Curriculum vitae of Paolo Fiorini

Personal Information
Family name, First name: **Fiorini, Paolo**
Researcher unique identifier: **ORCID 0000-0002-0711-8605**
Nationality: **Italian**
Date of birth: **February 1st, 1953**
URL for web site: **http://profs.scienze.univr.it/~fiorini/**

Education
1995	**Doctor of Philosophy in Mechanical Engineering**, UCLA
1982	**Master of Science in Electrical Engineering**, University of California, Irvine
1976	**Laurea in Electronic Engineering**, Università degli Studi di Padova
1971	**Diploma** of Maturità Scientifica

Current Positions
2016-present	**Visiting Associate,** California Institute of Technology, Department of Mechanical Engineering
2011-present	**Full Professor**, University of Verona, Department of Computer Science, Verona, Italy

Previous Positions
2014	**Distinguished Visiting Professor**, Irell & Manella Graduate School of Biological Sciences, Beckman Research Institute of the City of Hope, Duarte (CA. USA)
2001-2010	**Associate Professor**, University of Verona, Dep. of Computer Science, Verona, Italy
1985-2000	**Member of Technical Staff**, NASA-JPL, Caltech, Pasadena (CA-USA)
1984-1985	**Principal Engineer**, Trimedyne Corp., Irvine (CA-USA)
1982–1984	**Control System Designer**, Parker-Hannifin Corp., Irvine (CA-USA)
1980–1981	**Software Analyst**, Studio di Informatica, Milano (Italy)
1977–1980	**Microprocessor System Designer**, Zeltron-Zanussi, Udine (Italy)

Fellowships and Awards
2016	**Honorary Professor**, Obuda University, Budapest (Hungary)
2015	**Corresponding Member**, Academy of Agriculture, Sciences and Humanities of Verona
2013	**Finalist,** Entrepreneurship Workshop of the European Robotics Forum, Lyon (France)
2011	**3rd prize euRobotics Technology Transfer Award,** Vasteras (Sweeden)
2011	**Antonio D'Auria Prize**, robotic applications for disabled, elderly users, Milano (Italy)
2009	**Fellow** of the Institute of Electrical and Electronic Engineers (IEEE)
2008	**Group Award** for Springer Handbook in Robotics, Ass. of American Publishers
2006	**Most Active Chapter**. Italian Chapter of IEEE Robotics and Automation Soc. (RAS)
2003	**Most Active Technical Committee**. Service Robotics of IEEE RAS
2000	**Finalist** for Best Conference Paper at the IEEE ICRA2000 conference
1993	**Finalist** for Best Student Paper at the IEEE ICRA1993 conference
1993	**NASA Group Award** for contribution to NASA telerobotics program
1985-2000	**Awarded** 13 NASA Technical Awards

Supervision of Graduate Students and Postdoctoral Fellows
2001-present	**Supervision of 12 Doctoral Students**, 6 graduated and 6 on-going, at the University of Verona, Department of Computer Science, Verona, Italy
	1 Doctoral Student at the University of Karlsruhe, Karlsruhe (Germany)
	3 Doctoral Students at the Universitad Nacional de San Juan, San Juan (Argentina)
1999-present	**Supervision of about 70 Master Students**, at the Univ. of Verona, Comp. Sci. Dep.
1989-present	**More than 20 Post-Doctoral Fellows** either at JPL or at the University of Verona

Teaching Activities
2001-present   **Undergraduate Courses:**
1. Systems and Signals: elements linear system analysis and signal processing
2. Industrial Informatics: basic concepts of system analysis and control

Graduate Courses:
1. Introduction to robotics: robotic kinematics, planning and control
2. Linear System Theory: State space model and analysis of linear systems
3. Surgical Robotics: laboratory experiments using the da Vinci surgical robot

Organization of Scientific Meetings
2016-2018   **Doctoral School on Control of Surgical Robots (COSUR2016,2018)**: organizer
2014-present   **Workshop on Computer and robot Assisted Surgery (CRAS)**: organizer
2014   **European Robotics Forum 2014 (ERF2014)**: Local host and organiser
2013   **IEEE Int. Conf. on Robotics and Automation (ICRA)**: Prg. Co-Chair, Karlsruhe (D)
2012   **IEEE Int. Conf. on Intelligent Robots and Systems (IROS)** : Editor, Vilamoura (P).
2011-2012   **IEEE ICRA 2011-2012:** Associate Editor, Shanghai (China), St. Paul (USA)
2009-present   **Int. Conf. on Advanced Robotics (ICAR)** : Chair of the Steering Committee.
Organizer, Munich (Germany) '09, Tallinn (Estonia) '11, Montevideo (Uruguay) '13, Istanbul (Turkey) '15, Hong Kong (China) '17, Belo Horizonte (Brazil) '19
2007   **IEEE ICRA 2007:** Member of the Organizing Comm. and Financial Chair, Roma (I)
2006   **IEEE ICRA 2006:** Poster Chair, Orlando (FL USA).
2001-2018   **Discovery on Film:** Organizer and speaker, Science Museum of Rovereto, Rovereto (I)
1995-present   **Member of program committee** of more than 30 international robotics conferences, including BIOROB, ICAR, SYROCO, ICINCO.

Institutional Responsibilities
2019   **University Coordinator for Research**
2013-2019   **University Coordinator** of Innovation and Technology Transfer activities
2013-2017   **Department Coordinator** of the Doctoral Program in Computer Science
2001-2012   **Department Coordinator** for International Programs (Erasmus/Socrates)
2007-2010   **University Coordinator** of Information Technology projects
2001-2003   **Member of the Administrative Board** of the Computer Science Department.

Commissions of Trust
2004-present   **Evaluation of Academic Career**
Associate Research Scientist at the Univ. of Maryland at College Park (USA); Associate Professorship at Georgia Tech, Lorraine Campus, (France). Full professorship at UC Berkeley (San Francisco, USA). Full professorship at the Naval Postgraduate School (Monterey, CA)
2005-present   **Evaluation of Canadian, European and Italian Grant Proposals**
2015-2016 FP7 ICT Reviewer (Stiff-Flop, Futura, RockEU); **2014** Ontario Research Fund; **2007-2011** FP7 SPACE 2011; **2010** Call 1 FP7 Project ECHORD;
2001-present   **Doctoral Thesis Committees**
2013 University Federico II of Naples; **2010** EPFL Lausanne (Switzerland); ETH Zurich (Switzerland); **2009** University of Genova - IIT Genova; **2007** Universitè d'Orlèans, Bourges (France); KTH Stockholm (Sweeden); **2006** University of Calabria, Cosenza (Italy);
2007-2010   **Guest Editor**
07/'10 Journal of Applied Bionics and Biomechanics:; **03/'05** Autonomous Robot Journal: **01/'08** Transaction on Automation Science and Engineering: **12/'00** Autonomous Robot Journal
1995-present   **Associate Editor**
(2012-present) BJUI Editorial Board Member; **(2006-present)** Journal of Intelligent Service Robots; **(2005-present)** Autonomous Robot Journal; **(2004-2008)** IEEE Transaction of Automation Science and Engineering; **(1995-1998)** IEEE RAS Magazine.

Membership of Scientific Societies
2020   Secretary of IEEE Robotics and Automation Society (RAS)
2008-2010   Elected to the Board of Directors of the European Robotics Network (EURON)
2014-present   Associate Vice President of Conference Activity Board of IEEE Robotics and Automation Society (RAS)
2004-2015   Co-Chair of the Education Committee of RAS
2010-2012   Associate Vice President of Member Activity Board of RAS
2003-2006   Elected for two consecutive terms to the Administrative Committee of RAS
2005   Founder and first President of the Italian Chapter of the IEEE-RAS
2003-2010   Chair of RAS Technical Committee on Service Robotics
2005-2007   Chair of RAS Technical Committee on Search Safety and Rescue Robotics

Major Collaboration
1995-present   Prof. Joel Burdick, Robotics, California Institute of Technology, Pasadena (CA-USA)
2014-present   Prof. Yuman Feng, Robotic Surgery, City of Hope Medical Center, Duarte (CA-USA)
1995-present   Prof. Ricardo Carelli, Robotics, Univ. Nacional de San Juan, San Juan (Argentina)
2003-present   Dr. Franziska Mathis-Ullrich, Robotics, Karlsrhue Institute of Technology (Ger)

Career Breaks

2001   Relocation to Italy to assist my mother.

On-going Grants

Project Title	Funding source	Amount (Euros)	Period	Role of the PI	Description
MRI and Ultrasound Robotic Assisted Biopsy (MURAB)	H2020	3,982,307.50	2016-2019	Partner	The project addresses the automatic execution of breast and muscle biopsy.
Autonomous Robotic Surgery (ARS)	ERC-ADG	2,750,000.00	2017-2022	Coordinator	The project addresses the technologies for the autonomous execution of a surgical intervention
AuTonomous intraLuminAl Surgery (ATLAS)	MARIE SKŁODOWSKA-CURIE ACTIONS EJD	972,000.00	2019-2022	Partner	The project addresses the development of an autonomous endoscope
Autonomous Robot for Prostate Biopsy (PROST)	ERC-POC	150,000.00	2019-2021	Coordinator	The project aims at transferring the technologies developed by ARS to a robotic device for prostate biopsy.

Ten Selected Journal Papers (Citations by Google Scholar)

1. Riccardo Muradore and Paolo Fiorini, **A Review of Bilateral Teleoperation Algorithms**, Acta Polytechnica Hungarica, Vol. 13, N. 1, 2016. This papers summarizes the main teleoperation algorithms that are applicable to robotic surgery.

2. B. Maris, and P. Fiorini, **Generalized Shapes and Point Sets Correspondence and Registration**, J Math Imaging Vis, (2015) 52: 218, DOI: 10.1007/s10851-014-0538-8. This paper gives a solution to the correspondence and registration of point sets in two different images *without* a pre-assigned point correspondence. A closed form solution is derived suitable for real time registration of images in the operating room.

3. Dall'Alba, D. and Fiorini, P., **BIPCO: ultrasound feature points based on phase congruency detector and binary pattern descriptor (1)**, Int J CARS DOI 10.1007/s11548-015-1204-3, published on line May 1st, 2015. This papers presents a novel feature descriptor specifically designed for ultrasound images, based on phase congruency, to establish the correspondance between image features in different images.

4. L. Repele, R. Muradore, D. Quaglia, P. Fiorini, *Improving the Performance of Networked Control Systems by Using Adaptive Buffering (12)*, IEEE Transactions on Industrial Electronics. Vol. 61, N. 9, September 2014, pp. 4847-4856. This paper addresses the problem of compensating the communication time delay by using an adaptive buffer and in which data are interpolated and sampled to reduce noise. The paper shows that this approach reduces delay and packet loss probability and improves control performance

5. A. Calanca, R. Muradore and P. Fiorini. *Adaptive Human-Robot Interaction Control (10)*, Robotica, vol. 2, no. 08, pp. 13011316, 2014. This paper addresses the control problems in human-robot interface. It shows that passivity does not allow specifying the response performance and shows a solution to obtain predictable

force/torque dynamics based on adaptive control and oversimplified human models.

6. E. Slawinski, V. A. Mut, P. Fiorini, and L. R. Salinas, ***Quantitative Absolute Transparency for Bilateral Teleoperation of Mobile Robots, (15),*** IEEE Transactions on Systems, Man, and Cybernetics Part A: Systems and Humans (2012), ISSN: 1083-4427, DOI 10.1109/TSMCA.2011.2159588. In this paper we address: (1) the use of visual feedback to generate force feedback to the driver of a remote vehicle and (2) the development of the absolute transparency value, which measures how and how fast the human operator and the remote system interact with each other through a teleoperation system.

7. Marcello Bonfe, Fabrizio Boriero, Riccardo Dodi, Paolo Fiorini, Angelica Morandi, Riccardo Muradore, Liliana Pasquale, Alberto Sanna, Cristian Secchi, ***Towards automated surgical robotics: A requirements engineering approach,*** 2012 4th IEEE RAS & EMBS International Conference on Biomedical Robotics and Biomechatronics (BioRob). This paper describes the approach followed in the design of the I-SUR control system for the autonomous execution of puncturing tasks.

8. R. Muradore, D. Bresolin, L. Geretti, P. Fiorini and T. Villa, ***Formal Verification of Plans for Robotic Surgery (35),*** IEEE Robotics and Automation Magazine, 09/2011, pp. 24-32, September 2011. This paper addresses task correctness in the context of robotic surgery when the level of uncertainty is very high. Therefore, autonomous or teleoperated robots should "simulate" their tasks before execution. In long-distance teleoperation, this capability may compensate delays and ensure a smooth operation.

9. M. Scandola, L. Grespan, M. Vicentini, P. Fiorini, ***Robot-Assisted Laparoscopic Hysterectomy vs Traditional Laparoscopic Hysterectomy: Five Metaanalyses (21)***, The Journal of Minimally Invasive Gynecology, Volume 18, Issue 6 , Pages 705-715, November 2011. In this paper we assess differences between laparoscopic hysterectomy performed with or without robot-assistance, examining 5 key indices strongly associated with societal and hospital costs, patient safety, and intervention quality. Our results confirm that robot-assisted laparoscopy has less deleterious effect on hospital, society, and patient stress and leads to better intervention quality.

10. R. Muradore and P. Fiorini, ***A PLS-Based Statistical Approach for Fault Detection and Isolation of Robotic Manipulators (63)***, IEEE Transaction on Industrial Electronics, 2012, 59 (8), 3167-3175. Here, we address robotic self-monitoring and identification of its own malfunctioning. The insurgence of a problem implies that the nominal model used in control and task assessment is no longer valid: either the robot should be updated or its tasks should be halted. This feature assumes particular relevance in the case of safety-critical remote systems.

Granted Patents

1. PCT/IB2010/050824: 25/02/2010, (WO2010/097771). Methods and apparatus for surgical training.
2. PCTIB2010052647, 14/06/2010 (WO2010/146526). Method for interactive simulation.
3. EP - 10170547.3, 22/07/2010 (EP2277441). Device for minimally invasive robotic surgery.
4. EP - 11156111.4, 25/02/2011 (EP2364825). Device for minimally invasive robotic surgery.
5. EP - 13187462.0, 05/10/2012 (EP2716252). Device and method for manual needle insertion.

Selected Plenary Presentations

2016	Hamlyn Symposium on Medical Robotics, London (UK)
2014	Congress of automatic control in Argentina, AADECA, Buenos Aires (Argentina)
2014	French National Robotics Research Days, Paris (France)
2012	Schunk Expert Days, Hausen (Germany)
2011	IROS 2011 Symposium on Medical Robotics, San Francisco (CA-USA)
2011	SCATh Workshop on New technologies for Computer/Robot Assisted Surgery, Graz (Austria)
2010	EST-2010, University of Kent, Manchester (UK)
2009	ISRIS, Summer School on "International School on Robots and Intelligent Systems", Iasi (Romania)
2008	SIMPAR 2008, Workshop on "Teaching with Robots", Venice (Italy)
2007	ARISER Workshop, Otranto (Italy)

2004   III Jornadas Argentinas de Robotica 2004, San Juan (Argentina)

Organization of International Conferences

2014-present   **Workshop on Computer and robot Assisted Surgery (CRAS)**: organizer
2014   **European Robotics Forum 2014 (ERF2014)**: organizer and local host
2009-present   **Int. Conf. on Advanced Robotics (ICAR)**: Chair of the Steering Committee. Organizer, Munich (D) '09, Tallinn (Est) '11, Montevideo (U) '13, Istanbul (TR) '15, Hong Kong '17, Pasadena (CA-USA) '19.
2007   **IEEE ICRA 2007:** Member of the Organizing Committee
2001-present   **Discovery on Film:** Organizer and speaker, Science Museum of Rovereto, Rovereto (I)

Major contributions to the early careers of excellent researchers

2009-2011   **Dr. Otar Akanyeti**. After receiving his PhD from the University of Essex (UK), was a post doctoral fellow in my laboratory, managing a large portion of the EU project FILOSE, acquiring the background that landed him a position at the Whitney Laboratory for Marine Bioscience, St Augustine, (FL-USA) and now a Lecturership at the Aberystwyth University (UK).
2009-2012   **Dr. Jessica Burgner-Khars**. She did her Phd in the context of the AccuRobAs project, under my co-supervision, then she moved to Vanderbilt University for her post-doc, returned to Germany under the Emmy Noether Programme to Leibniz Universität in Hannover where she became associate professor. Currently she moved to the University of Toronto to start a new program on continuum robots.

Leadership in Industrial Innovation

2009   Founded three spin-off's of the University of Verona:
- **Accurobot Srl** for the development of a robotic device for prostate biopsy.
- **Surgica Robotica SpA** that acquired two rounds of Venture Capital, developed and CE certified a new surgical robot. The work of Surgica Robotica received the 3rd prize euRobotics Technology Transfer Award.
- **AltairMed Srl** that is focusing on developing computer-based simulation and training tools for surgery