

Fernando Moreno-Pino, PhD

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POSITIONS

- Oxford-Man Institute of Quantitative, University of Oxford Oxford, UK
Aug. 2023 - Present
 - Postdoctoral Researcher
 - **Summary:** My research lies at the intersection of Deep Learning, Probabilistic Machine Learning, and Quantitative Finance. I have led multiple first-author research projects on Machine Learning methods for time-series modeling and their application in quantitative finance, publishing in top venues in both fields. Additionally, I have led the OMI's research lab on Machine Learning.
 - **(Some) current projects:** Rough paths theory for efficient Transformers for very long time-series, spectral robust contrastive learning for noisy time-series, and survival analysis of limit orders in the LOB.
 - Mathematical Institute, University of Oxford Oxford, UK
Aug. 2023 - Present
 - Teaching Assistant
 - **Summary:** Teaching the Deep Learning course at the MSc in Mathematical and Computational Finance, University of Oxford.
 - Universidad Carlos III de Madrid Madrid, Spain
Sep. 2018 - July 2023
 - Research & Teaching Associate, Signal Processing and Learning Group
 - **Supervisor:** Prof. Dr. Antonio Artés Rodríguez.
 - **Summary:** I collaborated with Universidad Carlos III de Madrid in teaching and research activities.
 - Oxford-Man Institute of Quantitative Finance, University of Oxford Oxford, UK
May 2022 - Oct. 2022
 - Visiting Researcher. Founded by MAN Group
 - **Supervisor:** Dr. Stefan Zohren.
 - **Summary:** Studying and developing of novel neural-based methods for the problems of assets' volatility forecasting and estimation of fill probabilities in Limit Order Books.
 - Universidad Carlos III de Madrid Madrid, Spain
Dec. 2017 - Sep. 2018
 - Research Assistant, Signal Processing and Learning Group
 - **Supervisor:** Prof. Dr. Antonio Artés Rodríguez.
 - **Summary:** My work focused on applying Machine Learning techniques for the Human Activity Recognition problem.
 - Universidad de Málaga Málaga, Spain
Jan. 2016 - Sep. 2016
 - Research Assistant, Department of Programming Languages and Computer Science
 - **Supervisor:** Prof. Dr. Pedro Merino Gómez.
 - **Summary:** I worked at the MORSE Research Group during my Bachelor Thesis, focused on developing communication systems software.

EDUCATION

- **Universidad Carlos III de Madrid** Madrid, Spain

• *PhD Candidate in Probabilistic Machine Learning and Deep Learning (Cum Laude).* Sep. 2018 – May. 2023

 - **Dissertation:** “Deep Attentive Time Series Modelling for Quantitative Finance”
 - **Advisors:** Prof. Dr. Antonio Artés Rodríguez and Dr. Pablo Martínez Olmos.
 - **Research:** My research included probabilistic machine learning methods, signal processing techniques integration into deep-learning architectures, the development of DNN methodologies (as Transformer-based models) for time-series modelling and forecasting, and the application of ML techniques to quantitative finance-related problems. Previously, I worked with heterogeneous models in high dimensional data for the problem of Human Activity Recognition.

- **Universidad Carlos III de Madrid** Madrid, Spain
M.Sc. in Telecommunications Engineering Sep. 2016 – Jul. 2018
 - **Universidad de Málaga** Málaga, Spain
B.Sc. in Telecommunications Engineering Sep. 2012 – Jul. 2016
 - **Graduated with Honors:** Best academic record of the class.

PUBLICATIONS

- **Moreno-Pino, F.***, Arroyo, Á.* , Waldon, H.* , Dong, X., Cartea, Á. (2024). Rough Transformers: Lightweight Continuous-Time Sequence Modelling with Path Signatures. In Advances in Neural Information Processing Systems 37 (NeurIPS), 2024.
 - **Moreno-Pino, F.**, Zohren, S. (2022). DeepVol: Volatility Forecasting from High-Frequency Data with Dilated Causal Convolutions. In Quantitative Finance, Taylor & Francis, 2024.
 - **Moreno-Pino, F.***, Arroyo, Á.* , Waldon, H.* , Dong, X., Cartea, Á. (2024). Rough Transformers: Lightweight Continuous-Time Sequence Modelling with Path Signatures. In “Next Generation of Sequence Modeling Architectures” workshop, ICML 2024.
 - **Moreno-Pino, F.***, Arroyo, Á.* , Waldon, H.* , Dong, X., Cartea, Á. (2024). Rough Transformers for Continuous and Efficient Time-Series Modelling. In “Learning from Time Series for Health” workshop, ICLR 2024.
 - **Moreno-Pino, F.**, Olmos, P. M., & Artés-Rodríguez, A. (2023). Deep Autoregressive Models with Spectral Attention. In Pattern Recognition, Elsevier, 2023.
 - Jiménez Rama, Ó., **Moreno-Pino, F.**, Ramírez, D., Olmos, P.M. (2023). Interpretable Spectral Variational AutoEncoder (ISVAE) for time series clustering. arXiv preprint arXiv:2310.11940.
 - Arroyo, Á.* , Cartea, Á., **Moreno-Pino, F.*** & Zohren, S. (2023). Deep Attentive Survival Analysis in Limit Order Books: Estimating Fill Probabilities with Convolutional-Transformers. Presented at Euro Working Group on Commodities and Financial Modelling (EWGCFM) 2023 & in Quantitative Finance, Taylor & Francis, 2023.
 - Martínez-García, M.* , **Moreno-Pino, F.*** , Olmos, P. M., & Artés-Rodríguez, A. (2023). Sleep Activity Recognition and Characterization from Multi-Source Passively Sensed Data. arXiv preprint arXiv:2301.10156.
 - **Moreno-Pino, F.**, Martínez-García, M., Olmos, P. M., & Artés-Rodríguez, A. (2022). Heterogeneous Hidden Markov Models for Sleep Activity Recognition from Multi-Source Passively Sensed Data. Accepted at ML4H 2022, collocated with NeurIPS.
 - **Moreno-Pino, F.**, Sükei, E., Olmos, P. M., & Artés-Rodríguez, A. (2022). PyHHMM: A Python Library for Heterogeneous Hidden Markov Models. arXiv preprint arXiv:2201.06968, submitted to the Journal of Machine Learning Research, Machine Learning Open Source Software section.
 - Ríos-Muñoz, G. R., **Moreno-Pino, F.**, Soto, N., M. Olmos, P. , Artés-Rodríguez, A., Ferández-Avilés, F., & Arenal, A. (2020). Hidden Markov Models for Activity Detection in Atrial Fibrillation Electrograms. In 2020 Computing in Cardiology (pp. 1-4). IEEE.
 - **Moreno-Pino, F.**, Porras-Segovia, A., López-Esteban, P., Artés, A., & Baca-García, E. (2019). Validation of Fitbit Charge 2 and Fitbit Alta HR against polysomnography for assessing sleep in adults with obstructive sleep apnea. Journal of Clinical Sleep Medicine, 15(11), 1645-1653.

* Denotes co-first authors with equal contributions.

OTHERS

- **Moreno-Pino, F.**, Artés-Rodríguez, A. (2019). Human Activity Recognition in Psychiatric Patients through Heterogeneous Hidden Markov Models. Machine Learning Summer School (MLSS), Moscow, Russia (Poster).
- **Moreno-Pino, F.**, Artés-Rodríguez, A. (2018). Sleep Activity Recognition through Hidden Markov Models. Data Science Summer School (DS3), Paris, France (Poster).

TEACHING

- **University of Oxford** Oxford, UK
Teaching Assistant at the MSc in Mathematical and Computational Finance Sep. 2023 – Present
 - **Deep Learning** : 2023 – Present
- **BBVA** Madrid, Spain
Teaching Staff, Associated with Fundación Universidad Carlos III Sep. 2021 – Present
 - **Advanced Machine Learning and Feature Engineering Course**: 2022 – Present
 - **Natural Language Processing (NLP) Course**: 2021 – Present
- **Universidad Carlos III de Madrid** Madrid, Spain
Teaching Assistant (Bachelors in Electrical Engineering & Data Science and Engineering) Sep. 2018 – July 2023
 - **Signals and Systems**: 1st Semester 2023 (30 hours).
 - **Machine Learning II**: 1st Semester 2021 (38 hours).
 - **Bayesian Machine Learning, Modern Theory of Detection and Estimation**: 1st Semester 2018 – 2019 (61 hours).
 - **Communications Theory**: 1st Semester 2018 – 2019, 2023 (102 hours).
 - **Linear Systems**: 1st Semester 2018 (11 hours).

HONOR AND AWARDS

- **FPU Grant (2018-2022)**: My doctoral studies were funded by the Spanish Ministry of Education through competitive selection process (60996,12€).
- **Talentia Scholarship by “Junta de Andalucía” (2017, declined)**: Two years scholarship to complete the Master of Engineering at Cornell University’s New York campus (62092,68€).
- **‘Premios Extraordinarios de Fin de Estudios’ (2016)**: This prize rewards the student with the best academic record, granted by Universidad de Málaga for my Bachelor studies.
- **‘Premios Ingenio’, Finalist (2016)**: These prizes award the best thesis of the year on the field of Telecommunications Engineering, in the Region of Andalusia, Spain.

SUMMER SCHOOLS AND OTHERS

- **AI for Global Goals - University of Oxford** Oxford, United Kingdom
ML x Finance Aug. 2022
- **University of Sheffield** Sheffield, United Kingdom [Online]
The Gaussian Process Summer School Sep. 2021
- **University of Sheffield** Sheffield, United Kingdom [Online]
The Gaussian Process Summer School Sep. 2020
- **Liège Université** Liège, Belgium [Online]
Machine Learning Frontiers in Precision Medicine (MLFPM) Sep. 2020
- **ETH Zürich** Basel, Switzerland
Machine Learning Frontiers in Precision Medicine (MLFPM) Sep. 2019
- **Skoltech** Moscow, Russia
Machine Learning Summer School (MLSS) Aug. 2019 – Sep. 2019
- **École Polytechnique** Paris, France
Data Science Summer School (DS3) Jun. 2018

REVIEWING

- Conference and Workshop on Neural Information Processing Systems (NeurIPS): Since 2024 (Reviewer and workshop proposals reviewer).
- Artificial Intelligence and Statistics (AISTATS): Since 2023.
- Artificial ACM International Conference on AI in Finance (ICAIIF): Since 2023.
- Pattern Recognition: Since 2022.
- AAAI Conference on Artificial Intelligence: Since 2022.
- IEEE Transactions on Neural Networks and Learning Systems: Since 2021.
- Journal of Biomedical and Health Informatics (JBHI): 2020-2023.

COURSES

• University of California, Santa Cruz	Coursera [Online]
<i>Bayesian Statistics: From Concept to Data Analysis, 4 weeks course</i>	Jul. 2021
• DeepLearning.AI	Coursera [Online]
<i>Structuring Machine Learning Projects, 3 weeks course</i>	May 2018
• DeepLearning.AI	Coursera [Online]
<i>Improving DNNs: Hyperparameter Tuning, Regularization and Optimization, 2 weeks course</i>	May 2018
• Universidad Internacional Menéndez Pelayo	Barcelona, Spain
<i>English Immersion Course</i>	Apr. 2018
• DeepLearning.AI	Coursera [Online]
<i>Neural Networks and Deep Learning, 4 weeks course</i>	Mar. 2018
• Stanford University	Coursera [Online]
<i>Machine Learning, 11 weeks course</i>	Feb. 2018
• University of Washington	Coursera [Online]
<i>Machine Learning: Classification, 7 weeks course</i>	Nov. 2017
• University of Washington	Coursera [Online]
<i>Machine Learning: Regression, 6 weeks course</i>	Oct. 2017
• University of Washington	Coursera [Online]
<i>Machine Learning Foundations, 6 weeks course</i>	Jul. 2017
• Nvidia Corporation, CUDA Fellows Program & Universidad de Málaga	Málaga, Spain
<i>Technical Training Course: Parallel Programming of the GPU with CUDA</i>	Jul. 2016 – Aug. 2016

LANGUAGES

- Spanish: Native language.
- English: Advanced, TOEFL:102/120.
- French: Basic.

PROJECTS

- **Heterogeneous Hidden Markov Model:** Python implementation of a HMM model capable of managing heterogeneous and missing data: <https://github.com/fmorenopino/HeterogeneousHMM>, <https://pyhhmm.readthedocs.io/>.
- **VoIP calls:** C implementation of a Voice over IP calls' service (point-to-point audio conference). RTP over UDP was used: https://github.com/fmorenopino/c_calls.

PROGRAMMING SKILLS

- **Languages:** Python, Matlab, C, C++
- **Technologies:** Pytorch, Keras, Sklearn, Jupyter, Git, LATEX

REFEREES

- Dr. Álvaro Cartea, University of Oxford, UK.
- Dr. Stefan Zohren, University of Oxford, UK.
- Dr. Antonio Artés Rodríguez, Universidad Carlos III de Madrid, Spain.
- Dr. Pablo Martínez Olmos, Universidad Carlos III de Madrid, Spain.