

CURRICULUM VITAE



PERSONAL INFORMATION

First and Last Name

Monica Maranesi

Date and Place of Birth

27/04/1981 – Brescia (BS), Italy

Office Phone

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Office Address

Via Volturmo 39/E, Parma (PR), Italy

Email

monica.maranesi@unipr.it

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Scholar Profile

<https://scholar.google.it/citations?user=yZwefSwAAAAJ&hl=it&oi=ao>

Academic seniority: 14 years post-PhD

Bibliometric indices (Scopus)

31 authored documents: 28% as first author and 72% as co-author. H-index: 20. Citations: 1052.

Measures of impact: 61.1% (n=11) of the documents in the top 25% most cited documents worldwide.

Current Position

Tenure Track Researcher

EDUCATION

2007-2011

PhD in Neuroscience, University of Parma

2006

Degree in Psychology, summa cum laude, University of Parma

PREVIOUS POSITIONS

2022-2025

Animal Welfare Delegate at the Primate Facility of the University of Parma.

2024-present

Tenure Track Researcher, University of Parma

2019-2023

Fixed-term Researcher, University of Parma

2017-2019

Senior Post-doc, University of Parma

2012-2017

Junior Post-doc at the Italian Institute of Technology (IIT)

RECOGNITIONS & AWARDS

2017

National Scientific Qualification as Associate Professor in Psychobiology

DIRECTION OF FUNDED RESEARCH PROJECTS	2017	National Scientific Qualification as Associate Professor in Physiology
	2022	€ 105.984 – PRIN 2022 (MUR) “Motor resonance during action planning and social interactions: from single neurons to brain circuits”. National coordinator.
	Main Participation in Funded Research Projects	
	2020	Consolidator Grant 2022 (101002704), PI Prof. Luca Bonini.
	2017	FARE Grant (MIUR), PI Prof. Luca Bonini.
SUPERVISION OF STUDENTS, PHD CANDIDATES, AND POST-DOCS	2016	Starting Grant 2015 (678307), PI Prof. Luca Bonini.
	2010	ERC Advanced Grant (FP7 – 250013 – Cogsystem). PI Prof. Giacomo Rizzolatti.
	2019 to date	More than 20 undergraduate Master Degree students in Psychology, Neurobiology or Pharmacology for the preparation and defense of their thesis. More than 20 undergraduate Bachelor Degree students in Exercise and Sports Sciences for the preparation and defense of their thesis.
	NATIONAL & INTERNATIONAL SCIENTIFIC COLLABORATIONS	
	2022 to date	Prof. Guido Barchiesi, University of Milan (Italy). Collaboration in a national project.
TEACHING	2021 to date	Prof. Silvestro Micera and Alberto Mazzoni, Sant’Anna School of Advanced Studies in Pisa (Italy). 1 co-authored publication.
	2025 to date	Professor of Neural Bases of Sensorimotor and Socio-cognitive Functions in the Bachelor's Degree Program in Psychology at the University of Parma.
	2024 to date	Professor of Animal and Comparative Psychobiology in the Master's Degree Program in Psychobiology and Cognitive Neuroscience at the University of Parma.
	2019 to date	Professor of Sport Psychobiology in the Bachelor's Degree Program in Exercise and Sports Sciences at the University of Parma.
	2023 to date	Professor of Neurophysiology at the "Academy of Developmental Neuropsychology" (ANSVI), Parma.

MEMBERSHIP IN
SCIENTIFIC SOCIETIES

2024 to date

International Society for Neuroethology (ISN)

2012 to date

Society for Neuroscience (SfN)

EDITORIAL AND
REVIEWING ACTIVITIES

Member of the Editorial Board of Frontiers in Neuroscience

Reviewer for various indexed international journals (alphabetical order)

1. Brain Structure and Function
2. eLife
3. Journal of Neural Engineering
4. Journal of Cognitive Neuroscience
5. Neuroimage
6. Psychological Research
7. Psychological Review
8. Scientific Reports

SYMPOSIA
ORGANIZER/SPEAKER

2023

“Neurobiology of social interactions: integration of ecological and neurophysiological approach”. Proponent: **Maranesi, M.** Second Chair: Genovesio, A. Speakers: **Maranesi, M.**, Palagi, E., Dal Monte, O. *Congresso Nazionale della Società Italiana di Neuroscienze, Torino, Italy*

2014

“Distinction between own and other's grasping hand in the ventral premotor cortex”. *Federation of European Neuroscience Societies (FENS), Milano, Italy*

2013

“Space-dependent representation of objects and other's actions in monkey ventral premotor grasping neurons.”. *Federation of European Neuroscience Societies (FENS), Milano, Italy*

2011

“Anatomo-functional organization of the lateral agranular frontal cortex in the macaque monkey”. *Primate Neurobiology Meeting, Göttingen, Germany*

PRESENTER OF POSTER IN
INTERNATIONAL
CONFERENCES

2009 to date

Linkage of multiple sensory and motor properties in single neuron activity of the macaque anterior intraparietal area. **Maranesi M.**, Lanzilotto M., Ferroni C. G., Livi A, Albertini D., Bonini L. *Society for Neuroscience (SFN), Chicago, IL, 2019.*

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 (SFN), Washington, DC, 2017.*

Time course of affordances processing in macaque ventral premotor neurons. **Maranesi M.**, Bruni S., Livi A., Fogassi L., Rizzolatti G., Bonini L. *Society for Neuroscience (SFN), Washington, DC, 2014.*

Influence of the sight of monkey's own acting hand on the motor discharge of mirror neurons **Maranesi M.**, Livi A., Caselli L., Fogassi L., Rizzolatti G.,

Bonini L. *Society for Neuroscience (SFN), New Orleans, LA, 2012.*

Monkey dorsal premotor neurons can discharge during execution and observation of a reach-to-grasp motor task. **Maranesi M.**, Caselli L., Livi A., Bimbi M., Fogassi L., Rizzolatti G., Bonini L. *Federation of European Neuroscience Societies (FENS), Barcellona, Spagna, 2012.*

Monkey gaze behavior during action observation and its relationship with mirror neurons activity. **Maranesi M.**, Ugolotti Serventi, F., Bimbi, M., Bruni, S., Fogassi, L., Bonini, L. *Society for Neuroscience (SFN), Washington, DC, 2011.*

Influence of the gaze direction of an observed agent on the visual discharge of grasping mirror neurons in macaque monkey **Maranesi M.**, Ugolotti F., Bonini L., Simone L., Rozzi S., Ferrari PF., Fogassi L. *The Primate Mind, Erice, Italia, 2009.*

**CO-AUTHOR OF POSTER IN
INTERNATIONAL
CONFERENCES**

Pragmatic representations of self and other's action in the monkey putamen. Rotunno C., Reni M., Ferroni C., Ismaiel E., Ballestrazzi G., Borra E., **Maranesi M.**, Bonini L. *Annual Meeting of the Society for the Neural Control of Movement, Panama (Panama), 2025.*

Neural correlates of walking and reaching in the monkey lateral frontal cortex. Albertini D., Sini R., Tili F., Lanzarini F., **Maranesi M.**, Bonini L. *Annual Meeting of the Society for the Neural Control of Movement, Panama (Panama), 2025.*

Predicting spontaneous behaviors in freelymoving monkeys from intracortical recordings. Rondoni E.H., Lanzarini F., **Maranesi M.**, Albertini D., Bonini L., Mazzoni A. *Society for Neuroscience (SFN), Chicago, IL, 2024.*

From walking to reaching: single neurons and population dynamics in monkey lateral frontal cortex. Sini R., Albertini D., Lanzarini F., Tili F., **Maranesi M.**, Bonini L. *Society for Neuroscience (SFN), Chicago, IL, 2024.*

2009 to date

Pragmatic representation of self and other's action in the monkey putamen. Rotunno C., Reni M., Ferroni C.G., Bonini L., **Maranesi M.** *Society for Neuroscience (SFN), Chicago, IL, 2024.*

Neural dynamics of spontaneous walking: insights from macaque motor cortex activity. Sini R., Albertini D., Lanzarini F., **Maranesi M.**, Bonini L. *International congress of neuroethology, Berlin, Germany, 2024.*

Neural fingerprints of grasping actions in the monkey premotor cortex in head-fixed, head-free, and freely moving contexts. Ismaiel E., Ferretti E., **Maranesi M.**, Bonini L. *National Congress of Italian Society of Physiology, Rome, Italy, 2024.*

Single-neuron encoding of self and other's actions in the monkey putamen. Reni M., Rotunno C., Ferroni C.G., **Maranesi M.**, Bonini L. *CAOs Workshop on CONCEPTS, ACTIONS, and OBJECTS, Rovereto (TN), 2024.*

Neuronal correlates of spontaneous walking in the monkey ventral premotor cortex. Sini, R., Albertini, D., Lanzarini, F., **Maranesi, M.**, Bonini, L. *Society*

for Neuroscience (SFN), Washington, DC, 2023.

Premotor coding of natural behaviors in freely moving monkeys. Albertini, D., Lanzarini, F., **Maranesi, M.**, Rondoni, E.H. Lanzilotto, M., Mazzoni, A., Bonini, L. *Society for Neuroscience (SFN), Washington, DC, 2023.*

Yawn selective neurons in the monkey ventral premotor cortex. Ferretti, E., Lanzarini, F., **Maranesi, M.**, Bonini, L. *Society for Neuroscience (SFN), Washington, DC, 2023.*

Neuronal representations of self and other's action in the monkey putamen. Rotunno, C., Reni, M., Ferroni, C.G., Bonini, L. **Maranesi, M.** *Society for Neuroscience (SFN), Washington, DC, 2023.*

Neuronal encoding of reaching-grasping actions in the monkey putamen. Reni, M., Rotunno, C., Ferroni, C.G., Bonini, L., **Maranesi, M.** *Society for Neuroscience (SFN), Washington, DC, 2023.*

Memory-driven coding of graspable objects in monkey parieto-frontal areas. Mitola, A., **Maranesi, M.**, Bonini, L., Lanzilotto, M. *Society for Neuroscience (SFN), Washington, DC, 2023.*

Neurophysiological correlates of peripersonal space representation in human and non-human primates. Fitzpatrick, A.M., Bufacchi, R., Lanzarini, F., Albertini, D., **Maranesi, M.**, Novembre, G., Bonini, L., Iannetti, G. *National Congress of the Italian Society for Neuroscience, Torino, Italia, 2023.*

Neurons responsive to yawn in the monkey ventral premotor cortex. Ferretti, E., Lanzarini, F., **Maranesi, M.**, Bonini, L. *National Congress of the Italian Society for Neuroscience, Torino, Italia, 2023.*

Monkey ventral premotor cortex generates rhythmic activity during spontaneous walking. Sini, R., Albertini, D., Lanzarini, F., **Maranesi, M.**, Bonini, L. *National Congress of the Italian Society for Neuroscience, Torino, Italia, 2023.*

Memory-driven coding of objects in the monkey parieto-frontal grasping network. Mitola, A., **Maranesi, M.**, Bonini, L., Lanzilotto, M. *National Congress of the Italian Society for Neuroscience, Torino, Italia, 2023.*

Neuronal signals for self and other's action in the monkey putamen. Reni, M., Rotunno, C., Ferroni, C.G., Di Volo, M., Bonini, L., **Maranesi, M.** *National Congress of the Italian Society for Neuroscience, Torino, Italia, 2023.*

Neuronal signals for self and other's action in the monkey putamen. Rotunno, C., Ferroni, C.G., Reni, M., Di Volo, M., Bonini, L., **Maranesi, M.** *Primate Neurobiology Meeting, Göttingen, Germania, 2023.*

Visuo-tactile place fields of macaques' ventral premotor neurons. Albertini, D., **Maranesi, M.**, Lanzarini, F., Bonini, L. *Comparative neurobiology of higher cognitive functions, Erice, Italia, 2022.*

Neural correlates of yawning in the monkey ventral premotor cortex. Ferretti, E., Lanzarini, F., Albertini, D., **Maranesi, M.**, Bonini, L. *Comparative neurobiology of higher cognitive functions, Erice, Italia, 2022.*

Neuronal signals for self and other's action in the monkey putamen. Rotunno, C., Ferroni, C.G., Di Volo, M., Reni, M., Bonini, L., **Maranesi, M.** *Comparative neurobiology of higher cognitive functions, Erice, Italia, 2022.*

Neuronal representations of self and other's action in the monkey basal ganglia. Rotunno, C., **Maranesi, M.**, Ferroni, C.G., Di Volo, M., Reni, M., Bonini, L. *Federation of European Neuroscience Societies (FENS), Parigi, Francia, 2022.*

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 (SFN), Chicago, IL, 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 (SFN), Chicago, IL, 2019.*

View-dependent processing of observed manipulative action in the monkey anterior intraparietal area (AIP). Lanzilotto M., **Maranesi, M.**, Livi A., Ferroni C. G., Fogassi L., Bonini L., Orban G. A. *Society for Neuroscience (SFN), Chicago, IL, 2019.* Abs 404.03

Connectional gradients underlie functional transitions in monkey pre-supplementary motor area. Albertini D., Gerbella M., Lanzilotto M., Livi A., **Maranesi, M.**, Ferroni C. G., Bonini L. *Society for Neuroscience (SFN), Chicago, IL, 2019.*

A visual-to-motor gradient in AIP: An anatomo-functional study. Ferroni C. G., Gerbella M., Lanzilotto M., **Maranesi, M.**, Livi A., Borra E., Fogassi L., Bonini L., Orban G. A. *Society for Neuroscience (SFN), Washington, DC, 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 (SFN), Washington, DC, 2017.*

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 (SFN), Washington, DC, 2017.*

Anatomo-functional evidence on the role of pre-supplementary motor area F6 in the extended cortical grasping network. Gerbella M., Lanzilotto M., **Maranesi, M.**, Livi A., Ferroni C. G., Bonini L. *Society for Neuroscience (SFN), Washington, DC, 2017.*

Beyond the dorsolateral grasping network: comparative properties between area F6 and F5 neurons during vision and grasping of objects. Lanzilotto M., **Maranesi, M.**, Livi A., Gerbella M., Fogassi L., Rizzolatti G., Bonini L. *Society for Neuroscience (SFN), Washington, DC, 2017.*

Functional properties of mirror neurons of the monkey presupplementary motor area f6. Livi A., Lanzilotto M., **Maranesi, M.**, Gerbella M., Fogassi L., Rizzolatti G., Bonini L. *Society for Neuroscience (SFN), Washington, DC, 2017.*

Visuo-motor processing of objects in pre-supplementary motor area F6 neurons of the macaque. Bonini L., Livi A., Lanzilotto M., **Maranesi, M.**, Ruther P., Barz F., Fogassi L., Rizzolatti G. *Society for Neuroscience (SFN), Chicago, IL, 2015.* Abs 601.14/L36

Mirror neurons responding to inaction in the monkey ventral premotor cortex. Bonini L., Maranesi M., Livi A., Fogassi L., Rizzolatti G. *Society for*

**PUBLICATIONS –
INTERNATIONAL JOURNAL
ARTICLES**

- Neuroscience (SFN), San Diego, CA, 2013.*
- Functional characterization of monkey ventral premotor grasping neurons classes during execution and observation of a visuo-motor task. Bonini L., **Maranesi, M.**, Caselli L., Livi A., Bimbi M., Fogassi L., Rizzolatti G. *Society for Neuroscience (SFN), New Orleans, LA, 2012.*
- Ventral premotor cortex of the macaque monkey controls conditioned vocalization. Coudé G., Ferrari PF., Rodà F., **Maranesi, M.**, Rozzi S., Fogassi L., *Society for Neuroscience (SFN), Chicago, IL, 2009*
- Neuronal responses during vocalization in the ventral premotor cortex of macaque monkeys. Coudé G., Ferrari PF., Rodà F., **Maranesi, M.**, Veroni V., Monti F., Rizzolatti G., Fogassi L. *Society for Neuroscience (SFN), San Diego, CA, 2007.*
- Tufted Capuchin Monkeys (*Cebus apella*) Prefer Variety when Dealing with Objects and Food. Addressi E., **Maranesi, M.**, Visalberghi E. *XVIII Congresso dell'Associazione Primatologica Italiana (API), Calci, Italia, 2007.*
- 2025 Tili F. **Maranesi M.** Lanzilotto M. Ferroni C.G. Livi A. Bonini L. Albertini D. (2025). Mirror Neurons in Monkey Frontal and Parietal Areas. *Scientific Data*
- 2025 Lanzarini F.* **Maranesi M.*** Rondoni E.H.* Albertini A.* Ferretti E. Lanzilotto M. Micera S. Mazzoni A. Bonini L. (2025). Neuroethology of natural actions in freely moving monkeys. *Science* 387(6730):214-220. *These authors contributed equally to this work
- 2024 **Maranesi M.** Lanzilotto M. Arcuri E. Bonini L. (2024). Mixed selectivity in monkey anterior intraparietal area during visual and motor processes. *Prog Neurobiol.* 236:102611.
- 2021 Albertini D. Lanzilotto M. **Maranesi M.** Bonini L. (2021). Largely shared neural codes for biological and nonbiological observed movements but not for executed actions in monkey premotor areas. *J Neurophysiol.* 126(3):906-912.
- 2021 Ferroni C.G. Albertini D. Lanzilotto M. Livi A. **Maranesi M.** Bonini L. (2021). Local and system mechanisms for action execution and observation in parietal and premotor cortices. *Curr Biol* S0960-9822(21)00547-9.
- 2020 Lanzilotto, M., **Maranesi, M.**, Livi, A., Ferroni, C.G., Orban, G.A., Bonini, L. (2020). Stable readout of observed actions from format-dependent activity of monkey's anterior intraparietal neurons. *Proceedings of the National Academy of Sciences* 117(28):16596-16605.
- 2020 Albertini D. Gerbella M. 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.
- 2019 **Maranesi M.*** Bruni S.* Livi A. Donnarumma F. Pezzulo G. **Bonini L.** (2019). Differential neural dynamics underlying pragmatic and semantic affordance processing in macaque ventral premotor cortex. *Sci Rep* 9(1):11700. *These authors contributed equally to this work
- 2019 Lanzilotto M. Giulia Ferroni C. Livi A. Gerbella M. **Maranesi M.** Borra E. Passarelli L. Gamberini M. Fogassi L. Bonini L. Orban G.A. (2019). Anterior intraparietal area: a hub in the observed manipulative action network. *Cereb*

Cortex 29(4):1816-1833.

- 2019 Livi A. Lanzilotto M. **Maranesi M.** Fogassi L. Rizzolatti G. Bonini L. (2019). Agent-based representations of objects and actions in the monkey pre-supplementary motor area. *Proceedings of the National Academy of Sciences* 116(7):2691-2700.
- 2018 Bruni S. Gerbella M. Bonini L. Borra E. Coudé G. Ferrari P.F. Fogassi L. **Maranesi M.** Rodà F. Simone L. Serventi F.U. Rozzi S. (2018). Cortical and subcortical connections of parietal and premotor nodes of the monkey hand mirror neuron network. *Brain Struct Funct* 223(4):1713-1729.
- 2017 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 in macaque monkey. *Front Syst Neurosci.* 10.3389/fnsys-2017.00084.
- 2017 **Maranesi M.*** Livi A. * Bonini L. (2017) Spatial and viewpoint selectivity for others' observed actions in monkey ventral premotor mirror neurons. *Sci Rep.* 7(1):8231. *These authors contributed equally to this work
- 2017 Barz F. Livi A. Lanzilotto M. **Maranesi M.** Bonini L. Paul O. Ruther P. (2017) Versatile modular 3D microelectrode arrays for neuronal ensemble recordings: from design to fabrication assembly and functional validation in non-human primates. *J Neural Eng.* 14(3):036010.
- 2016 Lanzilotto M. Livi A. **Maranesi M.** Gerbella M. Barz F. 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. *Cereb Cortex* 26(12):4435-4449.
- 2015 **Maranesi M.** Livi A. Bonini L. (2015) Processing of own hand visual feedback during object grasping in ventral premotor mirror neurons. *J Neurosci* 35(34):11824-11829.
- 2014 **Maranesi M.** Livi A. Fogassi L. Rizzolatti G. Bonini L. (2014) Mirror neuron activation prior to action observation in a predictable context. *J Neurosci.* 34(45):14827-32.
- 2014 Bonini L.* **Maranesi M.*** Livi A. Fogassi L. Rizzolatti G. (2014) Ventral premotor neurons encoding representations of action during self and others' inaction. *Curr Biol.* 24(14):1611-1614. *These authors contributed equally to this work
- 2014 Bonini L. **Maranesi M.** Livi A. Fogassi L. Rizzolatti G. (2014) Space-dependent representation of objects and other's action in monkey ventral premotor grasping neurons. *J. Neurosci.* 34(11):4108-4119.
- 2014 **Maranesi M.** Bonini L. Fogassi L. (2014) Cortical processing of object affordances for self and others' action. *Front Psychol.* 5:538 doi: 10.3389/fpsyg.2014.00538.
- 2014 Uithol S., **Maranesi M.** (2014) No need to match: a comment on Bach, Nicholson and Hudson's "Affordance-Matching Hypothesis". *Front Human Neurosci.* 8:710 doi: 10.3389/fnhum.2014.00710.
- 2013 **Maranesi M.** Ugolotti Serventi F. Bruni S. Bimbi M. Fogassi L. Bonini L. (2013) Monkey gaze behaviour during action observation and its relationship to mirror neuron activity. *Eur J Neurosci.* 38(12):3721-3730.
- 2012 Bonini L. Ugolotti Serventi F. Bruni S. **Maranesi M.** Bimbi M. Simone L. Rozzi S. Ferrari P.F. Fogassi L. (2012) Selectivity for grip type and action goal in macaque inferior parietal and ventral premotor grasping neurons. *J Neurophysiol* 108(6):1607-19.
- 2012 **Maranesi M.** Rodà F. Bonini L. Rozzi S. Ferrari P.F. Fogassi L. Coudé G. (2012) Anatomic-functional organization of the ventral primary motor and

2012

premotor cortex in the macaque monkey. *Eur J Neurosci* 36(10):3376-87.

Macellini S.* **Maranesi M.*** Bonini L. Simone L. Rozzi S. Ferrari P.F. Fogassi L. (2012) Individual and social learning processes involved in the acquisition and generalization of tool-use in macaques. *Phil Trans R Soc* 367(1585):24-36.
*These authors contributed equally to this work

2011

Coudé G. Ferrari P.F. Rodà F. **Maranesi M.** Borelli E. Veroni V. Monti F. Rozzi S. Fogassi L. (2011). Neurons controlling voluntary vocalization in the macaque ventral premotor cortex. *Plos One* 6(11): e26822.

Maternity leave

I took maternity leave twice (in 2015 for 8 months; in 2017 for 6 months).

RESEARCH ACHIEVEMENT AND FUTURE DIRECTIONS

Role of ventral premotor cortex in motor planning and execution

As PhD student I investigated the functional properties of ventral premotor areas F5 and F4 and of primary motor cortex (F1) matched with the cytoarchitectonic parcellation of the recorded region (Maranesi et al 2012, *Eur J Neurosci*): this multidisciplinary approach allowed us to clarify the general anatomo-functional organization of this region, with the caudal areas (F4 and F1) involved in the control of simple movements whereas the rostral area F5 exploiting the individual's motor knowledge for processing observed objects, other's action, the surrounding space (Maranesi et al 2014, *Front Psychol*), or even voluntary vocalization (Coudé et al 2012, *Plos One*). We are able to perform really complex action sequences, capacity that implies neural structures that integrate spatial and temporal features into temporally organized activation and chaining of single motor acts in action sequences: I contributed to both behavioral (Macellini, Maranesi et al, 2012, *Phil Trans Royal Society B*) and electrophysiological (Bonini et al, 2012, *J Neurophysiol*) works in monkeys exploring this issue in an integrated manner.

Cortical processing of object and action observation

Text-book knowledge (e.g. Principle of Neural Sciences by Eric Kandel) strongly derived from works carried out in Parma's laboratories in the '80 and '90 highlight the categorical segregation of neural processing of observed objects and other's actions by distinct neuronal categories, such as canonical neurons and mirror neurons, respectively. A series of work recently carried out by myself (Maranesi et al, 2019, *Scientific Reports*; Maranesi et al, 2015, *J Neurosci*; Maranesi et al, 2014, *Front Psychol Behav Science*) and the research group in which I was involved (Albertini et al, 2021, *J Neurophysiol*; Bonini et al, 2014, *J Neurosci*; Coudé et al, 2011, *PLoS ONE*) revealed a broader mapping of a variety of sensory information at the level of the same single neuron, and the relevance of population activity in the extraction of shared motor codes for a variety of sensory information, encompassing graspable object, self and other's observed actions, and even non biological movements. These findings paved the way to recent hypotheses on a more interactive, rather than perceptual, role of mapping sensory properties in the motor system.

Extension of mirror neuron network.

While most of the work I carried out as a first author was focused on the ventral premotor cortex, I contributed to several papers that highlighted a wider distribution of mirror neurons and action observation properties in the macaque cerebral cortex, encompassing parietal, presupplementary and dorsal premotor cortices, adding neuroanatomical approaches to the physiologically investigated animals to directly trace the anatomical connectivity of functionally-characterized regions.

Development and testing of multi-contact probes.

Most of my research has been performed uniting the scientific investigation to the developing and testing of new concepts and tools for extracellular single neuron recording and stimulation. Indeed, within a long-lasting collaboration of our group with the Dept of Microsystem Engineering of the University of Freiburg, we validated different types of probes and approach to advance and optimize neurophysiological investigations in monkeys. Recently, we adopted these probes also for recording multisite activity from the Putamen nucleus, an approach that will be exploited for this proposal as well.

Mixed selectivity coding and natural action coding.

I recently contributed as first author (Maranesi et al, 2024, *Prog Neurobiol*) to demonstrate that mixed selectivity is a key organizational principle of anterior intraparietal cortex, as well as of ventral and mesial premotor cortex (Livi et al, 2019, *PNAS*).

Investigation of motor cortex during natural actions.

Through my investigation of motor cortical dynamics during naturalistic actions, and my contribution to the neuroethological characterization of complex behaviors in freely moving monkeys (*Lanzarini et al., 2025, Science*), I have developed a solid expertise in combining behavioral and neural data under ethologically relevant conditions. This background enables me to take full advantage of novel technological approaches to explore the neural mechanisms underlying social facilitation (within the framework of an Italian National funded project – PRIN2022).