 [Poster]*, 2022
- 2021
- S. Luo, N. Lepora, U. Martinez-Hernandez, **Joao Bimbo**, and H. Liu, “Vitac: Integrating vision and touch for multimodal and cross-modal perception,” *Frontiers in Robotics and AI [Editorial]*, vol. 8, pp. 697601–697601, 2021
- 2020
- **Joao Bimbo**, “Contact sensing for robot grasping”, *RPL Seminar*, UCL, UK *[Invited Talk]*, 2020
 - M. Pozzi, C. Gaudeni, **Joao Bimbo**, Z. Iqbal, E. Turco, M. M. Ghazaei-Ardakani, G. Salvietti, V. Bo, M. Malvezzi, and D. Prattichizzo, “Soft hand-environment interaction in grasping tasks,” in *Shaping quality metric of a grasp with the manipulation task: Grasping as a sub action of object manipulation, Workshop at ICRA 2020 [Poster]*, 2020
- 2017
- **Joao Bimbo**, C. Pacchierotti, N. Tsagarakis, and D. Prattichizzo, “Particle-filter-based estimation of the location and force of robot collisions using torque measurements,” in *Revisiting Contact - Turning a problem into a solution Workshop at RSS’17 [Poster]*, 2017
 - O. A. Moreno, **Joao Bimbo**, C. Pacchierotti, G. Bianchini, and D. Prattichizzo, “Optimizing damping factors in a 3dof passive two-layer approach for bilateral telemanipulation,” in *Work-in-Progress session at World Haptics ’17 [Poster]*, 2017
- 2015
- **Joao Bimbo**, K. Althoefer, and H. Liu, “Object pose estimation using tactile to geometric covariance matching,” in *IROS Late Breaking Results Session [Poster]*, 2015
 - **Joao Bimbo** and H. Liu, “Soft fingers for robotic grasping,” in *Perceptions on Soft-based Contact workshop at IEEE CASE 2015 [Invited Talk]*, 2015

- 2014 • J. Back, **Joao Bimbo**, M. Addison, U. Cupcic, G. Cassidy, R. Walker, L. D. Seneviratne, K. Althoefer, and H. Liu, “Finger surface following control through intrinsic contact sensing,” in *Autonomous Grasping and Manipulation: An Open Challenge at ICRA [Poster]*, 2012
- 2013 • **Joao Bimbo**, S. Rodriguez-Jimenez, H. Liu, N. Burrus, L. D. Senerivatne, M. Abderrahim, and K. Althoefer, “Fusing visual and tactile sensing for manipulation of unknown objects,” in *Mobile Manipulation Workshop on Interactive Perception at ICRA 2013 [Poster]*, 2013
- 2012 • **Joao Bimbo**, H. Liu, L. D. Senerivatne, M. Abderrahim, and K. Althoefer, “Active perception of objects for robot grasping,” in *Closing the Action-Perception Loop Workshop at IROS 2012 [Presentation]*, 2012
- **Joao Bimbo**, “Managing coordinate frames with ROS,” in *Handling ROS Introductory tutorial to ROS and its use for robot in-hand manipulation Workshop at IROS [Workshop]*, 2012

Patents

- 2021 • Y. Noh, J. Bimbo, and H. Liu, “Multi-axis force sensor,” 2021, US Patent 11,002,625 / CN110050179B