Javier **Rasero**

School of Data Science. University of Virginia.
Charlottesville, VA 22904 (USA)

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Biosketch

I am a former physicist interested in the application of statistical and machine learning methods in the Neuroscience field. I earned my Ph.D. in 2014 from the University of Valencia, specializing in model building and statistical testing with experimental data from the primordial Universe, with a specific focus on inflationary physics. After a short period in industry working as a developer for 3D applications, I earned a postdoctoral fellowship from the Basque Government (Spain), which allowed me to first spent 2 years at the University of Bari (Italy) and later 1 year at the Biobizkaia Health Research Institute (Spain). During this time, I developed and applied machine learning methods for studying brain disorders using connectivity data. In 2019, I joined the CoAx Lab at Carnegie Mellon University (Pittsburgh) as a postdoctoral researcher. I contributed to the growth of the Health Neuroscience field by building predictive models of cardiovascular disease risk factors from neuroimaging data. Currently, I am an Assistant Professor in the School of Data Science at the University of Virginia, where my research focuses on developing and applying new pipelines and methodologies for the efficient integration of multimodal brain data to predict and explain individual differences in healthy and neuropathological populations.

Scientific Production

- Number of publications: 28
- Number of indexed papers: 33
- First authors contribution: 16
- Timespan: 2011-2023
- Author Search code (AU =): Rasero, Javier
- h-index: 13 (Google Scholar)

Expertise

- Computational Neuroimaging
- Machine Learning
- Statistics
- Health Neuroscience
- Brain Connectivity
- Physics

Profesional Experience

School of Data Science. University of Virginia — *Charlottesville, VA*
Assistant Professor — *2023 - Present*

Cognitive Axon (CoAx) Lab. Department of Psychology. Carnegie Mellon University — *Pittsburgh, PA*
Postdoctoral Researcher — *2019 - 2023*
- Supervisor: Prof. Timothy Verstynen

Computational Neuroimaging Laboratory. Biocruces Health Research Institute. Hospital Universitario de Cruces — *Cruces, Spain*
Postdoctoral Researcher — *2018 - 2019*
- Supervisor: Prof. Jesús Cortés

Departament of Physics. University of Bari — *Bari, Italy*
Postdoctoral Researcher — *2016 - 2018*
- Supervisor: Prof. Sebastiano Stramaglia

3DKumo. Innovation Association *Bilbao, Spain*

C++ Developer *2015 - 2016*

Departament of Theoretical Physics. University of Valencia *Valencia, Spain*

Ph.D. Student *2009 - 2014*

- Supervisor: Prof. Prof. Gabriela Barenboim

Education

University of Valencia *Valencia, Spain*

Ph D. in Physics. Mention of *DOCTOR EUROPEUS* *June, 2014*

- Dissertation Title: "Implications of non standard scenarios in Cosmology and the Very Early Universe"
- Supervisor: Gabriela Barenboim
- Grade: Sobresaliente Cum Laude

University of Valencia *Valencia, Spain*

M.S. in Advanced Physics *June, 2009*

University of Basque Country *Leioa, Spain*

B.S. in Physics *2003 - 2008*

Publications

In preparation

1. **Javier Rasero**, Timothy D. Verstynen, Caitlin M. DuPont, Thomas Kraynak, Emma Barinas-Mitchell, Mark R. Scudder, Thomas Kamarck, Amy I. Sentis, Regina L. Leckie, and Peter J. Gianaros. Stressor-evoked fMRI activity, cardiovascular reactivity, and subclinical atherosclerosis in midlife adults. `https://osf.io/j278q`

Preprints/Under Revision

4. Diandra Brkić, Sara Sommariva, Anna-Lisa Schuler, Annalisa Pascarella, Paolo Belardinelli, Silvia L. Isabella, Giovanni Di Pino, Sara Zago, Giulio Ferrazzi, **Javier Rasero**, Giorgio Arcara, Daniele Marinazzo, Giovanni Pellegrino. The impact of ROI extraction method for MEG connectivity estimation: practical recommendations for the study of resting state data. *bioRxiv* 2023.06.20.545792 (under revision in Neuroimage)

3. **Javier Rasero**, Richard Betzel, Amy Isabella Sentis, Thomas E. Kraynak, Peter J. Gianaros, Timothy D. Verstynen. Similarity in evoked responses does not imply similarity in macroscopic network states across tasks. *bioRxiv* 2021.11.27.470015.

2. Krista Bond, **Javier Rasero**, Raghav Madan, Jyotika Bahuguna, Jonathan Rubin, Timothy Verstynen. Competition between action plans tracks with evidence accumulation during flexible decision-making. *bioRxiv* 2022.10.03.510668. (under revision in eLife)

1. **Javier Rasero**, Diego Rivera, Reza Mohammadi, Ernst Wit, Jesus M Cortes, Juan Carlos Arango-Lasprilla. The usefulness of Bayesian graphical modelling with neuropsychological data. *PsyArxiv* `https://doi.org/10.31234/osf.io/8cr2f`.

Peer-reviewed

28. Cristina Penas, Yoana Arroyo-Berdugo, Aintzane Apraiz, **Javier Rasero**, Iraia Muñoa-Hoyos, Noelia Andollo, Goikoane Cancho-Galán, Rosa Izu, Jesús Gardeazabal, Pilar A. Ezkurra, Nerea Subiran, Carmen Alvarez-Dominguez, Santos Alonso, Anja K. Bosserhoff, Aintzane Asumendi, María D. Boyano. Pirin is a prognostic marker of human melanoma that dampens the proliferation of malignant cells by downregulating *JARID1B/KDM5B* expression. *Scientific Reports* 13, 9561. (2023)

27. **Javier Rasero**, Antonio Jimenez-Marin, Ibai Diez, Roberto Toro, Mazahir T. Hasan, Jesus M. Cortes. The neurogenetics of functional connectivity alterations in Autism: Insights from subtyping in 657 patients. *Biological Psychiatry*, S0006-3223(23)01230-1. (2023)

26. Jose Luis Diaz-Ramón, Jesus Gardeazabal, Rosa Maria Izu, Estibaliz Garrote, **Javier Rasero**, Aintzane Apraiz, Cristina Penas, Sandra Seijo, Cristina Lopez-Saratxaga, Pedro Maria De la Peña, Ana Sanchez-Diaz, Goikoane Cancho-Galan, Veronica Velasco, Arrate Sevilla, David Fernandez, Iciar Cuenca, Jesus María Cortes, Santos Alonso, Aintzane Asumendi, María Dolores Boyano. Melanoma Clinical Decision Support System: An Artificial Intelligence-Based Tool to Diagnose and Predict Disease Outcome in Early-Stage Melanoma Patients. *Cancers*, 15, 2174. (2023)

25. Hannelore Aerts, Nigel Colenbier, Hannes Almgren, Thijs Dhollander, **Javier Rasero**, Kenzo Clauw, Amogh Johri, Jil Meier, Jessica Palmer, Michael Schirner, Petra Ritter, and Daniele Marinazzo. Pre- and post-surgery brain tumor multimodal MRI data optimized for large scale computational modelling. *Scientific Data*, 9, 676. (2022)

24. Amy Isabella Sentis **Javier Rasero**, Peter J. Gianaros, Timothy D. Verstynen. Integrating Multiple Imaging Modalities does not Boost Prediction of Carotid Artery Intima-Media Thickness in Midlife Adults. *NeuroImage. Clinical*, 35, 103134. (2022)

23. Peter J. Gianaros, **Javier Rasero**, Caitlin M. DuPont, Thomas E. Kraynak, James J. Gross, Kateri McRae, Aidan G.C. Wright, Timothy D. Verstynen, Emma Barinas-Mitchell. Multivariate brain activity while viewing and reappraising affective scenes and the multiyear progression of preclinical atherosclerosis in midlife adults. *Affective Science*, 3, 406–424. (2022).

22. Alfonso Santos-Lopez, Christopher W. Marshall, Allison L. Welp, Caroline Turner, **Javier Rasero**, Vaughn S. Cooper. The roles of history, chance, and natural selection in the evolution of antibiotic resistance. *eLife*, 10:e70676. (2021)

21. **Javier Rasero**, Amy Isabella Sentis, Fang-Cheng Yeh, Timothy Verstynen. Integrating across neuroimaging modalities boosts prediction accuracy of cognitive ability. *PLOS Computational Biology*, 17 (3), e1008347. (2021)

20. DuPont, Caitlin M., **Javier Rasero**, Thomas E. Kraynak, Thomas W. Kamarck, Stephen B. Manuck, Timothy D. Verstynen, and Peter J. Gianaros. Brain Morphology and stressor-evoked blood pressure reactivity in daily-life: a machine-learning analysis in midlife adults. *Psychosomatic Medicine*, 82(6), pp. A16-A16. (2020)

19. Peter J. Gianaros, Thomas E Kraynak, Dora C-H Kuan, James J Gross, Kateri McRae, Ahmad R Hariri, Stephen B Manuck, **Javier Rasero**, Timothy D Verstynen, Affective brain patterns as multivariate neural correlates of cardiovascular disease risk. *Social Cognitive and Affective Neuroscience*, 15(10), 1034–1045. (2020)

18. Filippo Mancuso*, Sergio Lage*, **Javier Rasero***, José Luis Díaz-Ramón, Aintzane Apraiz, Gorka Pérez-Yarza, Pilar Ezkurra, Cristina Penas, Ana Sánchez-Diez, María Dolores García-Vazquez, Jesús Gardeazabal, Rosa Izu, Karmele Mujika, Jesús Cortés, Aintzane Asumendi,

María Dolores Boyano. Serum markers improve current prediction of metastasis development in early-stage melanoma patients: a machine learning-based study. *Molecular Oncology*, 14: 1705-1718. (2020) *(equally author contributions)

17. Cristina Penas, Aintzane Apraiz, Iraia Muñoa, Yoana Arroyo-Berdugo, **Javier Rasero**, Pilar A Ezkurra, Veronica Velasco, Nerea Subiran, Anja K Bosserhoff, Santos Alonso, Aintzane Asumendi, Maria D Boyano. RKIP Regulates Differentiation-Related Features in Melanocytic Cells. *Cancers*, 12(6), 1451 (2020)

16. Arrate Sevilla, M Celia Morales, Pilar A Ezkurra, **Javier Rasero**, Verónica Velasco, Goikoane Cancho-Galan, Ana Sánchez-Diez, Karmele Mujika, Cristina Penas, Isabel Smith, Aintzane Asumendi, Jesús M Cortés, Maria Dolores Boyano, Santos Alonso. BRAF V600E mutational load as a prognosis biomarker in malignant melanoma. *PLOS ONE*, 15(3): e0230136 (2020)

15. Antonio Jimenez-Marin, Diego Rivera, Victoria Boado, Ibai Diez, Fermin Labayen, Irati Garrido, Daniela Ramos-Usuga, Itziar Benito-Sánchez, **Javier Rasero**, Alberto Cabrera-Zubizarreta, Iñigo Gabilondo, Sebastiano Stramaglia, Juan Carlos Arango-Lasprilla, Jesus M. Cortes, Brain connectivity and cognitive functioning in individuals six months after multiorgan failure. *NeuroImage: Clinical*, 25, 102137. (2020)

14. Juan Carlos Arango-Lasprilla, Antonio Jiménez-Marín, Diego Rivera Ibai Diez, Fermin Labayen, Irati Garrido, Daniela Ramos-Usuga, **Javier Rasero**, Alberto Cabrera, Jesus M. Cortes. Hyperconnectivity of the Default Mode Network is Linked to Cognitive Disability in Multiorgan Dysfunction Syndrome. *Archives of Physical Medicine and Rehabilitation*, 100 (10), e83. (2019)

13. Natalia Lozovaya, Romain Nardou, Toman Tyzio, Morgane Chiesa, Alexandre Pons-Bennaceur, Sanaz Eftekhari, Thi-Thien Bui, Maxime Billon-Grand, **Javier Rasero**, Paolo Bonifazi, Jean-Luc Gaiarsa, Diana Ferrari and Yehezkel Ben-Ari. Early alterations in a mouse model of Rett syndrome: the GABA developmental shift is abolished at birth. *Scientific Reports* 9 (1), 9276. (2019)

12. **Javier Rasero**, Teresa Creanza, Nicola Ancona, Jesus M. Cortes , Daniele Marinazzo and Sebastiano Stramaglia. Consensus clustering approach for genome-wide association studies. Chapter in *Advances on Nonlinear Dynamics of Electronic Systems* book. pp 116-120. (2019)

11. **Javier Rasero**, Ibai Diez, Jesus M Cortes, Daniele Marinazzo and Sebastiano Stramaglia. Connectome sorting by Consensus Clustering increases separability in group neuroimaging studies. *Network Neuroscience* 3 (2), 325-343. (2018)

10. **Javier Rasero**, Hannelore Aerts, Marlis Ontivero Ortega, Jesus M. Cortes, Sebastiano Stramaglia and Daniele Marinazzo. Predicting functional networks from region connectivity profiles in task-based versus resting-state fMRI data. Included in *PLOS collection: "Machine Learning in Health and Biomedicine"*. *PLOS ONE* 13(11): e0207385, (2018)

9. Maria Lasalvia, Giuseppe Perna, Lorenzo Manti, **Javier Rasero**, Sebastiano Stramaglia and Vito Capozzi. Raman spectroscopy monitoring of MCF10A cells irradiated by protons at clinical doses. *International journal of radiation biology* 95 (2), 207-214. (2018)

8. Borja Camino-Pontes, Ibai Diez, Antonio Jimenez-Marin, **Javier Rasero**, Asier Erramuzpe, Paolo Bonifazi, Sebastiano Stramaglia, Stephan Swinnen, Jesus Corte. Interaction information along lifespan of the resting brain dynamics reveals a major redundant role of the default mode network. *Entropy*, 20(10), pp 742. (2018)

7. **Javier Rasero**, Nicola Amoroso, Marianna La Rocca, Sabina Tangaro, Roberto Bellotti and Sebastiano Stramaglia. Multivariate regression analysis of structural MRI connectivity matrices in Alzheimer's disease. *PLOS ONE* 12(11): e0187281. (2017)

6. **Javier Rasero**, Mario Pellicoro, Leonardo Angelini, Jesus M Cortes, Daniele Marinazzo and Sebastiano Stramaglia. Consensus clustering approach to group brain connectivity matrices. *Network Neuroscience*. 1-3, pp.242-253. (2017)

5. **Javier Rasero**, Carmen Alonso Montes, Ibai Diez, Laiene Olabarrieta-Landa, Lakhdar Remaki, Iaki Escudero, Beatriz Mateos Goi, Paolo Bonifazi, Manuel Fernandez Martinez, Juan Carlos Arango-Lasprilla, Sebastiano Stramaglia and Jesus Cortes. Group-Level Progressive Alterations in Brain Connectivity Patterns Revealed by Diffusion-Tensor Brain Networks across Severity Stages in Alzheimer's Disease. *Frontiers in Aging Neuroscience*. 9, pp.215-215. (2017)

4. Richard Easther, Laynce C. Price, **Javier Rasero****. Inflating an inhomogeneous universe. *Journal Of Cosmology And Astroparticle Physics (JCAP)*. 2014-8, pp.41. ISSN 1475-7516. (2014) **(In alphabetical order)

3. Gabriela Barenboim, **Javier Rasero****. Structure Formation during an early period of matter domination. *Journal of high energy physics (JHEP)*. 2014-4, pp.138. ISSN 1126-6708. (2014) **(In alphabetical order)

2. Gabriela Barenboim, **Javier Rasero*****. Electroweak baryogenesis window in non standard cosmologies. *Journal of high energy physics (JHEP)*. 2012-7, pp.28. ISSN 1126-6708. (2012) **(In alphabetical order)

1. Gabriela Barenboim, **Javier Rasero****. Baryogenesis from a right-handed neutrino condensate. *Journal of high energy physics (JHEP)*. 2011-3, pp.097. ISSN 1126-6708. (2011) **(In alphabetical order)

Conference Abstracts & Invited Talks

19. **November 2023**. *Neural response to stress predicts preclinical carotid atherosclerosis via blood pressure pathways*. Poster. OHBM Annual Meeting. Montreal (Canada)

18. **November 2022**. *Similarity in evoked responses does not imply similarity in macroscopic network states across tasks*. Poster. Neuroscience meeting organized by the Society for Neuroscience. San Diego (USA)

17. **August 2022**. *Similarity in evoked responses does not imply similarity in macroscopic network states across tasks*. Poster. Conference on Cognitive Computational Neuroscience. San Francisco (USA)

16. **June 2022**. *Similarity in evoked responses does not imply similarity in macroscopic network states across tasks*. Poster. OHBM Annual Meeting. Remote.

15. **March 2022**. *Integrating across neuroimaging modalities boosts prediction accuracy of cognitive ability*. Virtual talk. Gratton lab. Northwestern University.

14. **December 2021**. *Similarity in evoked responses does not imply similarity in macroscopic network states across tasks*. Flash talk. Neuromatch Conference 4.0 (`https://conference.neuromatch.io/`).

13. **June-July 2021**. *Response conflict tasks rely on different underlying network dynamics, despite overlapping activity profiles*. Poster. Network Neuroscience 2021 Satellite (`https://netneurosci.github.io/networks2021satellite`). Remote (due to COVID).

12. **June 2020.** *Stacking Learning of Multimodal Neuroimaging Data Enhances Cognitive Prediction*. Poster. OHBM Annual Meeting. Remote (due to COVID).

11. **September 2019.** *Affective brain patterns as multivariate neural correlates of cardiovascular disease risk*. Poster. Carnegie Mellon Forum on Biomedical Engineering. Pittsburgh (USA).

10. **January 2019.** *Application of Machine Learning and Advanced Statistics methods to the study of Melanoma Prognosis.* Invited talk. Workshop sobre investigación multidisciplinar en melanoma maligno. Leioa (Spain)
9. **May 2018.** *Predicting functional networks from region connectivity profiles in task-based versus resting-state fMRI data and its possible applications to brain tumor data.* Invited talk. European Network for Brain Imaging of Tumors (ENBIT). Brussels (Belgium)
8. **July 2017.** *Consensus clustering approach to group brain connectivity matrices*. Poster. First Internatioal Summer Institute on Network Physiology (ISINP). Como (Italy)
7. **February 2017.** *Consensus clustering approach to group brain connectivity matrices*. Invited talk. Third BCAM Workshop on Quantitative Biomedicine for Health and Disease. Bilbao (Spain)
6. **December 2016.** *Multivariate methods in machine learning: state of art, challenges and possible applications to melamics data.* Invited talk. MELAMICS workshop. Plentzia (Spain)
5. **December 2016.** *Consensus clustering approach to group brain connectivity matrices*. Poster. BrainModes 2016. Brussels (Belgium)
4. **March 2015.** *Deep Neural Networks in Biomdecine.* Invited talk. Biocruces Health Research Institute. Barakaldo (Spain)
3. **April 2013.** *Electroweak baryogenesis window in non standard cosmologies.* Invited talk. Korea Advanced Institute of Science and Technology (KAIST). Daejeon (South Korea)
2. **July 2012.** *Electroweak baryogenesis window in non standard cosmologies.* Invited talk. The LHC, Particle Physics and Cosmos Workshop. University of Auckland (New Zealand)
1. **May 2012.** *Baryogenesis, Dark Matter and Axions from a minimal cosmological supersymmetric model.* Invited talk. Departament of Theoretical Physics. University of Basque Country. Leioa (Spain)

Research Projects

- **2019-2024**. Neurobiology of Adult Health (NOAH). Principal Investigator: Peter J. Gianaros. National Institutes of Health (USA).
- **2017-2019**. Multidisciplinary investigation for malign melanoma II. Principal Investigator: Lola Boyano. ELKARTEK Industry, Basque Governement. Reference ID: KK-2017/00041. Budget: 276.548 €.
- **2017-2018** Research on Malign Melanoma: Validation and development of new biomarkers for diagnosis, prognosis and treatment of the melanoma. Principal Investigator: Lola Boyano (University of Basque Country). RIS3, Health Departament of Basque Country. Reference ID: 222020. Budget: 96.061 €.
- **2016-2017** Multidisciplinary investigation for malign melanoma. Principal Investigator: Lola Boyano (University of Basque Country). ELKARTEK Industry, Basque Governement. Reference ID: KK-2016/00036, Budget: 216.964 €.
- **2008-2014** Interacciones Fundamentales y sus implicaciones experimentales. Principal Investigator: Francisco J. Botella Olcina. (University of Valencia) Ministerio de educacion y ciencia. Plan nacional investigación científica, desarrollo e innovación tecnológica.
- **2008-2009** Proyecto Prometeo, De la Física del LHC a las claves del universo primordial.

Principal Investigator: Jose Bernabeu Arberola. (University of Valencia). Valencian Government.

Teaching Experience

- **2023** Carnegie Mellon University. Statistical Methods and Concepts for Social and Behavioral Sciences (CM-85309). *Duration*: 1 semester.
  Webpage: `https://jrasero.github.io/cm-85309-2023/`
- **2020** Carnegie Mellon University. Guest Lecturer: *(Computational) Models of fMRI*. Cognitive Neuroscience Research Methods (CM-85314). *Duration*: 2h.
- **2019** University of Basque Country. Analysis, prediction and classification of biomedical data. Graduate Programme in Biomedical Research. *Duration*: 25h.
  Webpage: `https://jrasero.github.io/curso-scikit-ehu-2019` (in Spanish)
- **2018** University of Basque Country. Analysis, prediction and classification of biomedical data. Graduate Programme in Biomedical Research. *Duration*: 25h.
- **2012-2013** University of Valencia. Course of Fundamental Physics I. B.S of Chemistry. *Duration*: 1 semester.

Professional Services

- **2020-Present**. Review Editor, Frontiers in Network Physiology.
- **2022-2023**. BRIDGE Steering Committee.
- **2020**. Organizing Committee: *The Pittsburgh Brainhack: DeBurghing 2020*. Official satellite event of the International Global Brainhack 2020.
  Webpage: `https://pitt-brainhack.github.io/DeBurghing2020`
- *Ad-hoc reviewer*: eLife, NeuroImage, PLOS Biology, PLOS Computational, Biology, Network Neuroscience, Brain Sciences, Human Brain Mapping, Frontiers in Network Physiology, Developmental Cognitive Neuroscience

Skills

Programming	Python, R, C++, Matlab, Fortran, Mathematica.
Specific Libraries	scikit-learn, PyTorch, Keras, Nilearn, Nipype
Neuroimaging toolboxes	fMRIPrep, DSI-Studio, Freesurfer, FSL, SPM
Languages	English (C1 Advanced CAE), Italian (B1), Basque (C1). Spanish (Mother Tonge)