# VIERI GIULIANO SANTUCCI - CV

**Surname: Santucci**
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## PROFILE

I am a **researcher at the Italian National Research Council (CNR)**, Institute of Cognitive Science and Technologies (ISTC). I hold a **BA in Philosophy of Science** (University of Pisa, Italy), an **MA in Theories and Techniques of Knowledge** (Faculty of Philosophy, University of Rome "La Sapienza", Italy) and a **Ph.D in Computer Science** (University of Plymouth, UK).

I study Artificial Intelligence and Cognitive Science from an interdisciplinary perspective combining Machine Learning, Robotics, Computational Modeling and Experimental Studies.

My main research areas are: **Autonomous and Developmental Robotics**, **Motivational Systems** (both in artificial and biological agents), **Impact of new Technologies on Society.**

## EDUCATION

### Ph.D: Computer Science (2016)

University of Plymouth (UK), School of Computing, Electronics and Mathematics. Thesis: *Autonomous learning of multiple skills through intrinsic motivations: A study with computational embodied models* (Supervisors: Dr. Marco Mirolli, Prof. Angelo Cangelosi).

### MA: Theories and Techniques of Knowledge (2009)

University of Rome "La Sapienza" (Italy), Faculty of Philosophy. Thesis: *From hybrid robotics to representational robotics* (Supervisors: Prof. Roberto Cordeschi, Dr. Giovanni Pezzulo)

### BA: Philosophy of Science (2006)

University of Pisa (Italy), Faculty of Literature and Philosophy. Thesis: *Mirror Neurons: Analysis of a scientific debate* (Supervisor: Prof. Claudio Pogliano)

# SCIENTIFIC BIOGRAPHY

## RESEARCH CAREER

**27/12/2018 - now**

### Researcher III Lvl (Perm. Position)

Institute of Cognitive Science and Technologies (ISTC), National Research Council (CNR), Rome, Italy.

**01/02/2017 - 27/12/2018**

### Researcher III Lvl (Fixed Term. Position, Art. 23)

ISTC-CNR, Rome, Italy. (From 1/02/2017 to 31/01/2018 Prot. 197, 25/01/2017 and Extensions: from 1/02/2018 to 30/06/2018; from 01/07/2018 to 27/12/2018)

**01/12/2012 - 31/01/2017**

### Research Fellow

ISTC-CNR, Rome, Italy. (From 01/12/2012 to 31/10/2013, Prot. 3442, 24/10/2012, and Extensions: from 01/11/2013 to 31/10/2014; from 01/11/2014 to 30/04/2015; from 01/05/2015 to 30/04/2016; from 01/05/2016 to 31/10/2016, from 01/11/2016 to 31/12/2016; from 01/01/2017 to 31/01/2017)

**03/05/2010 - 31/10/2012**

### Research Fellow

ISTC-CNR, Rome, Italy. (From 03/05/2010 to 30/04/2011, Prot. 1291, 19/04/2010, and Extensions: from 01/05/2011 to 30/04/2012; from 01/05/2012 to 31/10/2012)

## PROJECTS

**2016/2020**

### GOAL Robots - Goal-based Open-ended Autonomous Learning Robots

(FP - European Framework Programs, Contract n°. FET-OPEN-713010)

Participation in the writing of proposal, scientific and management activity.

**2018/2019**

### IMPACT: Intrinsically Motivated Planning Architecture for Curiosity-driven roboTs

(European Space Agency, Contract n° 4000124068/18/NL/CRS)

Participation in the writing of proposal, scientific and management activity.

**2008/2013** **IM-CLeVeR: Intrinsically Motivated Cumulative Learning Versatile Robots**
(FP - European Framework Programs, Contract n° FP7-ICT-IP-231722)

Scientific and management activity.

## MEMBERSHIP IN SCIENTIFIC BOARDS

**2020/now** **Institute of Cognitive sciences and Technologies**
Member of the Board at ISTC-CNR

**2018/now** **IEEE Transactions on Cognitive and Developmental Systems**
Member of the Technical Committee

**2018/now** **Frontiers in Neuroscience (sec: "Decision Neuroscience")**
Associate Editor

## REVIEWING ACTIVITY

Reviewer for international journals: Artificial Intelligence Review; Autonomous Robots; IEEE Transactions on Cognitive and Developmental Systems; Advances in Complex Systems; Frontiers in Neurorobotics; Frontiers in Neuroscience; Frontiers in Psychology;

Reviewer for international conferences: International Joint Conference on Robot Learning (IJCAI); Conference on Robot Learning (CoRL); IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS); IEEE International Conference on Developmental Learning and Epigenetic Robotics (ICDL- EpiRob); International Conference on Cognitive Modelling (ICCM); IEEE-RAS International Conference on Humanoid Robots; International Conference on Trust Management (IFIPTM);

## SPECIAL ISSUE EDITOR

**2019** "Intrinsically Motivated Open-Ended Learning in Autonomous Robots" in Frontiers in Neurorobotics / Frontiers in Robotics and AI

## EVENTS ORGANIZATION

**01-03/07/2019** **Fourth International Workshop on Intrinsically Motivated Open-ended Learning (IMOL 2019)**
Main Organizer. Frankfurt, Germany.

**04-06/10/2017** **Third International Workshop on Intrinsically Motivated Open-ended Learning (IMOL 2017)**
Main Organizer. Rome, Italy.

**18/09/2017** **First International Workshop on Ethics and Future of Artificial Intelligence (E-FAI 2017)**
Co-Organizer. Lisbon, Portugal.

## TEACHING

**From 2020** **Contract Professor - UNINETTUNO, International Telematic University (Rome, Italy)**
Course on Foundation for Artificial Intelligence

**From 2019-now** **Contract Professor - Advanced School of AI (Rome, Italy)**
Course on Fundamentals of Reinforcement Learning

**27-30/06/2019** **Teacher at the International Summer School on Intrinsically Motivated Open-Ended Learning (Frankfurt, Germany)**

**01-11/05/2011** **Teacher at IM-CLeVeR Summer School (Alghero, Italy)**

## INVITED SPEAKER AND SEMINARS

**19/08/2019** **IEEE ICDL-EpiRob conference. Workshop on "Mapping the self: infants, robots, and modeling" (Oslo, Norway)**
Invited speaker presentation: "Computational models of body-knowledge development based on intrinsic goals"

**15/11/2015** **University "Suor Orsola Benincasa" (Naples, Italy)**
Seminar in the course "Artificial Intelligence and fundamentals of programming"

**30-31/10/2014** **The Donders Discussions - International Conference on Cognition and Neuroscience (Nijmegen, The Netherlands)**
Invited speaker presentation: “Learning multiple skills with Intrinsic Motivations: computational embodied models”

**13/06/2014** **Workshop on “An operant analysis in the onset of gambling disorder” (Milan, Italy)**
Invited speaker presentation: “Phasic dopamine and reinforcement learning: Applications to robotics”

**26/03/2014** **University of Pisa. Workshop on “Understanding consciousness: from philosophy to neuroscience” (Pisa, Italy)**
Invited speaker presentation

## COMMISSION MEMBER

**30/03/2020** **ISTC-CNR, Scholarship grant**
Member of the commission. (Comp. Notice n. ISTC.126.078.BS.34/2020)

**31/08/2019** **Grenoble University - Master of Science in Informatics**
Jury Member as external supervisor

**24/02/2019** **University of Rome “La Sapienza” - MA in Neurobiology**
Jury Member as external supervisor

**19/11/2018** **ISTC-CNR, Research fellow grant**
Member of the commission. (Comp. Notice n. ISTC-AdR-243-2018-RM)

**23/07/2018** **ISTC-CNR, Research fellow grant**
Member of the commission. (Comp. Notice n. ISTC-AdR-244-2018-RM)

**28/11/2017** **ISTC-CNR, Research fellow grant**
Member of the commission. (Comp. Notice n. ISTC-AdR-241-2017-RM)

**27/04/2017** **ISTC-CNR, Scholarship grant**
Member of the commission. (Comp. Notice n. ISTC.126.078.BS.27/2017)

## SUPERVISOR

### Master thesis

Fabio Mastrantuono (University of Rome “La Sapienza”, Neurobiology); Quentin Delfosse (University of Grenoble, Computer Science)

### Bachelor degree

Davide Montella (University of Rome “La Sapienza”, Computer Science)

## PUBLICATIONS (BY DATE)

- Santucci, V. G., Oudeyer, P. Y., Barto, A., & Baldassarre, G. (2020). Intrinsically motivated open-ended learning in autonomous robots. *Frontiers in Neurorobotics*, *13*, 115.

- Oddi, A., Rasconi, R., Santucci V.G., Sartor, G., Cartoni, E., Mannella, F. & Baldassarre G. (2020, t.b.p.). Integrating Open-Ended Learning in the Sense-Plan-Act Robot Control Paradigm. In *The 24th European Conference on Artificial Intelligence* (ECAI).

- Oddi, A., Rasconi, R., Santucci V.G., Sartor, G., Cartoni, E., Mannella, F. & Baldassarre G. An Intrinsically Motivated Planning Architecture for Curiosity-driven Robots (2020). Proceedings of the 6th Italian Workshop on Artificial Intelligence and Robotics (AIRO 2019)

- Oddi, A., Rasconi, R., Cartoni, E., Sartor, G., Baldassarre, G., & Santucci, V. G. (2019). Learning High-Level Planning Symbols from Intrinsically Motivated Experience. *arXiv preprint arXiv:1907.08313*.

- Santucci, V. G., Cartoni, E., da Silva, B. C., & Baldassarre, G. (2019). Autonomous Open-Ended Learning of Interdependent Tasks. *arXiv preprint arXiv:1905.02690*.

- Jacquey, L., Baldassarre, G., Santucci, V. G., & O’Regan, J. K. (2019). Sensorimotor contingencies as a key drive of development: from babies to robots. *Frontiers in Neurorobotics*, *13*.

- Santucci, V. G., Baldassarre, G., & Cartoni, E. (2019). Autonomous reinforcement learning of multiple interrelated tasks. In *2019 Joint IEEE 9th International Conference on Development and Learning and Epigenetic Robotics (ICDL-EpiRob)* (pp. 221-227). IEEE.

- Baldassarre, G., Lord, W., Granato, G., & Santucci, V. G. (2019). An embodied agent learning affordances with intrinsic motivations and solving extrinsic tasks with attention and one-step planning. *Frontiers in Neurorobotics*, *13*, 45.

- Baldassarre, G., Mannella, F., Santucci, V. G., Somogyi, E., Jacquey, L., Hamilton, M., & O'Regan, J. K. (2018). Action-outcome contingencies as the engine of open-ended learning: computational models and developmental experiments. In *2018 Joint IEEE 8th*

*International Conference on Development and Learning and Epigenetic Robotics (ICDL-EpiRob)* (pp. 46-53). IEEE.

- Mannella, F., Santucci, V. G., Somogyi, E., Jacquey, L., O'Regan, K. J., & Baldassarre, G. (2018). Know your body through intrinsic goals. *Frontiers in neurorobotics*, *12*, 30.

- Baldassarre, G., Santucci, V. G., Cartoni, E., & Caligiore, D. (2017). The architecture challenge: Future artificial-intelligence systems will require sophisticated architectures, and knowledge of the brain might guide their construction. *Behavioral and Brain Sciences*, *40*.

- Seepanomwan, K., Santucci, V. G., & Baldassarre, G. (2017). Intrinsically motivated discovered outcomes boost user's goals achievement in a humanoid robot. In *2017 Joint IEEE International Conference on Development and Learning and Epigenetic Robotics (ICDL-EpiRob)* (pp. 178-183). IEEE.

- Santucci, V. G., Baldassarre, G., & Mirolli, M. (2016). GRAIL: a goal-discovering robotic architecture for intrinsically-motivated learning. *IEEE Transactions on Cognitive and Developmental Systems*, *8*(3), 214-231.

- Santucci, V. G. (2016). Autonomous learning of multiple skills through intrinsic motivations: A study with computational embodied models. University of Plymouth, Ph.D. Thesis.

- Santucci, V. G., Cilia, D. N., & Pezzulo, G. (2015). The status of the simulative method in cognitive science: current debates and future prospects. *PARADIGMI*.

- Santucci, V. G., Baldassarre, G., & Mirolli, M. (2014, October). Autonomous selection of the “what” and the “how” of learning: an intrinsically motivated system tested with a two armed robot. In *4th International Conference on Development and Learning and on Epigenetic Robotics* (pp. 434-439). IEEE.

- Santucci, V. G., Baldassarre, G., & Mirolli, M. (2014). Cumulative learning through intrinsic reinforcements. In *Evolution, Complexity and Artificial Life* (pp. 107-122). Springer, Berlin, Heidelberg.

- Mirolli, M., Santucci, V. G., & Baldassarre, G. (2013). Phasic dopamine as a prediction error of intrinsic and extrinsic reinforcements driving both action acquisition and reward maximization: A simulated robotic study. *Neural Networks*, *39*, 40-51.

- Santucci, V. G., Baldassarre, G., & Mirolli, M. (2013). Which is the best intrinsic motivation signal for learning multiple skills?. *Frontiers in Neurorobotics*, *7*, 22.

- Santucci, V. G., Baldassarre, G., & Mirolli, M. (2013). Intrinsic motivation signals for driving the acquisition of multiple tasks: a simulated robotic study. In *Proceedings of the 12th International Conference on Cognitive Modelling (ICCM)* (pp. 1-6).

- Santucci, V. G., Baldassarre, G., & Mirolli, M. (2012). Intrinsic motivation mechanisms for competence acquisition. In *2012 IEEE International Conference on Development and Learning and Epigenetic Robotics (ICDL)* (pp. 1-6). IEEE.

- Santucci, V. G., Baldassarre, G., & Mirolli, M. (2010). Biological cumulative learning through intrinsic motivations: a simulated robotic study on the development of visually-guided reaching. In *Proceedings of the Tenth International Conference on Epigenetic Robotics (EpiRob2010)* (pp. 121-128). Lund, Sweden: Lund University.