

Valeria Fascianelli

Center for Theoretical Neuroscience, Columbia University, New York, USA

✉ vf2266@columbia.edu

Research activities and responsibilities

2020–ongoing **Postdoctoral Research Scientist , Computational Neuroscience (Fusi lab)**, Center for Theoretical Neuroscience, Columbia University, New York, USA.

2019 **Ph.D. visitor at Columbia University**, Center for Theoretical Neuroscience, Columbia University, New York, USA.

Neural decoding, geometry of neural representations, training of artificial neural networks to perform cognitive tasks.

Education and training

2016-2020 **Ph.D. in Neuroscience (Genovesio lab)**, La Sapienza University, Rome, Italy.

Thesis title: *The geometry of abstraction in macaque dorsolateral and orbital prefrontal cortex in a visually cued strategy task*

Grade: with honors

2015 **Master student visitor at CERN**, CERN, Geneva, Switzerland.

Based constantly at CERN as expert of, and part of, the teams of people responsible for, the development and operation of the Level 1 and Level 2 trigger software of NA62 experiment.

2014-2016 **Master of Research in Particle Physics**, University of Birmingham, Birmingham, UK.

Thesis title: *Development of a software trigger algorithm for electron identification using the NA62 RICH Cherenkov detector*

Grade: with honors

2013-2014 **Undergraduate fellow at the Italian National Laboratories of Nuclear Physics**, INFN, Rome, Italy.

Monte Carlo simulation to study the feasibility of an exclusive search for two-body decays of Heavy Neutrinos at the NA62 experiment.

2012-2014 **M.Sc. in Nuclear and Subnuclear Physics**, University Tor Vergata, Rome, Italy.

Thesis title: *Search for Heavy Neutrinos at the NA62 experiment at CERN*

Grade: 110/110 with honors

2008-2011 **B.Sc. degree in Physics**, University Tor Vergata, Rome, Italy.

Thesis title: *Measure of the muon lifetime*

Grade: 110/110 with honors

2008 **High School Graduation at Classical Lyceum**, Liceo Classico Ugo Foscolo, Albano Laziale, Rome, Italy.

Grade: 100/100

Teaching activities and mentorship

- 2025 **Invited as Teacher to Mathematical Methods in Computational Neuroscience Summer School**, *Kavli Institute for Systems Neuroscience*, Eresfjord, Norway.
- 2024 **Lecturer for the Advanced Neurotheory Course**, *Center for Theoretical Neuroscience, Columbia University*, New York, USA.
Lecture's title: The Geometries of Neural Representations
- 2023 **Teaching assistant of Cognitive Science**, *Barnard College*, New York, USA.
- 2023 **Teaching assistant at the Methods in Computational Neuroscience summer school**, *Marine Biological Laboratory*, Woods Hole, MA, USA.
- 2022 **Teaching assistant of Cognitive Science**, *Barnard College*, New York, USA.
- 2022 **Mentor for the Summer program within the Leadership Alliance Program**, *Center for Theoretical Neuroscience, Columbia University*, New York, USA.
- 2022 **Lecturer for the Advanced Neurotheory Course**, *Center for Theoretical Neuroscience, Columbia University*, New York, USA.
Lecture's title: The geometries of Abstraction
- 2014-2015 **Teaching Assistant of Calculus**, *School of Physics and Astronomy, University of Birmingham*, Birmingham, UK.

Working Experiences

- 2025 **Invited as Research Visitor**, *Kavli Institute for Systems Neuroscience*, Trondheim, Norway.
- 2025 **Invited as Co-chair of Biocomputation Session**, *Mathematics of Neuroscience and AI Conference*, Split, Croatia.
- 2024-ongoing **Reviewer for COSYNE**.
- 2024-ongoing **Reviewer for Journal of Neuroscience**.
- 2023-ongoing **Reviewer for PNAS journal**.
- 2021-ongoing **Reviewer for PeerJ journal**.
- 2022 **Organizer of the workshop at COSYNE2022**.
Workshop title: "Is geometry all you need?"
- 2021-2022 **Organizer of the weekly Seminar at the Center for Theoretical Neuroscience**,
Columbia University, New York (USA)

Conferences

Neuroscience Conferences:

- 2025 **Bernstein Conference**, Main, Germany.
Invited Speaker to the workshop "Relational Inference and knowledge composition via neuronal geometric representations"
- 2025 **Neuro-inspired AI**, La Sapienza, Rome, Italy.
Invited Speaker to the workshop "Neuro-inspired AI"
- 2025 **Mathematics for Neuroscience and AI**, Split, Croatia.
Invited Co-Chair of the session "Neural Data"
- 2025 **COSYNE**, Montreal, Canada.
Invited Speaker to the workshop: "Brain mechanisms of working memory: where do we stand?"

- 2024 **AREADNE**, Milos, Greece.
Poster title: "Neural signatures of stress susceptibility and resilience in amygdala-hippocampal network"
- 2024 **COSYNE2024**, Lisbon, Portugal.
Poster title: "Neural signatures of stress susceptibility and resilience in amygdala-hippocampal network"
- 2023 **COSYNE2023** , Montreal, Canada.
Poster title: "Decoding stress susceptibility from activity in amygdala-ventral hippocampal network"
- 2022 **SFN 2022**, San Diego, USA.
Poster title: "Neural representational geometry correlates with behavioral differences between monkeys"
- 2022 **Neuronex meeting**, San Diego, USA.
Poster title: "Neural representational geometry correlates with behavioral differences between monkeys"
- 2022 **Swartz meeting**, Cold Spring Harbor Laboratory, Long Island, USA.
Talk title: "Neural representational geometry correlates with behavioral differences between monkeys"
- 2022 **Tri-Center Gatsby meeting**, Hebrew University, Jerusalem, Israel.
Talk title: "Neural representational geometry correlates with behavioral differences between monkeys"
- 2021 **SFN 2021**, online.
Poster title: "Stimulus and response encoding in a population of Purkinje cells in Crus I and Crus II of the cerebellum during learning of a visuomotor association task"
- 2021 **SFN 2021**, online.
Poster title: "Neural representational geometry correlates with behavioral differences between monkeys"
- 2018 **Italian National Congress in Neuroscience**, Ischia, Italy.
Poster title: "Autocorrelation structure in the macaque dorsolateral, but not orbital or polar, prefrontal cortex predicts response-coding strength in a visually cued strategy task"
- 2017 **Italian national Meeting of PhD students in Neuroscience**, Naples, Italy.
Poster title: "Neural intrinsic timescales in the macaque dorsal premotor cortex predict the strength of spatial response coding"

Physics Conferences:

- 2015 **Collaboration meeting of the NA62 experiment at CERN**, Prague, Czech Republic.
Talk title: "RICH L1 trigger for dilepton decays: new studies and improvement"
- 2015 **Collaboration meeting of the NA62 experiment at CERN**, CERN, Geneva.
Talk title: "RICH L1 trigger for dilepton decays"
- 2014 **Collaboration meeting of the NA62 experiment at CERN**, CERN, Geneva.
Talk title: "Cross talk studies for the KTAG detector"
- 2014 **Collaboration meeting of the NA62 experiment at CERN**, CERN, Geneva.
Talk title: "Search for Heavy Neutrinos at the NA62 experiment at CERN"

Awards and Fellowships

- 2025 **Research Fellowship at the Italian Academy in New York**, New York, USA.
- 2018 **"Avvio alla Ricerca" grant of Sapienza University of Rome**, Sapienza University of Rome, Rome, Italy.
Project title: "Neural correlates of rule switching in orbital prefrontal cortex"
- 2018 **Best Project Award at BCBT Summer School**, Institute for Bioengineering of Catalonia (IBEC) , Barcelona, Spain.
Project title: "Evaluation of metacognitive abilities in an uncertain collaborative task"
- 2017 **Best Poster Award at Italian National Congress in Neuroscience**, Italian Society for Neuroscience , Ischia, Italy.
Poster title: "Autocorrelation structure in the macaque dorsolateral, but not orbital or polar, prefrontal cortex predicts response-coding strength in a visually cued strategy task"

- 2017 **Best Poster Award at National Meeting of PhD students in Neuroscience, Italian Society for Neuroscience** , Naples,Italy.
Poster title: "Neural intrinsic timescales in the macaque dorsal premotor cortex predict the strength of spatial response coding"
- 2013-2014 **Undergraduate research fellow at the National Laboratories of Nuclear Physics, INFN, Rome,Italy.**
- 2012-2013 **First classified for the grant "Best students" as undergraduate student, University Tor Vergata, Rome,Italy.**

List of Publications

Neuroscience publications

- 2024 **F.Xia***, **V.Fascianelli***, **N.Vishwakarma**, **F.G.Ghinger**, **A.O. Kwon**, **M.M. Gergues**, **L.K. Lalani**, **S.Fusi**, **M.A. Kheirbek**, *Understanding the neural code of stress to control anhedonia.*, Nature.
 *Equal contribution
- 2024 **V.Fascianelli**, **A.Battista**, **F.Stefanini**, **S.Tsujimoto**, **A.Genovesio**, **S.Fusi**, *Neural representational geometries reflect behavioral differences in monkeys and recurrent neural networks*, Nature Communications.
- 2024 **A.E. Ipata***, **V.Fascianelli***, **C.I. De Zeeuw**, **N.Sendhilnathan**, **S. Fusi**, **M.E. Goldberg**, *Purkinje cells in Crus I and II encode the visual stimulus and the impending choice as monkeys learn a reinforcement based visuomotor association task*, bioRxiv, Submitted to Journal of Neuroscience.
 * equal contribution
- 2024 **S.Nougaret**, **L.Ferrucci**, **F.Ceccarelli**, **S.Sacchetti**, **D.Benozzo**, **V.Fascianelli**, **R.C.Saunders**, **L.Renaud**, **A. Genovesio**, *Neurons in the monkey frontopolar cortex encode learning stage and goal during a fast learning task*, PLoS Biology.
- 2023 **F.Xia***, **V.Fascianelli***, **N.Vishwakarma**, **F.G.Ghinger**, **S.Fusi**, **M.A.Kheirbek**, *Neural signatures of stress susceptibility and resilience in the amygdala-hippocampal network*, bioRxiv.
 * equal contribution
- 2022 **L.Ferrucci**, **S.Nougaret**, **F.Ceccarelli**, **S.Sacchetti**, **V.Fascianelli**, **D.Benozzo**, **A.Genovesio**, *Social monitoring of actions in the macaque frontopolar cortex*, Progress in Neurobiology.
- 2021 **S.Nougaret**, **V.Fascianelli**, **S.Ravel**, **A.Genovesio**, *Intrinsic timescales across the basal ganglia*, Scientific Reports .
- 2020 **V.Fascianelli**, **L.Ferrucci**, **S.Tsujimoto**, **A.Genovesio**, *Neural correlates of strategy switching in the macaque orbital prefrontal cortex*, Journal of Neuroscience.
- 2019 **V.Fascianelli**, **E.Marcos**, **S.Tsujimoto**, **A.Genovesio**, *Autocorrelation structure in the macaque dorsolateral, but not orbital or polar, prefrontal cortex predicts response-coding strength in a visually cued strategy task*, Cerebral Cortex .
- 2018 **R.Cirillo***, **V.Fascianelli***, **L.Ferrucci**, **A.Genovesio**, *Neural intrinsic timescales in the macaque dorsal premotor cortex predict the strength of spatial response coding*, iScience.
 * equal contribution

Physics selected publications¹

- 2024 **EC.Gil et al.**, *Measurement of the $K^+ \rightarrow \pi^+ \gamma \gamma$ decay*, Physics Letters B.
- 2023 **EC.Gil et al.**, *Performance of the NA62 trigger system*, Journal of High Energy Physics.
- 2023 **EC.Gil et al.**, *A search for the $K^+ \rightarrow \mu^- \nu e^+ e^+$ decay*, Physics Letters B.
- 2022 **EC.Gil et al.**, *A measurement of the $K^+ \rightarrow \pi^+ \mu^+ \mu^-$ decay*, Journal of High Energy Physics.
- 2022 **EC.Gil et al.**, *Searches for lepton number violating $K^+ \rightarrow \pi^- \pi^0 e^+ e^+$ decays*, Physics Letters B.
- 2022 **A.Akmete et al.**, *High level performance of the NA62 RICH detector*, Nuclear Instruments and Methods In Physics Research.
- 2021 **R.Aliberti et al.**, *Search for Lepton Number and Flavor Violation in K^+ and π^0 Decays*, Physical Review Letters.
- 2021 **E.C Gil et al.**, *Measurement of the very rare $K^+ \rightarrow \pi^+ \nu \bar{\nu}$ decay*, Journal of High Energy Physics.
- 2021 **EC.Gil et al.**, *Search for a feebly interacting particle X in the decay $K^+ \rightarrow \pi^+ X$* , Journal of High Energy Physics.
- 2021 **F.Ambrosino et al.**, *Search for Lepton Number and Flavor Violation in and Decays*, Physical Review Letters.
- 2020 **EC.Gil et al.**, *Search for heavy neutral lepton production in K^+ decays to positrons*, Physics Letters B.
- 2020 **EC.Gil et al.**, *Final performances of the NA62 RICH detector*, Journal of Instrumentations.
- 2019 **EC.Gil et al.**, *Search for production of an invisible dark photon in π^0 decays*, Journal of High Energy Physics.
- 2019 **EC.Gil et al.**, *First search for $K^+ \rightarrow \pi^+ \nu \bar{\nu}$ using the decay-in-flight technique*, Physics Letters B.
- 2018 **R.Aliberti et al.**, *Search for heavy neutral leptons at the NA62 experiment at CERN*, International Journal of Modern Physics A.
- 2017 **EC.Gil et al.**, *The Beam and detector of the NA62 experiment at CERN*, Journal of instrumentation.
- 2017 **G.A.Rinella et al.**, *NA62 Charged Particle Hodoscope. Design and performance in 2016 run*, Journal of instrumentation.

¹For a complete list of all publications refer to My Google Scholar page