

Curriculum Vitae of Cesare Stefanini

Career summary

- February 2015: Associate Professor, Department of Biomedical Engineering, Khalifa University, Abu Dhabi, UAE.
- November 2014: Associate Professor at the BioRobotics Institute of Scuola Superiore Sant'Anna (SSSA).
- February 2014: National Scientific Qualification for Associate Professor in Bioengineering.
- January 2012: Area Leader in Creative Engineering Design at the BioRobotics Institute of SSSA, leading a team of 9 people (one post-doc, three PhD students, four research assistants, one technician).
- July 2003: Assistant Professor of Industrial Bioengineering at SSSA, tenured from 2010.
- October 2002 – June 2003: Post Doc Scholarship at SSSA.
- January 1999 – October 2002: PhD Course in Microengineering at SSSA.
- September 1997 – December 1998: Officer of the Italian Navy as a Naval Engineer

Cesare Stefanini [M.Sc. in Mech. Eng. (honors): 1997, PhD in Microengineering (honors): 2002] served first as Assistant Professor and then, from November 2014, as Associate Professor at the BioRobotics Institute of Scuola Superiore Sant'Anna of Pisa, Italy, with the role of Area Leader in "Creative Engineering Design". From February 2015 he is Faculty at Khalifa University, BME department. His research activity is applied to different fields, including small scale biorobotics, actuators for compliant robots, biomechatronics and micromechatronics for medical applications. He received international recognitions for the development of novel actuators for microrobots and he has been visiting researcher at the University of Stanford, Center for Design Research, where he focused his activity on the issue of high-efficient, high performance mechanisms for bio-robotics.

Prof. Stefanini has been the project manager of two European Projects, the first one addressing new bioinspired robotic artefacts, the second one aimed at developing new high precision manufacturing technologies for flexible, cost efficient and eco-friendly mass production of complex shape parts at the micro/meso-scale level. Prof. Stefanini is also founder of a spin-off company active in the field of micro-scale energy and actuation.

Prof. Stefanini is the author or co-author of more than forty articles on refereed international journals, of more than seventy papers published in international conferences proceedings and of seven international patents, two of which industrially exploited by world-leading companies. His Scopus h-index is 17. He is member of the IEEE Societies RAS (Robotics and Automation), EMBS (Engineering in Medicine and Biology) and PES (Power and Energy).

Teaching experience

Here below my main teaching achievements and relevant experiences. Here below my main teaching achievements and relevant experiences.

- Since 2015: Circuits and Signals I at Khalifa University (BME undergraduate)
- Since 2015: Biorobotics and Medical Device Design at Khalifa University (BME undergraduate)
- Since 2012: professor of "Creative Engineering Design" within the PhD program in Biorobotics at Scuola Superiore Sant'Anna in Pisa (Italy).
- Since 2011: professor of "Structural Mechanics" at the School of Engineering of the University of Pisa (Italy).
- From 2010 to 2012: coordinator of the vocational summer school for the top 100 Italian high school students, in view of their academic choice.

- From 2009 to 2011: professor of "Energy Issues in Biorobotics and Relevant Examples" within the PhD program in Biorobotics at Scuola Superiore Sant'Anna in Pisa (Italy).
- Since 2007: visiting professor at Zhejiang University (Hangzhou, China).
- From 2001 to 2002: lecturer of "Mathematics for Engineering" at the School of Engineering of the University of Pisa (Italy).

Scientific participation in research projects with competitive calls and peer review

- 1/04/2011- 03/30/2014 - European Project Cocoro: "Collective Cognitive Robots", European contract no. 270382, R&D responsible
- 1/12/2010 - 30/11/2013 - National Project BIOMEAR: "Development of novel micro-manufactured Biological and BioHybrid prostheses for Middle Ear surgery ", Decree n. 4177, local coordinator
- 1/03/2008 - 28/02/2013 - European Project Replicator: "Robotic Evolutionary Self-Programming and Self-Assembling Organisms, "European contract no. 216240, R&D responsible
- 1/10/2008 - 30/09/2012 - European Project INTEG-MICRO: "New production technologies of complex 3D Microdevices through multi-process integration of ultra precision engineering techniques ", European contract no. CP-IP 214013-2, Project Manager
- 22/03/2010 - 22/09/2012 - National Project: "Experimental study and numerical characterization of tissue biomechanics of colon, contract no. 2008EM9B92, R&D responsible
- 1/02/2009 - 31/07/2012 - European Project ANGELS: "Robot with Anguilliform Electric Sense "European contract no. 231845, R&D responsible
- 1/05/2008 - 30/04/2012 - European Project Araknes: "Array of Robots Augmenting the Kinematics of Endoluminal Surgery ", European contract no. 224565, R&D responsible
- 1/02/2008 - 31/07/2011 - European Project Lampetra: "Life-like Artefacts for Motor-Postural Experiments and Development of New Control Technologies inspired by Rapid Animal locomotion", European contract no. 216100, Project Manager
- 18/07/2007 - 18/11/2010 - National Project "Advanced manufacturing systems for the machining of miniaturized products with combined processes (Multitasking) flexible, contract no. RBIP0692HF, R&D responsible
- 01/02/2006 - 31/07/2009 - European Project ARES: "Assembling Reconfigurable Endoluminal Surgical System", European contract no. 15653, R&D responsible
- 02/01/2005 - 31/01/2008 - European Project Vimpa: "Vibrating Microengines for Power Generation Microsystem and Actuation ", European contract no. 511869, Project Manager
- 1/01/2004 - 31/12/2007 - European Project NEUROBOTICS: "The fusion of Neuroscience and Robotics", European contract no. FP6-IST-001917, R&D responsible
- 05/01/2002 - 30/04/2005 - European Project BIOLOCH: "Bio-mimetic structures for Locomotion in the Human Body", European contract no. IST-2001-34181, R&D responsible
- 1/12/2001 - 30/11/2004 - European Project MINOSC: "MiroNeuroendoscopy Of Spinal Cord", European contract no. QLG5-CT-2001-02150, R&D responsible

Participation in editorial committees

- 06/2012: Bioinspiration & Biomimetics (ISSN 1748-3182), IOP publishing, Guest Editor of Special Issue

- 01/2011 - 06/2012: Associate Editor, member of the International Program Committee, The Fourth IEEE / RAS-EMBS International Conference on Biomedical Robotics and Biomechatronics
- 9/2006 - 11/2007: Member of the International Program Committee, IROS 2007 IEEE / RSJ International Conference on Intelligent Robots and Systems
- 07/2005 - 03/2006: Proceedings Chair, BioRob 2006, The First IEEE / RAS-EMBS International Conference on Biomedical Robotics and Biomechatronics
- 08/2010 - 04/2011: General Co-Chair, International Workshop on Bio-Inspired Robots (Nantes, France).

Active international collaborations

- Stanford University (California, USA), Prof. Mark Cutkosky
- Karolinska Institutet, The Nobel Institute for Neurophysiology (Stockholm, Sweden), Prof. Sten Grillner
- Georgia Institute of Technology, Department of Mechanical Engineering (Atlanta, USA), Prof. Jun Ueda
- Ecole de Mines de Nantes, Institut de Recherche en Communications et Cybernétique (Nantes, France), Prof. Frederic Boyer
- University of Stuttgart, Institute of Parallel and Distributed Systems (Stuttgart, Germany), Prof. Paul Levi
- Cranfield University, Precision Engineering Institute (Cranfield, UK), Prof. Paul Shore
- Lund Institute of Technology, Department of Energy Sciences (Lund Sweden), Prof. Per Tunestal
- Zhejiang University (Hangzhou, China), Prof. Liu Weiting

Organization of International Workshops

- Cesare Stefanini is the Chair of the workshop on "Bioinspired Underwater Robotics" for the IEEE conference IROS 2015 in Hamburg, on October 2, 2015.
- Cesare Stefanini has been organizer of the workshop "Emerging topics in Robotics and Micro / Nano Robotics: from science-based research to high impact applications "at the European Robotics Forum in Odense (Denmark) on 6 March 2012.
- Cesare Stefanini has been organizer of the workshop on "Biologically Inspired actuation" during the conference ICRA 2011 (IEEE International Conference on Robotics and Automation) in Shanghai, on 13 May 2011.

Awards and Recognitions

- January 2012: the European project "Lampetra", of which the candidate has been proponent, developer, and technical coordinator, won the recognition of "Project of the month" by the European Commission and was declared "A Success Story" in the official bulletin of the FET program.
- January 2010: winner of the grant research "Intuitive Surgical Research Award" given annually by Intuitive Surgical Inc. (Sunnyvale, USA), the leading industry in medical robotics
- February 2008: Finalist for Best Conference Paper Award at the conference RoBio 2008, with the article entitled "A Novel Receptor Based on Artificial Hair Aligned PVDF Micro / Nano Fibers ", 21 to 26 February, Bangkok, Thailand.
- Invited lecture at the conference IROS, 2012, entitled "High efficiency and adaptive behavior in bio-inspired robots by creative design and smart materials", Algarve (Portugal), 11 October 2012.

- Invited Lecture at the Conference ICRA, 2012, entitled "Energy in robots: measuring performance and efficiency", St. Paul (MN, USA), 18 May 2012.
- Plenary Lecture at the International Workshop on Bio-Inspired Robots entitled "Bio-inspired approaches to robotics: towards a new generation of adaptive systems", Nantes (France), 6 April 2011.
- Participation in the Round Table entitled "Robotics and medicine: from the mechanical arm to the intelligent capsules: last frontiers of robotic surgery", at the Academy of Agriculture, Science and Letters, Verona, Italy, 30 January 2009.
- Seminar invitation to Zhejiang University (Hangzhou, China), entitled "Energy Issues In Microrobotics: Jumping Locomotion", 19 December 2007.
- Seminar invitation to the "Journées Micro-Nano-Technologies" organized by the French CNRS in Paris on 28 and 29 November 2007 with a presentation entitled "Medical Microrobots".
- Invited Lecture entitled "Future Trends in Surgical Robotics" at the "3rd European Summer University on Surgical Robotics" in Montpellier, France, 5-12, September 2007.

Media dissemination

As demonstration and recognition of the interest aroused by the scientific activity of Cesare Stefanini also among the general public, and the resulting impact on common people opinion, a chronological list is given on personal contributions in the media:

- 9/1/2003 - Panorama (most read Italian magazine) - "Endoscope for bone", Cesare Stefanini describes the development of neuro endoscope conducted within the project "MINOSC"
- 29/7/2003 - Rai 1 (most watched Italian television channel), transmission Super Quark – Cesare Stefanini illustrates the subject of scaling laws in the design of miniaturized devices
- 15/08/2005 - Corriere della Sera (most read Italian newspaper) - "Bimbo, the second micro-robot in the world", description of participation in an international competition of robotics, by a team of students coordinated by Cesare Stefanini
- 28/9/2006 - Corriere della Sera - "A robot to study the sixth sense", article in which Cesare Stefanini explains the rationale and the first achievements of the European project "Lampetra"
- 26/4/2006 - Explora Rai - "Bioinspired Inventions ", Cesare Stefanini answers to questions on the above subject
- 7/6/2007 - Rai 1, transmission Super Quark - Cesare Stefanini illustrates the operation of the first prototype of the bioinspired robot developed within the "Lampetra" project
- 20/8/2008 - Rai 1, program "Uno Mattina" - Cesare Stefanini shows the experimental studies on the jump of small animals and the development of bioinspired robots.
- 3/9/2009 - The Espresso (second most read Italian magazine) - "Insect Robots", Cesare Stefanini describes the scenario of research in the field of small bioinspired robotics.
- 26/4/2010 - RAI-3, program "Geo & Geo" - Cesare Stefanini explains bioinspired robotics and shows both static and dynamic demonstrations
- 17/7/2011 - Il Sole 24 Ore (most read Italian financial magazine), "In the zoo where the robots learn from nature", "Lampetra" project presented
- 9/7/2011 - The Economist (international magazine) - "Zoobotics" article describing "Lampetra" and the international state of the art in the field
- 25/1/2012 - Rai 1, TG1 news program – Cesare Stefanini is interviewed on the possible use of robotic systems in the context of the sinking of the ship "Costa Concordia" and the applicability of proximity sensors, developed within the European project "ANGELS" for the safety of navigation

Selected publications on ISI journals (Scopus h-index equal to 17):

- Calìò, R., Rongala, U.B., Camboni, D., Milazzo, M., Stefanini C., “Piezoelectric energy harvesting solutions”, *Sensors*, vol. 14 (3), pp. 4755 – 4790, 2014
- L. Manfredi, T. Assaf, S. Mintchev, S. Marrazza, L. Capantini, S. Orofino, L. Ascari, S. Grillner, P. Wallén, O. Ekeberg, C. Stefanini, “A bioinspired autonomous swimming robot as a tool for studying goal-directed locomotion”, *Biological Cybernetics*, n. 105, pp. 513-527, 2013
- T. Assaf, C. Stefanini, P. Dario, “Autonomous underwater biorobots: A wireless system for power transfer”, *IEEE Robotics And Automation Magazine*, n. 20; pp. 26-32, 2013
- G. Bonsignori, C. Stefanini, U. Scarfogliero, S. Mintchev, G. Benelli and P. Dario, "The green leafhopper, *Cicadella viridis* (Hemiptera, Auchenorrhyncha, Cicadellidae), jumps with near-constant acceleration", *Journal of Experimental Biology*, vol. 216, pp. 1270-1279, 2013
- E.L. Carniel, C.G. Fontanella, C. Stefanini and A.N. Natali, "A procedure for the computational investigation of stress-relaxation phenomena", *Mechanics of Time-Dependent Materials*, vol. 17, pp. 25-38, 2013
- C. Stefanini, S. Orofino, L. Manfredi, S. Mintchev, S. Marrazza, T. Assaf, L. Capantini, E. Sinibaldi, S. Grillner, P. Wallén and P. Dario, “A novel autonomous, bioinspired swimming robot developed by neuroscientists and bioengineers”, *Bioinspiration & Biomimetics*, vol. 7, n. 2, ISSN 1748-3190, doi:10.1088/1748-3182/7/2/025001, 2012.
- G. Benelli, G. Bonsignori, C. Stefanini and A. Canale, “Courtship and mating behaviour in the fruit fly parasitoid *Psytalia concolor* (Szépligeti) (Hymenoptera: Braconidae): the role of wing fanning”, *Journal of Pest Science*, vol. 85, pp. 55-63, 2012.
- G. Benelli, A. Canale, G. Bonsignori, G. Ragni, C. Stefanini and A. Raspi, “Male wing vibration in the mating behavior of the olive fruit fly *Bactrocera oleae* (Rossi) (Diptera: Tephritidae)”, *Journal of Insect Behavior* DOI: 10.1007/s10905-012-9325-9, 2012
- Fei Li, Weiting Liu, Xin Fu, Gabriella Bonsignori, Umberto Scarfogliero, Cesare Stefanini, Paolo Dario, Jumping like an insect: Design and dynamic optimization of a jumping mini robot based on bio-mimetic inspiration, *Mechatronics*, Volume 22, Issue 2, March 2012, Pages 167-176.
- Fei Li, Weiting Liu, Cesare Stefanini, Xin Fu and Paolo Dario, “A Novel Bioinspired PVDF Micro/Nano Hair Receptor for a Robot Sensing System”, *Sensors*, 2010, 10 (1), 994-1011
- Weiting Liu, Fei Li, Cesare Stefanini, Dajing Chena, Paolo Dario, “Biomimetic flexible/compliant sensors for a soft-body lamprey-like robot”, *Robotics and Autonomous Systems*, 58 (2010), pp. 1138-1148
- Luca Ascari, Cesare Stefanini, Ulisse Bertocchi and Paolo Dario, “Robot-assisted endoscopic exploration of the spinal cord”, *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science*, Volume 224, Number 7, 2010, pp. 1515-1529.
- De Cristofaro, Sarah - Stefanini, Cesare - Ng Pak, Nicola - Susilo, Eka - Carrozza, Maria Chiara – Dario, Paolo, Electromagnetic wobble micromotor for microrobots actuation, *Sensors and Actuators (A)*, vol. 161, pp. 234–244 (2010)
- Scarfogliero, Umberto - Stefanini, Cesare - Dario, Paolo, The use of compliant joints and elastic storage in bio-inspired legged robots *Mechanisms and Machine Theory* - 44 : 580 - 590 (2009)

- Stefanini, Cesare - Menciassi, Arianna - Dario, Paolo, Modeling and experiments on a legged microrobot locomoting in a tubular, compliant and slippery environment, *International Journal of Robotics Research* - 25 : 551 - 560 (2006)
- Danti, Serena - Stefanini, Cesare - D'Alessandro, Delfo - Moscato, Stefania - Pietrabissa, Andrea - Petrini, Mario - Berrettini, Stefano, Novel biological/biohybrid prostheses for the ossicular chain: fabrication feasibility and preliminary functional characterization, *Biomedical Microdevices*, DOI 10.1007/s10544-009-9293-9, (2009)
- Berrettini S, Bruschini L, Stefanini C, D'Alessandro D., Dacunto M, Danti S (2010). Good Manufacturing Practices-grade Preformed Ossicular Prostheses from Banked Bone via Computer Numerically Controlled Micromilling. *Annals of Otology Rhinology and Laryngology*, 120(1):9-16. ISSN: 0003-4894
- Quirini, Marco - Menciassi, Arianna - Scapellato, Sergio - Stefanini, Cesare - Dario, Paolo, Design and Fabrication of a Motor Legged Capsule for the Active Exploration of the Gastrointestinal Tract, *IEEE/ASME Transactions on Mechatronics* - 13 : 169 - 179 (2008)
- Grillner, Sten - Kozlov, Alexander - Dario, Paolo - Stefanini, Cesare - Menciassi, Arianna - Lansner, Anders - Kotalieski, Jeanette Hellgren, Modeling a vertebrate motor system: pattern generation, steering and control of body orientation, *Progress in Brain Research* - 165 : 221 - 234 (2007)
- Valdastrì, Pietro - Harada, Kanako - Menciassi, Arianna - Beccai, Lucia - Stefanini, Cesare - Fujie, Masakatsu - Dario, Paolo, Integration of a Miniature Triaxial Force Sensor in a Minimally Invasive Surgical Tool, *IEEE Transactions on Biomedical Engineering* - 53 : 2397 - 2400 (2006)
- Menciassi, Arianna - Dario, Paolo - Stefanini, Cesare - Spina, Giovanni La, A novel technological process for fabricating micro tips for biomimetic adhesion, *Journal of Micromechanics and Microengineering* - 15 : 1576 - 1587 (2005)
- Menciassi, Arianna - Moglia, Andrea - Gorini, Samuele - Pernorio, Giuseppe - Stefanini, Cesare - Dario, Paolo, Shape Memory Alloy Clamping Devices of a Capsule for Monitoring Tasks in the Gastrointestinal Tract, *Journal of Micromechanics and Microengineering* - 15 : 2045 - 2055 (2005)
- Menciassi, Arianna - Stefanini, Cesare - Spina, Giovanni La - Castrataro, Piero - Dario, Paolo, Bio-inspired solutions for locomotion through the gastrointestinal tract, *Robotics and Machine Perception Newsletter* - 12 : 1 - 9 (2003)
- Phee, Louis - Accoto, Dino - Menciassi, Arianna - Stefanini, Cesare - Carrozza, Maria Chiara - Dario, Paolo, Analysis and development of locomotion devices for the gastrointestinal tract, *IEEE Transactions on Biomedical Engineering* - 49 : 613 - 616 (2002)
- Carrozza, Maria Chiara - Dario, Paolo - Stefanini, Cesare - D'Attanasio, Simona, A Mobile Microrobot Actuated by a New Electromagnetic Wobble Micromotor, *IEEE/ASME Transactions on Mechatronics* - 3 : 9 - 16 (1998)

Book chapters

- Laschi, Cecilia - Maini, Eliseo Stefano - Patanè, Francesco - Ascari, Luca - Ciaravella, Gaetano - Bertocchi, Ulisse - Stefanini, Cesare - Dario, Paolo, A vestibular interface for natural control of steering locomotion of robotic artefacts: preliminary experiments with a robotic endoscope, *Springer*, - 28 : 537 – 551 (2007)
- Dario, Paolo - Stefanini, Cesare - Menciassi, Arianna, Modeling and experiments on a legged microrobot locomoting in a tubular, compliant and slippery environment *Springer* - 21 : 165 - 174 (2006)

- Phee, Louis - Menciassi, Arianna - Accoto, Dino - Stefanini, Cesare - Dario, Paolo, Analysis of Robotic Locomotion Devices for the Gastrointestinal Tract, Springer - 6 : 467 - 483 (2003)
- Megali, Giuseppe - Tonet, Oliver - Stefanini, Cesare - Boccadoro, Mauro - Papaspyropoulos, Vassilios - Angelini, Licinio - Dario, Paolo, A Computer-Assisted Robotic Ultrasound-Guided Biopsy System for Video-Assisted Surgery Springer - 2208/1 : 343 - 350 (2001)

Patents

- Dario, P., Menciassi, A., Stefanini, C., Gorini, S., Pernorio, G., Accoto, D., “Teleoperated Endoscopic Capsule Equipped With Active Locomotion System”, US Patent n. US2008091070 published on April 17, 2008. Applicant: Scuola Superiore Sant' Anna.
- Stefanini C., Castrataro P., Accoto D. and Sabatini M., “Miniaturised Generator for the Production of Electrical Energy from Vibrations”, PCT patent n. WO2008062377 published on May 29, 2008. Applicant: Encrea srl. (patent exploited by PIRELLI Tyres SpA)
- Ferrari, M. and Stefanini, C., “Clip and clip applicator for closing blood vessels”, US patent n. US2006271103, published on November 30, 2006. (patent exploited by Karl Storz GmbH).
- Dario, P., Pietrabissa, A., Magnani, B., Stefanini, C., "Endoscopic surgery device for the insertion and recovery of a haemostatic plug at the surgical site", European patent n. EP1699401, published on September 13, 2006. Applicant: MicroTech srl.
- Pietrabissa, A., Stefanini, C., Menciassi, A. and Dario, P., “Auxiliary Forceps for Hand-Assisted Laparoscopic Surgery (HALS)”, PCT patent n. WO02100281, published on October 1st , 2008. Applicant: Scuola Superiore Sant' Anna.
- C. Stefanini, P. Dario, M.C. Carrozza, S. De Cristofaro, “Electromagnetic step-by-step wobble micromotor”, national patent application n. FI2008A000185 filed on September 29, 2008. (patent exploited by Faulhaber GmbH)
- C. Stefanini, S. Mintchev, P. Dario, “Magnetic Actuator for adaptive actuation”, national patent application n. FI2008A000150 filed on August 4, 2008.