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• EDUCATION

18.03.1996 M.D. Summa cum laude, University of Milan School of Medicine, Italy
06.02.2001 PhD in Neurophysiology, University of Milan School of Medicine, Italy

• CURRENT POSITIONS

2016-current Full Professor of Human Physiology, University of Milan
2016-current Senior Fellow, Canadian Institute for Advanced Research (CIFAR)
2018-current Scientific Consultant, Department for Severe Brain Injury, IRCCS Fondazione Don Gnocchi, Milan

• PREVIOUS POSITIONS

1999-2000 Assistant Scientist, Department of Physiology (Mircea Steriade), Laval University, Quebec, Canada
2002-2006 Research Associate, Department of Psychiatry (Giulio Tononi), University of Wisconsin, USA
2006-2012 Assistant Professor of Human Physiology, University of Milan
2009-2012 Visiting Professor, ComaScience Group (Steven Laureys), University of Liege, Belgium
2013-2016 Associate Professor of Human Physiology, University of Milan
2015-2017 Guest Professor, ZEN Center for Experimental Neurology (Claudio Bassetti), Bern, Switzerland

• COMPETITIVE FELLOWSHIPS AND AWARDS

2002 Pickwick Post-Doctoral Fellowship, National Sleep Foundation, USA
2006 Sanofi-Aventis Research Award, European Sleep Research Society
2011 Young Investigator Award, World Sleep Foundation
2011 “Premio SIPF”, Italian Psychophysiological Society
2013 James S. McDonnell Scholar Award, USA
2017 Gold Medal “Faustino Savoldi”, Lombardy Institute for Sciences and Letters
2017 Athena Award, by Athena Onlus Foundation (Rome)
2021 Human Brain Project Innovation Award (Bruxelles)
2024 Socio Eletto dell’Accademia Lombarda di Scienze e Lettere (Milan)
2025 Premio per la Teoria e Tecnica Medicina, Fondazione Irti (Rome)
2025 Italian Society for Neuroethics and Philosophy of Neuroscience Award (Munich)
2026 Elected Member of the International Neuropsychological Symposium (*INS*)

• FUNDED PROJECTS (as PI)

2002 EC grant FP6, STREP, LSHM-CT-2005-518189, “Enough sleep”
2006 PRIN 2006 Italian Ministry of Education “Sleep and cortical plasticity”
2007 EC grant FP7 -PEOPLE-2007-4-3-IRG “Spindlesinschizo”
2007 EC grant FP7, STREP, FP7-ICT-2007-2. “PredictAD”
2010 PRIN 2010 Italian Ministry of Education “Connage”
2013 EC grant FP7, ICT – 2011-9, 600806 “Corticonics”
2015 EC grant, H2020 FET Flagship Human Brain Project SGA1 (open call)
2015 EC grant, H2020 FET OPEN-2014-2015-RIA “Luminous”

2017	EC grant, H2020 FET Flagship Human Brain Project SGA2
2020	EC grant, H2020 FET Flagship Human Brain Project SGA3
2022-current	PNRR Infrastrutture “EBRAINS Italy”
2022- current	ERC Synergy Grant “NEMESIS”

• BIBLIOMETRICS

Google Scholar:

H-Index: 81

Total number of citations: 34800

I10-index: 142

• SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

2006-2026 35 PhD students and 29 Post-doctoral fellows (12 are currently faculty)

• ORGANISATION OF SCIENTIFIC MEETINGS

2013	Organizer (with Prof. Risto Illmoniemi) TMS-EEG Summer School and Workshop “Coupling the dynamics of the human brain with TMS-EEG”, Helsinki, Finland
2014	Organizer (with Prof. Risto Illmoniemi) TMS-EEG Summer School and Workshop “Probing Brain Dynamics”, Helsinki, Finland
2015	Organizer (with Prof. Risto Illmoniemi) TMS-EEG Summer School and Workshop “Perturbation of Brain Oscillations”, Helsinki, Finland
2016	Organizer (with Prof. Risto Illmoniemi) TMS-EEG Summer School and Workshop “TMS-EEG and closed-loop stimulation” Helsinki, Finland
2018	Co-organizer of the International HBP Conference “Understanding consciousness – a scientific quest for the 21st century” Barcelona, Spain
2019	Member of the local organizing committee Organization for Human Brain Mapping (OHBM) meeting, Rome
2021	Member of the organizing committee, Meeting of Italian Physiological Society, Milan
2025	Organizer NSAS Challenge Workshop, Cortical dynamics after brain injury, Crans Montana
2005	Co-organizer of the Brain, Mind and Consciousness Winter School, Montreal (CA)

• INSTITUTIONAL RESPONSIBILITIES

2015-2017	Coordinator of the PhD program in Philosophy and Human Sciences, University of Milan, Italy
2013	Founding member of the Italian Neuroethical Society (SINe)
2014-2021	Scientific Board Member, Fondazione Don Carlo Gnocchi
2018-current	Scientific Coordinator - Severe Brain Injury Department, Fondazione Don Carlo Gnocchi

NARRATIVE

My whole research activity, from the cellular level to the patient, has been devoted to **understanding what changes in thalamocortical networks when consciousness fades and recovers**. Hence, in order to understand the cellular mechanism of the slow EEG oscillations of sleep and anesthesia, I carried out simultaneous intracellular recording of cortical neurons, glial cells and extracellular calcium concentration in vivo (Massimini et al, J. Neurophysiol 2001; Amzica, Massimini, Cereb. Cortex 2002; Amzica, Massimini, J. Neurosci 2002). At the University of Wisconsin, I performed high-density EEG recordings (256 channels) in sleeping humans and I was able to show that sleep slow oscillations behave as traveling waves of neuronal hyperpolarization-depolarization (Massimini et al., J. Neurosci. 2005). Most important, I focused on the development and validation of a **novel technique (TMS/hd-EEG)**, which enables studying directly **cortico-cortical communication in humans**. Employing this system, I performed original experiments which demonstrated that, in agreement with theoretical predictions, the fading of consciousness during NREM sleep is associated with a substantial impairment of the brain’s capacity to sustain complex intracortical interactions

(Massimini et al., Science 2005; Massimini et al., PNAS 2007). The importance of complexity for consciousness was subsequently confirmed by experiments performed during anesthesia (Ferrarelli, et al., PNAS 2010); Sarasso et al., Curr Biol 2015), REM sleep (Massimini et al., Cogn. Neurosci. 2010) and in brain-injured patients (Rosanova et al., Brain 2012), leading to the proposal that measuring the brain's capacity for complex dynamics with TMS/EEG may represent a sensitive and robust way to **assess consciousness in brain-injured, non-communicating patients** (Massimini et al., PBR, 2009; Comanducci et al Clin Neuro 2020; Sarasso et al NoC 2021). Over the last ten years the importance of brain complexity for consciousness was confirmed intracranially (Pigorini et al., NIMG 2015), by experiments performed during anesthesia (Sarasso et al., Curr Biol 2015) and most important, in comatose patients (Rosanova et al., Brain 2012; Casali et al., Sci. Trans. Med. 2013; Casarotto et al., Annals of Neurology 2016; Comolatti et al., Brain Stim 2019), leading to the proposal that measuring the brain's capacity for complex interactions with TMS/EEG represents a novel and robust way to assess brain-injured, non-communicating patients (Koch et al, Nature Review Neuroscience 2016; Tononi et al., Nature Review Neuroscience 2016). Using the same approach we have recently elucidated **how brain injury alters neuronal activity** in parts of the cortex that are structurally intact. This idea has been recently sparked by the discovery of pathological sleep-like dynamics in the residual cortex of vegetative state patients (Rosanova, Nat. Comm, 2018), in the perilesional area of stroke patients (Sarasso et al., Brain 2020; Massimini et al Nature Communication 2024) and, intracranially, after small surgical lesions (Russo et al., NIMG 2021).

This work was covered by **scientific documentaries** (BBC Horizon “The secret you” 2009; Arte Documentary “The key to Consciousness” 2016), featured twice on the cover page of **Scientific American** (November 2017, February 2026 issues), on the **MIT Technology Review** magazine (August 25, 2022) and has been presented at the Brain Innovation Days (Bruxelles) in October 2021.

AWARDS, INVITED LECTURES AND OUTREACH

In recognition of my research activity, I have received **11 awards** (6 in the last 10 years, as detailed in the CV above), I was nominated Fellow of the **Canadian Institute of Advanced Research** (CIFAR), and of the **Istituto Lombardo di Scienze e Lettere**.

I have been invited over the last 10 years to give lectures at both public events and scientific meetings (75, between keynote and invited lectures). Among the most recent, the **Presidential lecture of the Italian Neurological Society** (Padova, 2025), the **Presidential Lecture of the Italian Neuroscience Society** (Pisa 2025), the **Keynote Lecture of the International Physiological Society** (Frankfurt 2025), a Gordon Conference lecture (Boston, 2023), a **public lecture at the Italian Senate** (2022) the CPIN **Distinguished Lecture at the University of Toronto** (2021), the **Annual EEG lecture at UCL, London** (2021), a public lecture at the **Natural History Museum of the University of Oxford** (2019), a public lecture at the Medical Science Festival in Bologna (2019) a keynote lecture at the Israeli Congress of Neuroscience (Eilat, 2019), the **Sundaram Lecture at Mass General Hospital - Harvard Medical School** (Boston, 2018), the presidential lecture of the Italian Epilepsy Society meeting (Rome, 2018) and invited lectures at the Neuroscience School of Advanced Studies (2018, 2017, 2016), the **New York University “The Boundaries of Consciousness”** (2015).

I've been actively engaged in dissemination through public media, lectures in schools and books (“Sizing up consciousness” published by Oxford University Press, also published in Italian by Baldini e Castoldi and in Japanese by Aki Shobo).

SELECTED PUBLICATIONS FROM THE LAST 10 YEAR:

- 1 MA Colombo, J Favaro, E Mikulan, A Pigorini, FM Zauli, I Sartori, P d'Orio, **M Massimini**. Hemispherotomy leads to persistent sleep-like slow waves in the isolated cortex of awake humans. **PLoS Biology** 23 (10), e3003060
- 2 **Massimini M***, Corbetta M, Sanchez-Vives MV, Andrillon T, Deco G, Rosanova M, Sarasso S. **Nature Communications**. Sleep-like cortical dynamics during wakefulness and their network effects following brain injury. 2024 Aug 22;15(1):7207
- 3 Russo S, Pigorini A, Mikulan E, Sarasso S, Rubino A, Zauli FM, Parmigiani S, d'Orio P, Cattani A, Francione S, Tassi L, Bassetti CLA, Lo Russo G, Nobili L, Sartori I, **Massimini M***. Focal lesions induce large-scale percolation of sleep-like intracerebral activity in awake humans. **Neuroimage**. 2021 Jul 1;234:117964.
- 4 Sarasso S, D'Ambrosio S, Fecchio M, Casarotto S, Viganò A, Landi C, Mattavelli G, Gosseries O, Quarenghi M, Laureys S, Devalle G, Rosanova M, **Massimini M*** Local sleep-like cortical reactivity in the awake brain after focal injury. **Brain**. 2020 Dec 1;143(12):3672-3684.
- 5 Rosanova M, Fecchio M, Casarotto S, Sarasso S, Casali AG, Pigorini A, Comanducci A, Seregni F, Devalle G, Citerio G, Bodart O, Boly M, Gosseries O, Laureys S, **Massimini M*** Sleep-like cortical OFF-periods disrupt causality and complexity in the brain of unresponsive wakefulness syndrome patients. **Nature Communications**. 2018 Oct 24;9(1):4427
- 6 Casarotto S, Comanducci A, Rosanova M, Sarasso S, Fecchio M, Napolitani M, Pigorini A, G Casali A, Trimarchi PD, Boly M, Gosseries O, Bodart O, Curto F, Landi C, Mariotti M, Devalle G, Laureys S, Tononi G, **Massimini M*** Stratification of unresponsive patients by an independently validated index of brain complexity. **Annals of Neurology**. 2016 Nov;80(5):718-729.
- 7 Koch C, **Massimini M**, Boly M, Tononi G. Neural correlates of consciousness: progress and problems. **Nature Review Neuroscience**. 2016 May;17(5):307-21.
- 8 D'Andola M, Rebollo B, Casali AG, Weinert JF, Pigorini A, Villa R, **Massimini M***, Sanchez-Vives MV* Bistability, Causality, and Complexity in Cortical Networks: An In Vitro Perturbational Study **Cereb Cortex**. 2016 Jul 1;28(7):2233-2242.
- 9 Sarasso S, Boly M, Napolitani M, Gosseries O, Charland-Verville V, Casarotto S, Rosanova M, Casali AG, Brichant JF, Boveroux P, Rex S, Tononi G, Laureys S, **Massimini M*** Consciousness and Complexity during Unresponsiveness Induced by Propofol, Xenon, and Ketamine. **Curr Biol**. 2015 Dec 7;25(23):3099-105.
- 10 Bistability breaks-off deterministic responses to intracortical stimulation during non-REM sleep. Pigorini A, Sarasso S, Proserpio P, Szymanski C, Arnulfo G, Casarotto S, Fecchio M, Rosanova M, Mariotti M, Lo Russo G, Palva JM, Nobili L, **Massimini M*** **Neuroimage**. 2015 May 15;112:105-113.
- 11 Casali A, Gosseries O, Rosanova M, Boly M, Sarasso S, Casali K, Casarotto S, Bruno MA, Laureys S, Tononi G, **Massimini M*** A theoretically based index of consciousness independent of sensory processing and behavior. **Science Translational Medicine** 2013 Aug 14;5(198):198ra105. doi: 10.1126

