Pedro HERRERO VIDAL

pmh314@nyu.edu · pedroherrerovidal.github.io · pedroherrerovidal · pedroherrerovidal

PhD qualified scientist engineering and implementing machine learning methods to understand neural computation and develop brain-inspired technology. Highly experienced at handling big data sets, extracting meaningful information and promoting data-driven decisions. Open to **full-time** positions in tech after graduation.

EDUCATION

Ph.D. Neural Science at **New York University** — expected Jan 2023
with specialization in Systems, Cognition, and Computation

M.S. Biology at **New York University** — 2017
with specialization in Bioinformatics and Systems Biology

M.S. Condensed Matter Physics and Systems Biology at **Autonomous University of Madrid** — 2015
with specialization in Biophysics

B.S. Biochemistry at **Autonomous University of Madrid** — 2014

RESEARCH EXPERIENCE

Ph.D. researcher at the **Center for Neural Science NYU, USA** — 2017-present
Supervisors: Cristina Savin and Dmitry Rinberg

Graduate research assistant at the **Center for Neural Science NYU, USA** — 2015-2017
Supervisor: Eric Klann

Research technician at **Pharmactive Biotech Products, Spain** — 2017

Graduate research assistant at the **Cajal Institute CSIC, Spain** — 2014-2015
Supervisor: Liset Menendez de la Prida

Research officer at the **Genome Institute of Singapore A*STAR, Singapore** — 2013
Supervisor: Jianjun Liu

Undergraduate research assistant at the **CBMSO UAM-CSIC, Spain** — 2012-2014
Supervisor: Beatriz Cubelos

TEACHING

Deep Learning graduate course grader at Center for Data Science NYU — Spring 2020
Professors: Yann LeCun and Alfredo Canziani

Brain and Behavior undergraduate course teaching assistant at Center for Neural Science NYU — Fall 2018
Professor: Andre Fenton

RELEVANT PROJECTS

Brain-machine interface for robust chemical detection (published in ***NeurIPS 2021*** and ***Biosensors and Bioelectronics***)

- Designed a processing and analysis pipeline to extract odor information from large datasets of neural activity
- Implemented ML algorithms to predict concentration and classify odor identity from low dimensional temporal dynamics; neural decoding matched trained-animal performance and could be used for industrial applications
- Engineered probabilistic across-animals decoding method for increased performance, reducing data demands five-folds

Semi-supervised Deep Learning strategy for image classification

- Implemented two deep learning based semi-supervised learning methods for image classification: using convolutional auto-encoders and a variation of the mean teacher algorithm
- Improved image classification accuracy by 20% using unlabeled images
- Performance and generalization results were awarded the 3rd place winner Semi-supervised learning competition

Large-scale transcriptomics data analysis to understand multiple sclerosis treatments

- Developed a preprocessing, analysis and visualization routines to extract differentially expressed genes in human samples before and after treatments
- Identified 260 genes as potential targets for multiple sclerosis treatment

SKILLS

Python (*numpy, TensorFlow, PyTorch, pandas, scikit-learn*), Git, Matlab, R, SQL, Shell, Unix, Linux

GitHub, MS Office (advanced Excel), Tableau, mySQL

English (Proficient), Spanish (Native), Italian (Basic)

Updated Oct. 2021

ADDITIONAL EDUCATION

- Machine Learning Summer School, Stellenbosch, South Africa — 2019
- Deep Learning Specialization, Coursera — 2018
- Introduction to Discrete Mathematics for Computer Science Specialization, Coursera — 2018
- Machine Learning, Coursera — 2017

AWARDS

- Mightex Research Awards' honorable mention, Mightex — 2021
- 3rd place winner Semi-supervised learning competition, NYU — 2019
- NYU Training Program in Computational Neuroscience Fellowship, NIH — 2018
- MacCracken Fellowship for Doctoral studies, NYU — 2018
- 3rd place winner 19th MS poster session, NYU — 2017
- Dean's student travel grant, NYU — 2017
- General grant for graduate University studies, MECD Spain — 2016
- U.A.M.'s financial support for master's studies, UAM — 2014
- Fellowship for graduate studies in North America, 'la Caixa' Foundation — 2014
- MECD Internship Award, MECD Spain — 2014
- Singapore International Pre-Graduate Award, A STAR — 2013
- Language exchange Internship, MECD Spain — 2013
- General grant for undergraduate University studies, MECD Spain — 2012-2014

PUBLICATIONS AND MANUSCRIPTS

1. **P. Herrero-Vidal**, D. Rinberg, C. Savin **(2021)** Across-animal odor decoding by probabilistic manifold alignment. *35th conference on Neural Information Processing Systems* (***NeurIPS*** *2021, spotlight <3% acceptance)*.
2. E. Shor*, **P. Herrero-Vidal***, A. Dewan, I. Uguz, V. Curto, G. Malliaras, C. Savin, T. Bozza, D. Rinberg **(2021)** Sensitive and robust chemical detection using an olfactory brain-computer interface. ***Biosensors and Bioelectronics***.
3. P. Shrestha, Z. Shan, M. Marmarcz, K. Ruiz, A. Zerihoun, C. Juan, **P. Herrero-Vidal**, J. Pelletier, N. Heintz, E. Klann **(2020)** De novo protein synthesis in distinct centrolateral amygdala interneurons is required for associative emotional memories. ***Nature***.
4. P. Shrestha, P. Ayata, **P. Herrero-Vidal**, F. Longo, A. Gastone, J. LeDoux, N. Heintz, E. Klann **(2020)** Cell-type-specific drug-inducible protein synthesis inhibition demonstrates that memory consolidation requires rapid neuronal translation. ***Nature Neuroscience***.
5. S. Gutierrez-Erlandsson*, **P. Herrero-Vidal***, M. Fernandez-Alfara, S. Hernandez-Garcia, S. Gonzalo-Flores, A. Mudarra-Rubio, M. Fresno, B. Cubelos **(2013)** R-RAS2 overexpression in tumors of the human central nervous system. ***Molecular Cancer***.

TALKS

1. **P. Herrero-Vidal (2021)** Linking piriform cortex activity to odor perception in the mouse. *Neuroscience Institute Group Meeting*, New York University, virtual meeting.
2. **P. Herrero-Vidal (2020)** A Brain-Computer Interface for robust and efficient chemical detection. *CogSys X-Mas workshop*, Technical University of Denmark - DTU, virtual meeting.
3. **P. Herrero-Vidal**, E. Chong, C. Savin, D. Rinberg **(2020)** Encoding of behaviorally relevant synthetic odor objects in the piriform cortex of the mouse. *International Symposium on Olfaction and Taste 2020*, Virtual meeting.
4. **P. Herrero-Vidal (2020)** Encoding and decoding of odor objects in the piriform cortex. *Computational Neuroscience Symposium*, New York University, NY.
5. **P. Herrero-Vidal (2020)** Decoding of chemical information from populations of olfactory neurons. *Neural Engineering Research Venture (NERV)*, Stellenbosch University, South Africa.
6. **P. Herrero-Vidal (2018)** Reliable chemical decoding from the olfactory bulb of the mouse. *First Year Talks*, New York University, NY.

CONFERENCE PRESENTATIONS

1. **P. Herrero-Vidal**, E. Chong, C. Savin, D. Rinberg **(2021)** Linking piriform cortex activity to odor perception in the mouse. *Cognitive and Systems Neuroscience conference (COSYNE 2021)*, virtual meeting.
2. **P. Herrero-Vidal**, E. Shor, D. Rinberg, C. Savin **(2020)** Efficient odor identification across animals by transfer learning. *Bernstein Conference 2020 online*
3. **P. Herrero-Vidal**, E. Shor, D. Rinberg, C. Savin **(2020)** Transfer Learning algorithm for bio-electronic nose stimulus identification across animals. *Interntional Conference on Mathematical Neuroscience*, digital.
4. **P. Herrero-Vidal**, E. Shor, C. Savin, D. Rinberg **(2019)** Reliable chemical decoding from the olfactory system of the mouse. *Machine Learning Summer School 2019,* Stellenbosch, South Africa.
5. P. Shrestha, Z. Shan, M. Marmarcz, A. Zerihoun, C. Juan, K. Ruiz, **P. Herrero-Vidal**, N. Heintz, J. Pelletier, E. Klann **(2019)** A protein synthesis code for differential threat memory trace in central amygdala interneurons. *Society for Neuroscience*, Chicago, IL.
6. P. Shrestha, P. Ayata, **P. Herrero-Vidal**, A. Gastone, N. Heintz, E. Klann. Chemogenetic evidence for the protein synthesis requirement during memory consolidation **(2018)**. *Society for Neuroscience*, Washington, D.C.
7. P. Shrestha, P. Ayata, **P. Herrero-Vidal**, A. Gastone, F. Longo, N. Heintz, E. Klann **(2017)**. *Chemogenetic interrogation of cell type specific translation in fear memories. Society for Neuroscience*, Washington, D.C.
8. P. Shrestha, **P. Herrero-Vidal**, E. Jones, E. Klann **(2017)**. Manipulations of Tsc2 in Oxytocin receptor expressing neurons causes sex-specific aberrations in social behavior. *2017 International Research Conference on TSC and LAM*, Washington, D.C.
9. **P. Herrero-Vidal**, P. Shrestha, P. Ayata, A. Gastone, N. Heintz, E. Klann **(2016)** Inducible protein synthesis inhibition in the amygdala. *Society for Neuroscience*; and *15th Molecular and Cellular Cognition Society*, San Diego.