

Claudio Rossi

Dr. Claudio Rossi received his Ph.D. in Computer Science from the University of Bologna, Italy, in 2001 with a thesis on Nature-inspired search techniques for hard optimization problems. His research interests in the last years they have been directed towards applications of Artificial Intelligence “soft computing” techniques (evolutionary algorithms, neural networks and fuzzy rules systems) to pattern matching, computer vision and robotics. Since 2009, he has started working on bio-inspired systems, shifting from Nature-based (software) search techniques to Nature-based physical systems, founding the “Bio-Inspired Systems Lab”.

He has been visiting researcher at the LIACS (Leiden Institute of Advanced Computer Science, NL), post-doctoral fellow at the Department of Artificial Intelligence at the UPM and Visiting Professor at the University Carlos III of Madrid. During 2005-09 he was "Ramon y Cajal" research fellow at the UPM, and since 2009 he is professor at the UPM. He has participated in several international research projects with ESA (European Space Agency) and EC-funded, and he has published over 100 papers in scientific journals and international conferences, on the topics of artificial intelligence and robotics.

Current position

Position: Profesor Titular

Institution: Universidad Politécnica de Madrid, Centre for automation and Robotics (CAR UPM-CSIC)

Education

Degree in Computer Science, University “Ca Foscari” of Venice, Italy, 1999,

Ph.D. in Computer Science, University of de Bologna, Italy, 2001

Public Office

Academic Registrar, ETS Ingenieros Industriales, 2014-2018

Deputy Director, Centre For Automation and Robotics (2019-current)

Research lines

Artificial intelligence and soft computing applied to robotics; Bio-inspired robots, embedded evolution, evolutionary robotics; Pattern recognition and optimization; field robotics.

Recent Research Projects

He has participated in more than 10 research project with public and private funding

As PI for UPM:

- ROBOMINERS, Resilient Bio-inspired Modular Robotic Miners (H2020, 2019-2023)
- UNEXUP, UNEXMIN upscaling (EIT Raw Materials, 2020-2022)
- UNEXMIN, Autonomous Underwater Explorer for Flooded Mines (H2020, 2016-2020)
- PRIC, Sistema Multirobot para Proteccion de Grandes Infraestructuras, MICINN, Proyectos de Investigación Fundamental no orientada, DPI2014-56985-R (2014-2017, co-IP)
- CHEMOCONTROL, Chemical Messengers for Robot Regulation , EXPLORA (Min. of Economy and Compet., Spain, 2015-2016)
- FOXIRIS, Flipper-based Oil&Gas ATEX Intelligent Robotics System, funded by TOTAL (2014-2016)
- The Moon Hound lunar rover project (European Space Agency, 2009).

Recent Publications

Main publications in international journals (top JCR ranking):

1. E. Aguado, Z. Milosevic, C. Hernández, R.Sanz, M. Garzon, D. Bozhinoski, C. Rossi, "Functional Self-Awareness and Metacontrol for Underwater Robot Autonomy", *Sensors* 21(4), 2021
2. Zorana Milosevic, Ramon A. Suarez Fernandez, Sergio Dominguez and Claudio Rossi, "Guidance for Autonomous Underwater Vehicles in Confined Semistructured Environments", *Sensors* 2020, 20(24), 7237
3. L. Lopes et al. "ROBOMINERS – Developing a bio-inspired modular robot-miner for difficult to access mineral deposits", *Advances in Geosciences* 54(54):99-108
4. R. A. Suarez Fernandez, Z. Milosevic, S. Dominguez, C. Rossi, "Motion Control of Underwater Mine Explorer Robot UX-1: Field Trials", *IEEE Access*, July 2019 (accepted).
5. R. A. Suarez Fernandez, E. Andres Parra, Z. Milosevic, S. Dominguez, C. Rossi, "Nonlinear Attitude Control of a Spherical Underwater Vehicle", *Sensors* 19(6), 2019.
6. R. A. Suarez Fernandez, D. Grande, A. Martins, L. Bascetta S. Dominguez, C. Rossi, "Modelling and Control of Underwater Mine Explorer Robot UX-1", *IEEE Access* 7:1,pp. 39432-39447, 2019.

7. Zhang, Chao; Rossi, Claudio, "Effects of elastic hinges on input torque requirements for a motorized indirect-driven flapping-wing compliant transmission mechanism", IEEE Access Vol 7, pp.10368-13077, 2019.
8. Coral, William; Rossi, Claudio; Curet, Oscar; Castro, Diego, "Design and assessment of a flexible fish robot actuated by shape memory alloys", Bioinspir. Biomim. (Vol. 13, Number 5, 2018).
9. Zhang, Chao; Rossi, Claudio, "A review of compliant transmission mechanisms for bio-inspired flapping-wing micro air vehicles", Bioinspir. Biomim. (Volume 12, Number 2, 2017).
10. A. Ravalli, C. Rossi, G. Marrazza, "Bio-inspired fish robot based on chemical sensors", Sensors & Actuators: B. Chemical, Volume 239, February 2017.

More than 70 international conference communications, 5 book chapters.

Teaching/Student supervising

Eleven years of teaching experience, on the subjects of intelligent control, soft computing, software engineering, robot cooperation, operating systems, systems dynamics, automation and control (approx. 15 ETCS credits/year)

- ▶ Director of 6 Ph.D. Thesis (2 ongoing, all of them with international students)
- ▶ Director of over 40 between University degree final thesis and Master's thesis in automation and robotics
- ▶ Teacher in the Degrees of Industrial Technologies (GITI) Industrial Organization (GIO), Master on Industrial Engineering (MII), Master on Automation and Robotics (MUAR), EIT Master on Digital Manufacturing, on the subjects of Software Engineering, Systems' Programming, Computer Architecture, Cooperative Robotics, Intelligent Control, Industrial Automation, Systems Dynamics, Advanced Programming, Artificial Intelligence.

Editorships and organization

- Associated editor, International Journal of Advanced Robotic Systems (Topic: bioinspired robots)^[1]_{SEP}
- Associated editor, Frontiers in Evolutionary Robotics (Frontiers in Robotics and AI)
- Member of the Editorial Board of Frontiers in Bionics (specialty of Frontiers in Bioengineering and Biotechnology)^[1]_{SEP}
- Organization of the workshop on smart materials and alternative technologies for bio-inspired robots and systems "ATBio", part of the IROS 2012 conference.
- Organization of the Workshop on Nature-inspired techniques for robotics at the PPSN 2014 conference.
- Organization of the "Raw material, tough robots" workshop ant IROS 2018.
- Participation as expert for the FET Programme:
 - EXTRACT-IT Coordination and support actions FP7 - 1 318149, " Defining FET research topics supporting the ICT challenges of mineral extraction under extreme geo-environmental conditions"
 - FET Consultation workshop "Living technology / Artificial systems / Embodied Evolution", Brussels November 2011.
 - The EvoBody (EU FET Proactive Initiative SA on AWARENESS) workshop, Mallorca, Spain, March 2011.