

# Marco Lanzilotto, PhD

Department of Psychology  
University of Turin  
Turin, Italy  
(rev. July 2020)

## Personal

Family name, First name: Lanzilotto, Marco  
Researcher unique identifier(s): ORCID:0000-0002-3854-7875  
Research ID: H-5418-2013  
Date of birth: April 28<sup>th</sup>, 1984  
Nationality: Italian

## Contact Information

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## Education

**PhD in Neuroscience** April 5<sup>th</sup>, 2013  
Department of Neuroscience, University of Modena and Reggio Emilia. Modena, Italy  
Supervisor: Lucchetti, C., PhD (University of Modena and Reggio Emilia)  
Thesis: “The Neural Correlates of Auditory Orienting in Macaque Monkey: A Role for PEEF in Species Specific Vocalizations Recognition and Head Motor Control”

**Visiting Student Research Collaborator**  
Department of Psychology, Princeton University Jan 2011 – Jan 2012  
Supervisor: Ghazanfar, A.A., PhD (Princeton University) Princeton, USA

**Master’s Degree** July 21<sup>st</sup>, 2009  
Biological Sciences (110/110) Modena, Italy  
Department of Neuroscience, University of Modena and Reggio Emilia.  
Supervisor: Lucchetti, C., PhD (University of Modena and Reggio Emilia)  
Thesis: “Neurons related to visuomotor task recognition in primate’s pre-SMA”

**Bachelor’s Degree** Nov 24<sup>th</sup>, 2006  
Biological Sciences (110/110) Modena, Italy  
Department of Neuroscience, University of Modena and Reggio Emilia.  
Supervisor: Bon, L., PhD (University of Modena and Reggio Emilia)  
Thesis: “Integrative functions of dorsal premotor cortex, area 8B, in monkeys”

## Positions

**Research Fellow (RTD-A)** July 2019-present  
Department of Psychology, University of Turin Turin, Italy

Investigating visual awareness in monkey after small lesion of V1  
Advisor: **Tamietto, M., PhD**

**Senior Postdoctoral researcher** Sept 2016-May 2019  
Department of Medicine and Surgery, University of Parma Parma, Italy

Investigating single neuro-activity during the ethered and wireless recording of premotor neurons in the macaque  
Advisor: **Bonini, L., PhD**

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|---------------------------------------------------------|--------------------|
| <b>Postdoctoral researcher</b>                          | Aug 2014-Sept 2016 |
| Department of Medicine and Surgery, University of Parma | Parma, Italy       |

Investigating single neurons properties in monkey's intraparietal sulcus (IPS) during visual stimuli observation  
 Advisor: **Orban, G.A., PhD**

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|---------------------------------------------------|-------------------|
| <b>Postdoctoral researcher</b>                    | Feb 2014-Jan 2015 |
| Department of Neuroscience, University of Catania | Catania, Italy    |

Investigating single neurons properties of monkey's prefrontal cortex  
 Advisor: **Perciavalle, V., MD**

|                                                                    |                   |
|--------------------------------------------------------------------|-------------------|
| <b>Postdoctoral researcher</b>                                     | Apr 2013-Jan 2015 |
| Department of Neuroscience, University of Modena and Reggio Emilia | Modena, Italy     |

Investigating single neurons properties of monkey's prefrontal cortex  
 Advisor: **Lucchetti, C., PhD**

|                                                |                   |
|------------------------------------------------|-------------------|
| <b>PhD student</b>                             | Jan 2011-Jan 2012 |
| Department of Psychology, Princeton University | Princeton, USA    |

Investigating EMG activity during facial expressions in monkeys  
 Advisor: **Ghazanfar, A.A., PhD**

|                                                                    |                   |
|--------------------------------------------------------------------|-------------------|
| <b>PhD student</b>                                                 | Jan 2010-Apr 2013 |
| Department of Neuroscience, University of Modena and Reggio Emilia | Modena, Italy     |

Investigating single neurons properties of monkey's prefrontal cortex  
 Advisor: **Lucchetti, C., PhD**

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| <b>Internship</b>                                                  | Apr 2005-Dec 2010 |
| Department of Neuroscience, University of Modena and Reggio Emilia | Modena, Italy     |

Investigating single neurons properties of monkey's prefrontal cortex  
 Advisor: **Bon, L., PhD**

### **Awards and Honors**

|                                      |              |
|--------------------------------------|--------------|
| Research fellow, University of Turin | 2019         |
|                                      | Turin, Italy |

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| Fellowship, University of Parma | 2016-2009    |
|                                 | Parma, Italy |

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| Fellowship, University of Parma | 2015-2016    |
|                                 | Parma, Italy |

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| Fellowship, University of Parma | 2014-2015    |
|                                 | Parma, Italy |

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| Fellowship, University of Catania | 2014-2015      |
|                                   | Catania, Italy |

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| Undergraduate Scholarships | 2003-2009     |
|                            | Modena, Italy |

### **Certificates**

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|-------------------------------------------------------------------------|--------------------|
| • Blackrock Microsystems Utah Array & MicroFlex Array Surgical Workshop | Nov 2018           |
|                                                                         | Amsterdam, Holland |

- Laboratory animal science course on Primates according to FELASA guidelines – Functions A and B-organized by EUPRIM-Net  
Apr 2016  
Gottingen, Germany

### **Teaching activities**

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|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Cognitive Neuroscience,<br>Department of Life Sciences, Faculty of Evolution in the Animal and Human behavior (ECAU)<br>University of Turin | 2019-present<br>Turin, Italy |
| Laboratory of Psychophysiology,<br>Department of Psychology, Faculty of Sciences and Psychological Techniques<br>University of Turin        | 2019-present<br>Turin, Italy |
| Laboratory of Neuropsychology,<br>Department of Psychology, Faculty of Sciences and Psychological Techniques<br>University of Turin         | 2019-2020<br>Turin, Italy    |
| Physiology,<br>Department of Neuroscience, Faculty of Medicine and Surgery<br>University of Modena and Reggio Emilia                        | 2013-2014<br>Modena, Italy   |

### **Publications**

Publications as first author

- **Lanzilotto, M.**, Maranesi, M., Livi, A., Ferroni, C.G., Orban, G., Bonini, L. (2020). Stable readout of observed actions from format-dependent activity of monkey's anterior intraparietal neurons. *Proceeding of National Academy of Sciences (PNAS)*, *In press*
- **Lanzilotto, M.**, Ferroni, C.G., Livi, A., Gerbella, M., Maranesi, M., Borra, E., Passarelli, L., Gamberini, M., Fogassi, L., Bonini, L., Orban, G. (2019). Anterior Intraparietal Area: A Hub in the Observed Manipulative Action Network. *Cerebral Cortex*, 29(4),1816-1833
- Livi, A.<sup>1</sup>, **Lanzilotto, M.**<sup>1</sup>, Maranesi, M., Fogassi, L., Rizzolatti, G., Bonini, L. (2019). Agent-based representations of objects and actions in the monkey pre-supplementary motor area. *Proceeding of National Academy of Sciences (PNAS)*, 116(7), 2691-2700. <sup>1</sup>Equal Contribution
- **Lanzilotto, M.**, Gerbella, M., Perciavalle, V., Lucchetti, C. (2017). Neuronal Encoding of Self and Others' Head Rotation in the Macaque Dorsal Prefrontal Cortex. *Scientific Report*, 7(1), 8571
- **Lanzilotto, M.**<sup>1</sup>, Livi, A.<sup>1</sup>, Maranesi, M., Gerbella, M., Falk, B., Ruther, P., Fogassi, L., Rizzolatti, G., Bonini, L. (2016). Extending the Cortical Grasping Network: Pre-supplementary Motor Neuron Activity During Vision and Grasping of Objects. *Cerebral Cortex*, 26(12), 4435-4449. <sup>1</sup>Equal Contribution
- **Lanzilotto, M.**, Perciavalle, V., Lucchetti, C. (2015). Evidence for a functional subdivision of Premotor Ear-Eye Field (Area 8B). *Frontiers in Behavioral Neuroscience*, 8(454), 1-20
- **Lanzilotto, M.**, Perciavalle, V., Lucchetti, C. (2015). Orienting Movement in area 9 Identified by Long Train ICMS. *Brain Structure and Function*, 220(2), 763-779
- **Lanzilotto, M.**, Perciavalle, V., Lucchetti, C. (2013). Auditory and visual systems organization in Brodmann Area 8 for gaze shift control: where we do not see, we can hear. *Frontiers in Behavioral Neuroscience*, 7(198),1-3
- **Lanzilotto, M.**, Perciavalle, V., Lucchetti, C. (2013). A New Field in Monkey's Frontal Cortex: Premotor Ear Eye Field (PEEF). *Neurosci Biobehav Review*, 37(8),1434-1444

#### Other publications as co-author

- Albertini, D.<sup>1</sup>, Gerbella, M.<sup>1</sup>, **Lanzilotto, M.**, Livi, A., Maranesi, M., Ferroni, C.G., Bonini, L. (2020). Connectional gradients underlie functional transitions in monkey pre-supplementary motor area. *Progress in Neurobiology*, 184:101699. <sup>1</sup>Equal contribution
- Ferroni, C.G., Maranesi, M., Livi, A., **Lanzilotto, M.**, Bonini, L. (2017). Comparative Performance of Linear Multielectrode Probes and Single-tip Electrodes for Intracortical Microstimulation and Single-neuron Recording. *Front. Syst. Neurosci.*, 11(84)
- Barz, F., Livi, A., **Lanzilotto, M.**, Maranesi, M., Bonini, L., Paul, O., Ruther, P. (2017). Versatile, modular three-dimensional microelectrode arrays for neuronal ensemble recordings: from design to fabrication, assembly, and functional validation in non-human primates. *J. Neural Eng.*, 14: 036010
- Pothof, F., Bonini, L., **Lanzilotto, M.**, Livi, A., Fogassi, L., Orban, G.A., Paul, O., Ruther, P. (2016). Chronic neural probe for simultaneous recording of single-unit, multi-unit, and local field potential activity from multiple brain sites. *J. Neural Eng.*, 13 (4)
- Shepherd, S.V., **Lanzilotto, M.**, Ghazanfar, A.A. (2012). Facial Muscle Coordination in Monkeys During Rhythmic Facial Expression and Ingestive Movement. *Journal of Neuroscience*, 32(18), 6105-6116
- Lucchetti, C., **Lanzilotto, M.**, Perciavalle, V., Bon, L. (2012). Neuronal activity reflecting progression of trials in the pre-supplementary motor area of Macaque monkey: an expression of neuronal flexibility. *Neuroscience Letters*, 506(1), 33-38
- Lucchetti, C., **Lanzilotto, M.**, Bon, L. (2008). Auditory-motor and cognitive aspects in area 8B of macaque monkey's frontal cortex: a premotor ear-eye field (PEEF). *Exp Brain Res*, 186 (1), 131-141

#### Book Chapters

- Bon, L., **Lanzilotto, M.**, Lucchetti, C. (2009). PEEF: Premotor Ear-Eye Field. A New Vista of Area 8B. In: Lorenzo Lograsso and Giovanni Moretti, "Prefrontal Cortex: Roles, Interventions and Traumas". *Nova Science Publishers*, p. 157-175

#### Invited Talks

- **Evidence for object-mirroring mechanism specificity in monkey's mirror neuron network** Sept 2019  
FEPS and Italian Physiological Society Bologna, Italy
- **Beyond the dorsolateral grasping network: comparative properties between area F6 and F5 neurons during vision and grasping of objects** Nov 2016  
Society for Neuroscience San Diego, USA
- **Cylindrical Probes: high order validation** Sept 2016  
Neuroseeker Meeting Budapest, Hungary
- **Visuo-motor processing of graspable and non-graspable objects in pre-supplementary motor neurons of the macaque** Sept 2015  
66<sup>th</sup> SIF National Congress Genova, Italy
- **Recording of single neuron activity in monkeys with Cylindrical Probes** Sept 2015  
Neuroseeker Meeting Lyon, France
- **Orienting Movements in Area 9 Identified by Long Train ICMS** July 2013  
University of Parma Parma, Italy
- **Bladder Emptying** 2012  
Faculty of Medicine and Surgery, University of Modena and Reggio Emilia Modena, Italy

- **The neural correlates of auditory orienting in macaque monkey: a role for PEEF in species specific vocalization recognition and head motor control**  
SIF National Congress June 2012  
Sestri Levante, Italy
- **PEEF: A New Vista of Area 8B**  
Princeton University June 2011  
Princeton, USA
- **The physiology of Human hypothalamic-pituitary axis**  
Faculty of Medicine and Surgery, University of Modena and Reggio Emilia 2010  
Modena, Italy
- **The physiology of Human sexual hormones**  
Faculty of Medicine and Surgery, University of Modena and Reggio Emilia 2010  
Modena, Italy
- **May the Warning Auditory-Visual Neurons Help the Monkey to Play the Piano?**  
59<sup>th</sup> SIF National Congress Sept 2008  
*Acta Physiologica Journal* vol 194 p. 29-30  
Cagliari, Italy

## **Poster presentation**

Abstract in International Conferences (presenter)

- **View-dependent processing of observed manipulative action in the monkey anterior intraparietal area (AIP)**  
Lanzilotto, M., Maranesi, M., Livi, A., Ferroni, C.G., Bonini, L., Orban, G.A.  
*Society for Neuroscience*, Chicago, USA, 2019
- **Evidence for object-mirroring mechanism specificity in monkey's mirror neuron network**  
Lanzilotto, M., Livi, A., Maranesi, M., Ferroni, C.G., Bonini, L.  
*Italian Society of Physiology*, Bologna, Italy, 2019
- **Neuronal selectivity for observed hand actions in monkey's anterior intraparietal area**  
Lanzilotto, M., Maranesi, M., Livi, A., Ferroni, C.G., Fogassi, L., Bonini, L., Orban, G.A.  
*Society for Neuroscience*, Washington, USA, 2017
- **Visuo-motor processing of graspable and non-graspable objects in pre-supplementary motor neurons of the macaque**  
Lanzilotto, M., Livi, A., Maranesi, M., Ruther, P., Barz, F., Fogassi, L., Rizzolatti, G., Bonini L.  
*Italian Society of Physiology*, Genova, Italy, 2015
- **The neural correlates of auditory orienting in macaque monkey: a role for PEEF in species-specific vocalization recognition and head motor control**  
Lanzilotto, M., Bon, L., Perciavalle, V., Lucchetti, C.  
*Italian Society of Physiology*, Sestri Levante, Italy, 2012
- **The Neural Correlates of Social Communication: Role of PEEF in Auditory Orienting**  
Lanzilotto, M., Bon, L., Perciavalle, V., Lucchetti, C.  
*Italian Society of Neuroscience*, Catania, Italy, 2012
- **Motor dynamics during monkey facial movement and expressive signaling**  
Shepherd, S.V., Lanzilotto, M., Ghazanfar, A.A.  
*Society for Neuroscience*, Washington DC, USA, 2011
- **Neglect Syndrome for Aversive and Pleasant Stimuli in A Macaque Monkey with PEEF Lesion**  
Croazzo, G., Lanzilotto, M., Bon, L., Perciavalle, V., Terlizzi, V., Lucchetti, C.  
*Italian Society of Physiology*, Siena, Italy, 2009  
*Acta Physiologica Journal* vol. 197 p. 49.
- **Conceptual mirror neurons in monkey's pre-supplementary motor area**  
Lanzilotto, M., Bon, L., Lucchetti, C.  
*Italian Society of Physiology*, Lecce, Italy, 2007  
*Acta Physiologica Journal* vol 191, p. 80,

Abstract in International Conferences (co-author, only most recent)

- **The NeuroEthoRoom: a new tool for neurobehavioral studies in freely behaving monkeys**  
Lanzarini, F., **Lanzilotto, M.**, Bonini, L.  
*Society for Neuroscience*, Chicago, USA, 2019
- **Connectional gradients underlie functional transitions in 1 monkey pre-supplementary motor area**  
Albertini, D., Gerbella, M., **Lanzilotto, M.**, Livi, A., Maranesi, M., Ferroni, C.G., Bonini, L.  
*Society for Neuroscience*, Chicago, USA, 2019
- **Linkage of multiple sensory and motor properties in single neuron activity of the macaque anterior intraparietal area**  
Maranesi, M., **Lanzilotto, M.**, Livi, A., Ferroni, C.G., Albertini, D., Bonini, L.  
*Society for Neuroscience*, Chicago, USA, 2019
- **Sensory and motor properties of physiologically identified neuronal classes in multiple areas of the parieto-frontal grasping network**  
Ferroni, C.G., Maranesi, M., Livi, A., **Lanzilotto, M.**, Albertini, D., Bonini, L.  
*Society for Neuroscience*, Chicago, USA, 2019
- **Local neural population dynamics rely on specific connectivity patterns in monkey pre-supplementary motor area**  
Albertini, D., Gerbella, M., **Lanzilotto, M.**, Livi, A., Maranesi, M., Ferroni, C.G., Bonini, L.  
*Italian Society of Physiology*, Bologna, Italy, 2019
- **Anatomo-functional evidence on the role of pre-supplementary motor area F6 in the extended the cortical grasping network**  
Gerbella, M., **Lanzilotto, M.**, Maranesi, M., Livi, A., Ferroni, C.G., Bonini, L.  
*Society for Neuroscience*, Washington, USA, 2017
- **Anterior intraparietal (AIP) neurons encode actions and pantomimes from dynamic and static stimuli**  
Maranesi, M., **Lanzilotto, M.**, Livi, A., Ferroni, C.G., Andujar, M., Bonini, L.  
*Society for Neuroscience*, Washington, USA, 2017
- **Barriers in the brain: pragmatic representation of objects by single neurons of the cortical grasping network**  
Livi, A., **Lanzilotto, M.**, Ferroni, C.G., Maranesi, M., Bonini, L.  
*Society for Neuroscience*, Washington, USA, 2017

## **Mentoring**

### **PhD Students**

- Francesca Lanzarini (University of Parma)
- Benedetta Zattera (University of Turin)
- Davide Albertini (University of Parma)
- Alessandro Livi (University of Parma, currently Washington University in St. Luis)
- Graziella Croazzo (University of Catania)

### **Master Students**

- Eleonora Bano (University of Parma, currently Washington University in St. Luis)
- Alessia Sepe (University of Parma)
- Michele Grignaffini (University of Parma)
- Marco Stucchi (University of Parma)
- Anna Bertucci (University of Parma)
- Vincenzo Terlizzi (University of Modena and Reggio Emilia, currently Groningen University)

## **Review activities**

- Editorial Board, Frontiers in Auditory Cognitive Neuroscience (Review Editor) 2017-present
- Editorial Board, Frontiers in Neuroscience (Review Editor) 2017-present
- Editorial Board, Frontiers in Psychology (Review Editor) 2017-present
- Editorial Board, Frontiers in Human Neuroscience (Review Editor) 2017-present

## **Occasional Reviewer**

- Frontier in Neurorobotics 2014-present
- Neurological Science 2014-present
- Plos One 2014-present
- Neurobiology of Learning and Memory 2014-present

## **Memberships of scientific societies**

- Society for Neuroscience - SfN 2011- present
- The Physiological Society of Italy - SIF 2007-2019
- Ordine Nazionale dei Biologi - ONB 2014-2018

## **Technical Skills**

- Decoding Analysis and Machine Learning
- PCA (principal component analysis)
- Ocular search coil recording (recording of ocular movements through magnetic field)
- Single unit, multiunit and LFP
- Intracortical microstimulation
- EMG recording
- Data analysis

## **Software Knowledge**

- Matlab Programming
- Simi Reality Motion System GmbH (Markerless Motion Capture 3D for both Human and Monkey)
- Deuteron Technologies (multichannel neural activity wireless recording)
- Plexon System (multichannel neural activity recording)
- Neuroexplorer System (neural activity analysis)
- Offline Sorter Software (sorter of single neurons)
- OpenEphys System (multichannel neural activity recording)
- Statistica software
- Microsoft Office
- Windows and Macintosh

## **Language Proficiency**

Italian (Native Language)

English (Written good, Spoken good)

## **Research Support**

- **ERC Consolidator Grant 2017 (Grant Agreement 772953)** August 2018-July 2023  
Marco Tamietto (PI)  
Role: Research Fellow
- **ERC Starting Grant 2015 (Grant Agreement 678307)** October 2016-Sept 2021  
Luca Bonini (PI)  
Role: Key Postdoctoral fellow

- **FET grant 2012 (Grant Agreement 600925)**  
Guy Orban (PI)  
Role: Key Postdoctoral fellow
- **ERC grant 2009 (Grant Agreement 250013)**  
Giacomo Rizzolatti (PI)  
Role: Postdoctoral fellow

January 2013- June 2017

May 2010- April 2015