Michael D. Nunez, Ph.D.

Associate Professor (UD1*)
Psychological Methods
University of Amsterdam

https://scholar.google.com/citations?user=vta5mnwAAAAJ www.michaeldnunez.com

m.d.nunez@uva.nl github.com/mdnunez

EDUCATION

University of California, Irvine
2017 - Ph.D. in Psychology w/ Concentration in Cognitive Neuroscience Cognitive Sciences Department
2017 - M.S. in Cognitive Neuroscience

University of California, Irvine
2015 - M.S. in Statistics Statistics Department

Tulane University, New Orleans, LA
2010 - B.S. in Mathematics and Economics (Double Major, cum laude), Minor in Psychology Mathematics Department

EMPLOYMENT HISTORY

Associate Professor (UD1) July 2021 (as Assistant Professor) - Present
Psychological Methods Group
Department of Psychology
University of Amsterdam
I develop my own research program on neurocognitive modeling, decision-making and other topics. I also teach graduate and undergraduate courses, as well as mentor PhDs, Master's and Bachelor students.

Assistant Project Scientist, Cognition and Individual Differences Lab, Human Neuroscience Lab Aug 2020 - June 2021
PIs: Prof. Joachim Vandekerckhove, Prof. Ramesh Srinivasan
Department of Cognitive Sciences
University of California, Irvine
I developed and found parameter estimates of neurocognitive models using human EEG and behavioral data.

Assistant Project Scientist, Fuster Laboratory of Cognitive Neuroscience Feb 2019 - July 2020
PI: Prof. Michele A. Basso
Department of Psychiatry and Biobehavioral Sciences
University of California, Los Angeles (UCLA)
I studied decision making from recordings of neurons, intracranial data, and behavioral data in Rhesus macaques.

Assistant Project Scientist, Cognition and Individual Differences Lab, Human Neuroscience Lab May 2018 - Feb 2019
PIs: Prof. Joachim Vandekerckhove, Prof. Ramesh Srinivasan
Department of Cognitive Sciences
University of California, Irvine
I sought to estimate unidentified cognitive models of human decision making with experimental behavior and scalp-recorded EEG.

Associate Specialist, Laboratory of Computational and Translational Neuroscience Sep 2017 - May 2018
PI: Prof. Beth A. Lopour
Department of Biomedical Engineering
University of California, Irvine
I classified and statistically modeled markers of epilepsy in human patients using electric potentials recorded directly from the cortex.

Graduate Student Researcher, Human Neuroscience Lab, Cognition and Individual Differences Lab Aug 2012 - Aug 2017
PIs: Prof. Ramesh Srinivasan, Prof. Joachim Vandekerckhove
Department of Cognitive Sciences
University of California, Irvine
I tested the veracity of combined electrocortical and cognitive models of human visual attention and decision-making. This was typically performed in a hierarchical Bayesian statistical framework with statistical models of EEG and human behavior.

Teaching Assistant, Cognitive Sciences Department Sep 2012 - Dec 2016
University of California, Irvine
I was responsible each academic quarter to fulfill the duties of a teaching assistant as needed by the instructor of the course. I held discussion courses for undergraduates each week as well as provided office hours and graded papers, homework, and exams.

Research Assistant, Psychology Department 2011 - 2012
PI: Prof. Edward Golob
Tulane University, New Orleans, LA
I sought to advance understanding of normal cognitive aging by exploring condition differences in auditory EEG Event Related Potentials obtained from Independent Component Analysis (ICA).

PUBLICATIONS

- van der Meer, D., van Gaal, S., Grasman, R. P. P. P., van der Maas, H. L. J., & **Nunez, M. D.** (2026). The Strengths and Pitfalls of No-report Paradigms in Multistable Perception Research. *PsyArXiv*. doi: 10.31234/osf.io/stfkp_v2
- Krijgsman, B., Steeghs-Turchina, M., & **Nunez, M. D**. (2026). Which model better predicts brain-behavior relationships during decision-making? A simulation-based comparison of single-trial directed and integrative drift-diffusion models. *PsyArXiv*. doi: 10.31234/osf.io/7d46a_v2
- Pinier, C., Opiełka, G., Rosenbusch, H., Webb, T.*, **Nunez, M. D.***, & Stevenson, C. E.* (2026). Which Attention Heads are like the Human Head? Not the Ones that Compute. *arXiv*. doi: 10.48550/arXiv.2609.37991 *Shared senior authorship
- Oberauer, K., Schubert, A.-L., Frischkorn, G. T., **Nunez, M. D.**, Fiebach, C. (2026). The Signal-To-Noise Ratio Hypothesis of Intelligence. *OSF*. doi: 10.31219/osf.io/nkms3_v2
- Hadian Rasanan, A. H., Schumacher, L., **Nunez, M. D.**, Weindel, G., & Rieskamp, J. (2026). Non-decision time-informed collapsing threshold diffusion model: A joint modeling framework with identifiable time-dependent parameters. *eLife*. 14:RP109730 doi: 10.7554/eLife.109730.2
- Lasagna, C. A., Kraft, J., **Nunez, M.D.**, Suzuki, T., Grove, T. B., Taylor, S. F., Tso, I. F., & Pleskac, T. J. (2026). Self-Referential Social Processing in Schizophrenia and Bipolar Disorder: Advancing Theoretical Precision and Clinical Insights with Model-Based Neuroscience. *PsyArXiv*. doi: osf.io/ucbhr_v1
- Pinier, C., Vargas, S. A., Steeghs-Turchina, M., Matzke, D., Stevenson, C. E.*, & **Nunez, M. D.*** (2025). Large Language Models Show Signs of Alignment with Human Neurocognition During Abstract Reasoning. *arXiv* doi: 10.48550/arXiv.2508.10057 *Shared senior authorship
- Steeghs-Turchina, M., Srinivasan, R., Nunez, P. L., & **Nunez, M. D.** (2025). Slow wave dynamics of scalp EEG can be explained by simple statistical models of long-range connections. *NeuroImage.* doi: 10.1016/j.neuroimage.2025.121418
- Grabowska, A., Sondej, F., Haaf, J. M.*, **Nunez, M. D**.*, & Senderecka, M.* (2025). Individual differences in neurophysiological correlates of post-response adaptation: A model-based approach. *NeuroImage,* 121349. doi: 10.1016/j.neuroimage.2025.121349 *Shared senior authorship
- **Nunez, M. D.**, Schubert, A.-L., Frischkorn, G. T., Oberauer, K. (2025). Cognitive models of decision-making with identifiable parameters: Diffusion Decision Models with within-trial noise. *Journal of Mathematical Psychology*, *125*, 102917. doi: 10.1016/j.jmp.2025.102917
- Feng, M. & **Nunez, M. D.** (2025) Can working memory be explained by predictive coding? *PsyArXiv*. doi: 10.31234/osf.io/5zbc6_v2
- **Nunez, M. D.**, Fernandez, K., Srinivasan, R., & Vandekerckhove, J. (2024). A tutorial on fitting joint models of M/EEG and behavior to understand cognition. *Behavior Research Methods*. doi: 10.3758/s13428-023-02331-x
- Vo, K., Sun, Q. J., **Nunez, M. D.**, Vandekerckhove, J., & Srinivasan, R. (2024). Deep latent variable joint cognitive modeling of neural signals and human behavior. *NeuroImage*. doi: 10.1016/j.neuroimage.2024.120559
- Alanis, J. C. G., **Nunez, M. D.**, Wehrheim, M. H., Fiebach, C., Löffler, C., & Schubert, A. L. (2023). The Devil's in the Variability: A Multidimensional Analysis of EEG Signal Dynamics and Their Relation to Behaviour. *PsyArXiv*. doi: 10.31234/osf.io/4ug3y
- *Ghaderi-Kangavari, A., Rad, J. A., **Nunez, M. D.** (2023). A general integrative neurocognitive modeling framework to jointly describe EEG and decision-making on single trials. *Computational Brain & Behavior*, 6, 317–376. doi: 10.1007/s42113-023-00167-4 *Computational Brain & Behavior Outstanding Paper Award in 2026

- Ghaderi-Kangavari, A., Parand, K., Ebrahimpour, R., **Nunez, M. D.,** Rad, J. A. (2023). How spatial attention affects the decision process: looking through the lens of Bayesian hierarchical diffusion model & EEG analysis. *Journal of Cognitive Psychology*, 35:4, 456-479. doi: 10.1080/20445911.2023.2187714
- Ghaderi-Kangavari, A., Rad, J. A., Parand, K., **Nunez, M. D.** (2022). Neuro-cognitive models of single-trial EEG measures describe latent effects of spatial attention during perceptual decision making. *Journal of Mathematical Psychology*, *111*, 102725. doi: 10.1016/j.jmp.2022.102725
- **Nunez, M. D.,** Charupanit, K., Sen-Gupta, I., Lopour, B. A., Lin, J. J. (2022). Beyond rates: Time-varying dynamics of high frequency oscillations as a biomarker of the seizure onset zone. *Journal of Neural Engineering.* 19, 016034. doi: 10.1088/1741-2552/ac520f
- Jun, E. J.*, Bautista, A. R.*, **Nunez, M. D.***, Allen, D. C., Tak, J. H., Alvarez, E., Basso, M. A. (2021). Causal role for the primate superior colliculus in the computation of evidence for perceptual decisions. *Nature Neuroscience*, 24, 1121–1131. doi: 10.1038/s41593-021-00878-6 *Contributed Equally
- Lui, K. K., **Nunez, M. D.**, Cassidy, J. M., Vandekerckhove, J., Cramer, S. C., & Srinivasan, R. (2021). Timing of readiness potentials reflect a decision-making process in the human brain. *Computational Brain & Behavior*, 4, 264–283 (2021). doi: 10.1007/s42113-020-00097-5
- **Nunez, M. D.**, Gosai, A., Vandekerckhove, J., & Srinivasan, R. (2019). The latency of a visual evoked potential tracks the onset of decision making. *NeuroImage*, *197*, 93-108. doi: 10.1016/j.neuroimage.2019.04.052.
- Nunez, P. L., **Nunez, M. D.**, & Srinivasan, R. (2019). Multi-Scale Neural Sources of EEG: Genuine, Equivalent, and Representative. A Tutorial Review. *Brain Topography*, 32, 193–214. doi: 10.1007/s10548-019-00701-3
- Schubert, A. L., **Nunez, M. D.,** Hagemann, D., & Vandekerckhove, J. (2019). Individual differences in cortical processing speed predict cognitive abilities: A model-based cognitive neuroscience account. *Computational Brain & Behavior*, 2, 64–84. doi: 10.1007/s42113-018-0021-5
- Bridwell, D. A., Cavanagh, J. F., Collins, A. G., **Nunez, M. D.**, Srinivasan, R., Stober, S., & Calhoun, V. D. (2018). Moving Beyond ERP Components: A Selective Review of Approaches to Integrate EEG and Behavior. *Frontiers in Human Neuroscience*, *12*, 106. doi: 10.3389/fnhum.2018.00106
- **Nunez, M. D.**, Vandekerckhove, J., & Srinivasan, R. (2017). How attention influences perceptual decision making: Single-trial EEG correlates of drift-diffusion model parameters. *Journal of Mathematical Psychology.* 76:B, (pp. 117-130), doi: 10.1016/j.jmp.2016.03.003
- **Nunez, M. D.** (2017). *Refining understanding of human decision making by testing integrated neurocognitive models of EEG, choice and reaction time* (Doctoral dissertation, UC Irvine).
- **Nunez, M. D.**, Nunez, P. L., & Srinivasan, R. (2016) Electroencephalography (EEG), neurophysics, experimental methods, and signal processing. In Ombao, H., Linquist, M., Thompson, W. & Aston, J. (Eds.) Handbook of Neuroimaging Data Analysis (pp. 175-197), Chapman & Hall/CRC. Advance online publication. doi: 10.13140/rg.2.2.12706.63687
- **Nunez, M. D.**, Srinivasan, R. & Vandekerckhove, J. (2015). Individual differences in attention influence perceptual decision making. *Frontiers in Psychology.* 8:18. doi: 10.3389/fpsyg.2015.00018

CONFERENCE PUBLICATIONS

- Pinier, C., Stevenson, C.E., **Nunez, M. D.** (2025) Moderate evidence for large language models reflecting human neurocognition during abstract reasoning. Conference on Cognitive Computational Neuroscience. University of Amsterdam, The Netherlands. August 2025.
- Pinier, C., Stevenson, C.E., **Nunez, M. D.** (2024) Are LLMs tools to understand human neurocognition during abstract reasoning? Conference on Cognitive Computational Neuroscience. Boston, Massachusetts. September 2024.
- Sun, Q. J., Vo, K., Lui, K., **Nunez, M. D.**, Vandekerckhove, J., & Srinivasan, R. (2022) Decision SincNet: Neurocognitive models of decision making that predict cognitive processes from neural signals. International Joint Conference on Neural Networks (IJCNN) Proceedings 2022. doi: 10.48550/arXiv.2208.02845
- **Nunez, M. D.**, Gosai, A., Vandekerckhove, J. & Srinivasan, R. (2017). EEG measures of neural processing speed reflect human visual encoding time. Conference on Cognitive Computational Neuroscience. New York, New York. September 2017.
- Charupanit, K., **Nunez, M. D.**, Bernardo, D., Bebin, E. M., Krueger, D. Northrup, H., Sahin, M., Wu, J. Y., & Lopour, B. A. (2018). Automated Detection of High Frequency Oscillations in Human Scalp Electroencephalogram. International Conference of the IEEE Engineering in Medicine and Biological Society. Honolulu, Hawaii. pp. 3116-3119, doi: 10.1109/EMBC.2018.8513033.

SELECTED CONFERENCE PRESENTATIONS

- **Nunez, M.D.** Krijgsman, B. The costs and benefits of different neurocognitive modeling structures that use single-trial EEG measures. Presented at the Society for Mathematical Psychology in the symposium *Neurocognitive Joint Models: Foundations and Applications*. The Ohio State University, Columbus, Ohio, USA July 2025.
- **Nunez, M.D.** Exploration and exploitation in (model-based) cognitive neuroscience. Presented at the Society for

Mathematical Psychology in the symposium *Exploitation/Exploration: Where is the balance?*. The Ohio State University, Columbus, Ohio, USA July 2025.

- **Nunez, M.D.** Using simulation-based Bayesian inference to explore the unidentified spaces of (neuro-)cognitive models. Presented at the Society for Mathematical Psychology in the symposium *Deep Learning and Simulation-Based Inference for Computational Cognitive Modeling*. Tilburg University, Netherlands July 2024.
- **Nunez, M.D.** Capturing noise in single-trial ERP analysis using simple decompositions and neurocognitive modeling, May 2024. Keynote at the EEG methods seminar at Ghent University, Belgium.
- Steeghs-Turchina, M., Nunez, P. L., Srinivasan, R., & **Nunez, M.D.** Modeling EEG with axon delay times to analyze individual differences in cognition. Presented at the Virtual Meeting of the Society for Mathematical Psychology, June 2024.
- Pinier, C., Stevenson, C.E., **Nunez, M. D.** Bridging human cognition and AI: A study on analogical reasoning via EEG and deep neural networks. Presented at the Virtual Meeting of the Society for Mathematical Psychology, June 2024.
- **Nunez, M.D.** Pinier, C., Ghaderi-Kangavari, A. When does evidence accumulation begin after a visual stimulus? Evidence from neurocognitive modeling of EEG and behavior. Presented at the Society for Mathematical Psychology in the symposium *Investigating Within-Trial Timing of Cognitive Processes with EEG*. University of Amsterdam, Netherlands July 2023.
- Ghaderi-Kangavari, A., Rad, J. A., **Nunez, M. D.** Integrative neurocognitive approaches to understanding cognition through simultaneous analysis of EEG and behavioral data on single trials. Presented at the Society for Mathematical Psychology in the symposium *Deep Learning for Cognitive Modeling*. University of Amsterdam, Netherlands July 2023.
- **Nunez, M.D.** Developing neurocognitive models of joint EEG and behavioural data during perceptual decision-making. Presented at the Virtual Neuromatch 4.0 Conference, November 2021.

SELECTED CONFERENCE POSTERS

- Krijgsman, B., Steeghs-Turchina, M., & **Nunez, M. D**. Which model better predicts brain-behavior relationships during decision-making? A simulation-based comparison of single-trial directed and integrative drift-diffusion models. Presenting at the Cognitive Computational Neuroscience (CCN) conference, New York, USA August 2026.
- **Nunez, M. D.**, Schubert, A.-L., Frischkorn, G. T., Oberauer, K. Using additional data types to identify the unidentifiable components of cognition during decision-making. Presented at the Cognitive Science Society, Rotterdam, Netherlands, July 2024.
- Pinier, C., **Nunez, M. D.** Exploration of a potential relationship between the N200 peak-latency and visual encoding time. Presented at the Meeting of the European Mathematical Psychology Group 2022 in Trento, Italy.
- **Nunez, M. D.,** Tisby, M. K., Lui, K. K., Vandekerckhove, J., Srinivasan, R. A macro-level perspective on evidence accumulation during decision making. Presented at the Society for Neuroscience Global Connectome Virtual Event, January 2021.
- **Nunez, M. D.**, Charupanit, K., Lin, J. J., Lopour, B. A. Temporal dynamics of high frequency oscillations at slow and fast time scales in patients with epilepsy. Presented at the American Epilepsy Society. New Orleans, LA, December 2018.
- **Nunez, M. D.,** Scambray, K. A., Lui, K. K., Vandekerckhove, J., Srinivasan, R. The time course of brain signals reflect different cognitive processes during human decision making. Presented at the Society for Neuroscience. San Diego, CA, November 2018.
- **Nunez, M. D.,** Vandekerckhove, J., Srinivasan, R. The cognitive chronometry of rapid human decision making. Presented at the Society for Neuroscience. Washington, DC, November 2017.

FUNDED GRANT PROPOSALS

- *University of Amsterdam Starting Grant 2023 "Extending AI models of abstract reasoning to jointly understand human brain, cognition, and behavior"* (€300,000 EUR). I wrote this grant with Claire E. Stevenson and Dora Matzke.
- *NWO SGW Open Competitie 2021 "Cascading transitions in multistable perception and cognition"* (€285,000 EUR). I wrote this grant proposal with Han van der Maas (project lead), Raoul Grasman, and Simon van Gaal.
- *NSF Methodology, Measurement, and Statistics Proposal 2051186 "Exploratory and confirmatory neurocognitive modeling with latent variables"* ($345,000 USD) I wrote this grant proposal along with Joachim Vandekerckhove and Ramesh Srinivasan based on a new modeling framework and preliminary results.
- *NSF Cognitive Neuroscience Proposal 1850849 "Critical tests of neurocognitive relationships"* ($675,000 USD) I wrote this grant proposal along with Joachim Vandekerckhove and Ramesh Srinivasan based on my work on the previous grant.
- *NSF Cognitive Neuroscience Proposal 1658303 "Estimation of unidentified cognitive models with physiological data"* ($337,000 USD) I wrote this grant along with Joachim Vandekerckhove and Ramesh Srinivasan based on my PhD materials.

DATASETS

- Pinier, C., Vargas, S. A., Steeghs-Turchina, M., Matzke, D., Stevenson, C. E., & **Nunez, M. D.** (2025) Large Language Models Show Signs of Alignment with Human Neurocognition During Abstract Reasoning. *Figshare*. doi:

10.21942/uva.29573534
- Vo, K., Sun, Q. J., **Nunez, M. D.**, Vandekerckhove, J., & Srinivasan, R. (2024). Neural signals and human behavior - encodingN200. *Zenodo*. doi: 10.5281/zenodo.8381751

SELECTED SOFTWARE
- **https://github.com/mdnunez/pyhddmjags -** Python repository for example Hierarchical Drift Diffusion Model (HDDM) code using JAGS and Stan

TEACHING / PEDAGOGY
Teaching Certification: Netherlands University Teaching Qualification (BKO)
- ***Programming in Psychological Science*** **(UvA), Jan-Feb 2022-2024, 2026; Sep-Oct 2026:** I teach Psychology Research Master's students introductory programming in both R and Python. Some (older) materials are available here: https://github.com/mdnunez/PIPS_course
- ***Research Design & Statistics / Statistical Methods in Brain & Cognitive Sciences*** **(UvA), Nov-Dec 2021-2026:** I teach Brain & Cognition Master's students to conduct statistical inference and analyze data in R and JASP.
- ***Behavioural Research Toolbox / Simulation Models, Methods & Statistics*** **(UvA), Sep-Oct 2021-2026**: I teach students in this undergraduate course to simulate from statistical distributions and models in Python and R, as well as conduct statistical analysis and build experiments
- ***Model-based Neuroscience Summer School,*** **Summers 2022-2026:** I teach sessions to mainly PhD students / Postdocs on the topic of joint models of EEG and behavior.
- **Unlocking New Horizons in Cognitive Modeling with Simulation-Based Inference (Summer School):** Tutorial with examples of simulation-based inference to estimate joint models of EEG and behavior
- ***Statistics 2*** **(UvA), March 2025:** I taught Psychology Research Master's students advanced topics in high dimensional statistics, such as Principal Component Analysis, penalized regression, and network modeling.
- ***Summer School on Computational and Mathematical Modeling of Cognition*****, July 2022 & August 2024:** I mentored PhD students on their own computational modeling projects. I also taught sessions on Python programming, Bayesian statistics, and joint models of EEG and behavior.
- ***Bayesian Statistics (UvA)*****, June 2022:** I co-taught a theoretical basis and principles of Bayesian Statistical analysis to approximately 70 undergraduates.
- ***Neuromatch Academy Project Mentor*****, Summer 2021:** I advised 5 PhD students from various backgrounds on a project to use High Frequency Oscillations (HFOs) in the Fusiform Face Area using ECoG/iEEG data to predict face perception.
- ***History of Neuroscience*** **(UCI), Fall 2016:** I answered student questions, graded quizzes and exams.
- ***Probability and Statistics III in MATLAB*** **(UCI), Spring 2015:** I held discussion sections and office hours and taught students statistical algorithms and topics such as bootstrapping.
- ***Introductory Statistics*** **(UCI), Falls of 2012 and 2014:** I taught lab and discussion sections as well as met with students individually and in group review sessions.
- ***Experimental Methods*** **(UCI), Winter 2012, Spring 2013, Winter 2013:** I was responsible for lab and discussion sections as well as helping students with their writing and research projects.

WORKSHOPS
- Bayesian cognitive modeling using the R-package brms - Given for the European Society for Cognitive Psychology 2022

COMMITTEE MEMBERSHIPS & ORGANIZATION ROLES
- UvA Psychology Scientific Advisory Board (active)
- UvA Psychological Methods Group Organizational Committee (active)
- UvA Psychology Research Master's Thesis Committee (active)
- UvA Psychology Diversity and Inclusivity Committee (former chair, inactive)
- Society for Mathematical Psychology 2023 Conference Chair

EDITORIAL DUTIES
- Consulting Editor for Behavior Research Methods
- Consulting Editor for Individual Differences in Cognition

GROUP MEMBERSHIPS
- Mathematical Cognitive Neuroscience Laboratory
- Amsterdam Mathematical Psychology Laboratory
- Amsterdam Brain and Cognition